

Dr. 11A-BK. 6A

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Dr. 11A-BK. 6A, Dr. 11A-BK. 6A
OFFICE OF
RAMSEY COUNTY ENGR.

CONSTRUCTION NOTES
SNELLING AVE.

6A
FIELD BOOK
960 A

32-M5

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.

"Copyright, 1895, by Keuffel & Esser Co."

	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

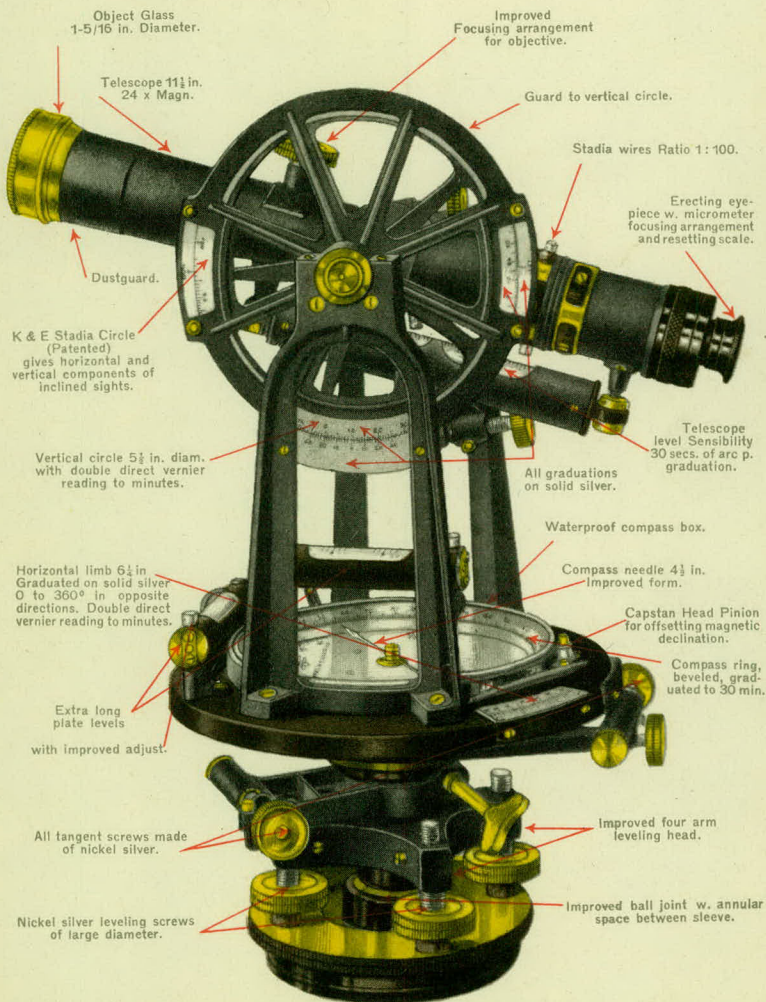
Calculated by Julien A. Hall, M. Am. Soc. C. E.

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

EXTRA FINE ENGINEERS' TRANSIT

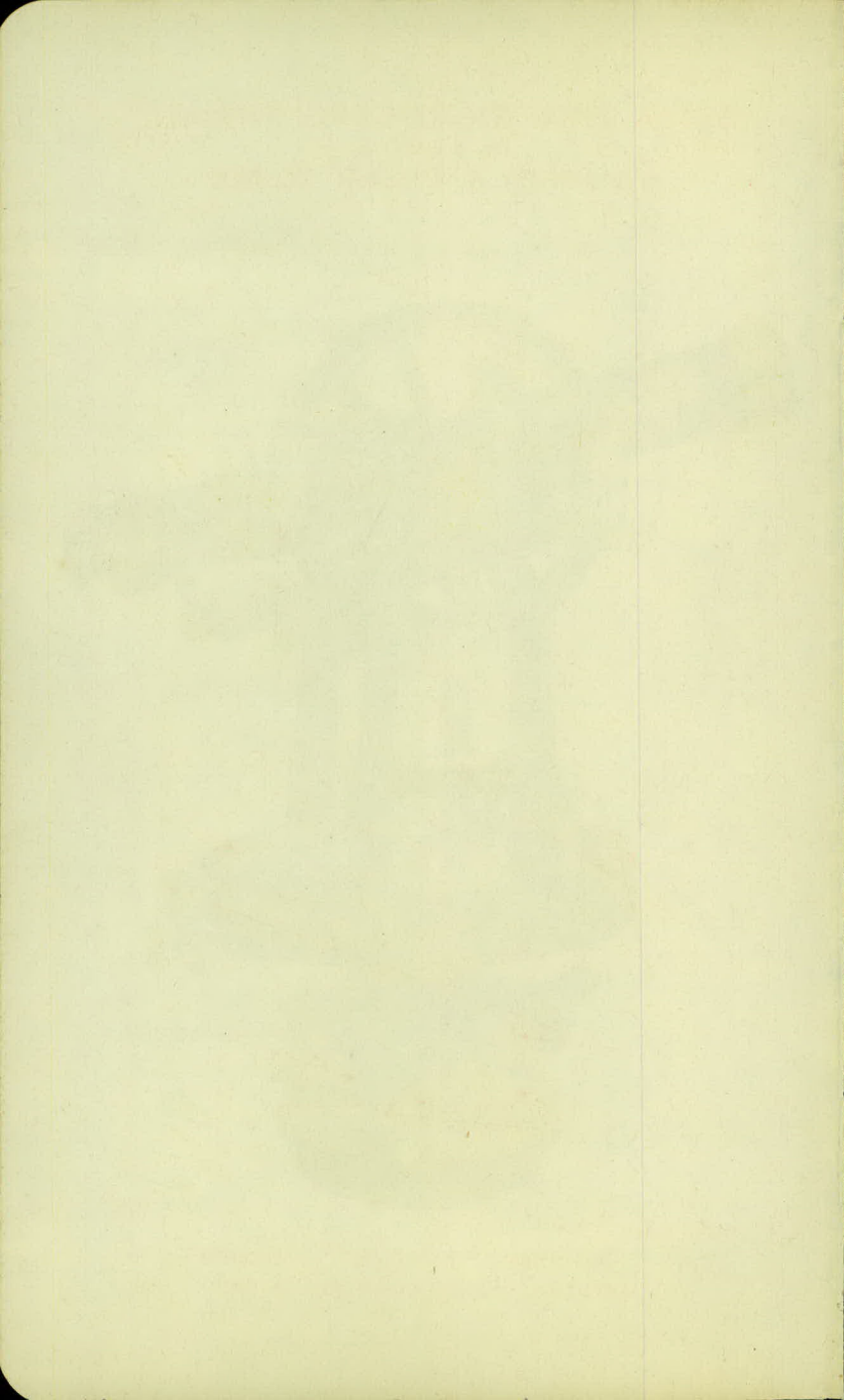
No. 5060 S

KEUFFEL & ESSER CO., N.Y.



ALSO MADE WITH

INTERNAL FOCUSING TELESCOPE
PRACTICALLY DUST AND MOISTURE PROOF.



Guard Rail 23' Cable to Cable

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52+56⁶⁹ Mont.

49+72⁷⁶ P.O.T.

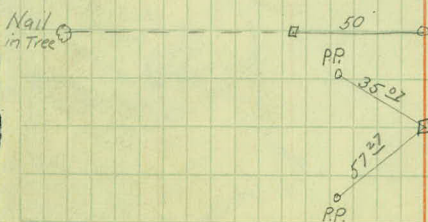
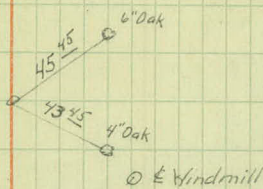
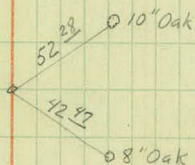
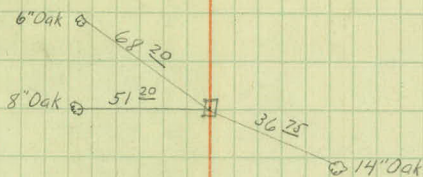
45+43⁴⁵ P.O.T.

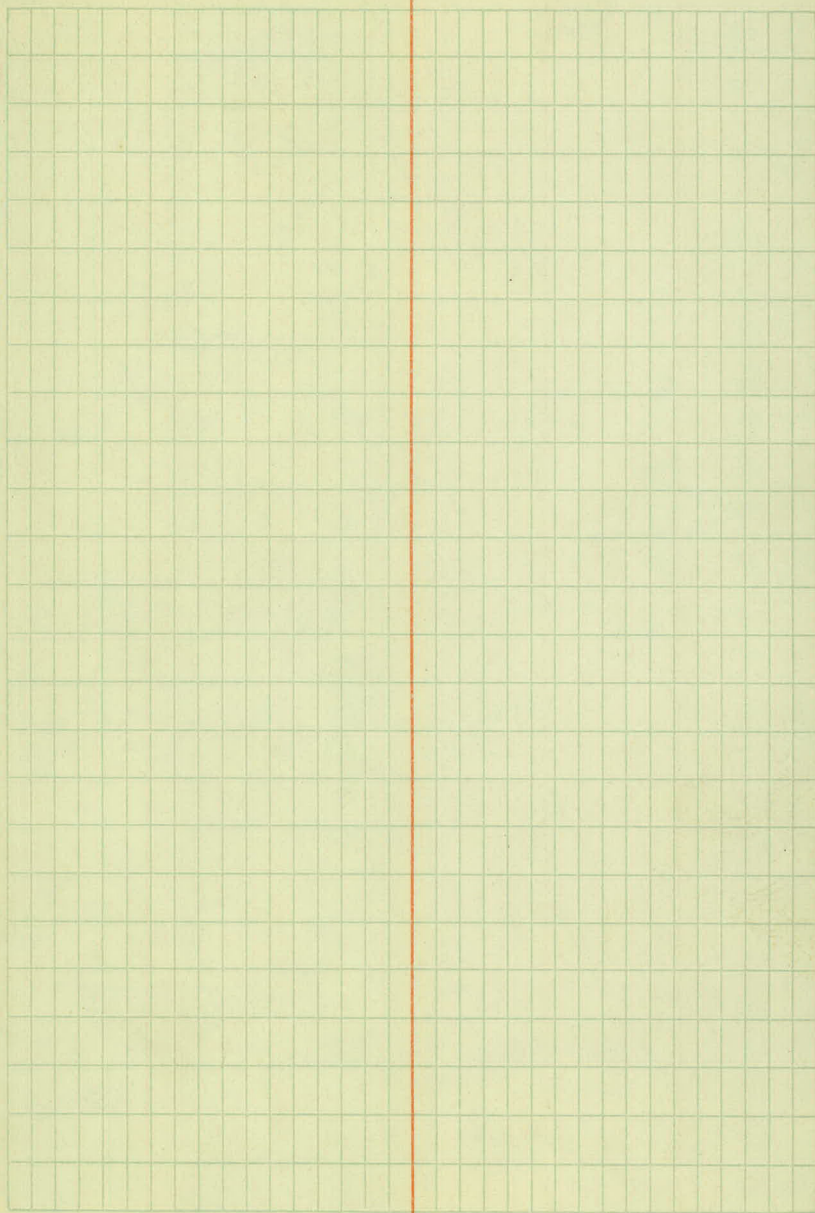
26+21⁴⁴ P.I. 0°18' Lt.

11+70⁴³ P.O.T.

8+57⁶⁵ P.O.T.

0+00 ϕ Co. Rd. G





Sta.	+	H.I. / -	Elev.	G.R.
B.M.	5.92	954.11	948.19	
0+00	Co. Rd. "G."		947.6	6.5 -
+13			47.7	6.4 -
+19			47.8	6.3 -
+50			48.2	5.9 -
1			48.8	5.3 -
+50			49.5	4.6 -
2			50.5	3.6 -
+50			51.7	2.4 -
3			53.1	1.0 -
+50			54.8	+0.7 -
T.P.	9.33	960.89	951.56	
4			56.7	4.2 -

Spk. in P.P. N.E. Cor. Snelling & 'G'

$$\begin{array}{r} 7.6 \\ 50 \end{array} \quad \begin{array}{r} 6.9 \\ 25 \end{array} \quad \begin{array}{r} 6.5 \\ 6.1 \end{array} \quad \begin{array}{r} 5.3 \\ 25 \end{array} \quad \begin{array}{r} 4.4 \\ 50 \end{array}$$

$$\begin{array}{r} 7.6 \\ 50 \end{array} \quad \begin{array}{r} 7.2 \\ 25 \end{array} \quad \begin{array}{r} 6.4 \\ 6.1 \end{array} \quad \begin{array}{r} 5.4 \\ 25 \end{array} \quad \begin{array}{r} 4.5 \\ 50 \end{array}$$

$$\begin{array}{r} 10.3 \\ 50 \end{array} \quad \begin{array}{r} 7.6 \\ 40 \end{array} \quad \begin{array}{r} 6.3 \\ 6.2 \end{array} \quad \begin{array}{r} 5.5 \\ 19 \end{array} \quad \begin{array}{r} 5.2 \\ 50 \end{array} \quad \begin{array}{r} 8.2 \\ 70 \end{array}$$

$$\begin{array}{r} F5.5 \\ 31 \end{array} \quad \begin{array}{r} 12.0 \\ 40 \end{array} \quad \begin{array}{r} 11.4 \\ 31 \end{array} \quad \begin{array}{r} 10.7 \\ 21 \end{array} \quad \begin{array}{r} 7.0 \\ 13 \end{array} \quad \begin{array}{r} 6.4 \\ -0.5 \end{array} \quad \begin{array}{r} 6.0 \\ 14 \end{array} \quad \begin{array}{r} 7.0 \\ 21 \end{array} \quad \begin{array}{r} 10.4 \\ 29 \end{array} \quad \begin{array}{r} 10.4 \\ 40 \end{array} \quad \begin{array}{r} F4.5 \\ 29 \end{array}$$

$$\begin{array}{r} F4.1 \\ 21.2 \end{array} \quad \begin{array}{r} 11.0 \\ 40 \end{array} \quad \begin{array}{r} 9.4 \\ 21.2 \end{array} \quad \begin{array}{r} 8.6 \\ 15 \end{array} \quad \begin{array}{r} 7.3 \\ 12 \end{array} \quad \begin{array}{r} 6.5 \\ 7 \end{array} \quad \begin{array}{r} 6.0 \\ -0.7 \end{array} \quad \begin{array}{r} 6.6 \\ 13 \end{array} \quad \begin{array}{r} 9.2 \\ 16 \end{array} \quad \begin{array}{r} 9.4 \\ 21.2 \end{array} \quad \begin{array}{r} 7.2 \\ 27 \end{array} \quad \begin{array}{r} 7.0 \\ 28.8 \end{array} \quad \begin{array}{r} 6.0 \\ 40 \end{array} \quad \begin{array}{r} F4.1 \\ 21.2 \end{array} \quad \begin{array}{r} 28.2.4 \\ 28.8 \end{array}$$

$$\begin{array}{r} F2.7 \\ 18.4 \end{array} \quad \begin{array}{r} 8.5 \\ 33 \end{array} \quad \begin{array}{r} 7.3 \\ 18.4 \end{array} \quad \begin{array}{r} 7.0 \\ 15 \end{array} \quad \begin{array}{r} 7.5 \\ 11 \end{array} \quad \begin{array}{r} 5.9 \\ 7 \end{array} \quad \begin{array}{r} 5.3 \\ -0.7 \end{array} \quad \begin{array}{r} 5.6 \\ 12 \end{array} \quad \begin{array}{r} 8.4 \\ 18 \end{array} \quad \begin{array}{r} 8.3 \\ 20.4 \end{array} \quad \begin{array}{r} 5.2 \\ 26 \end{array} \quad \begin{array}{r} 5.0 \\ 29.4 \end{array} \quad \begin{array}{r} 4.8 \\ 33 \end{array} \quad \begin{array}{r} F3.7 \\ 20.4 \end{array} \quad \begin{array}{r} 28.33 \\ 29.4 \end{array}$$

$$\begin{array}{r} F2.6 \\ 18.2 \end{array} \quad \begin{array}{r} 7.1 \\ 33 \end{array} \quad \begin{array}{r} 6.2 \\ 18.2 \end{array} \quad \begin{array}{r} 5.6 \\ 14 \end{array} \quad \begin{array}{r} 6.3 \\ 11 \end{array} \quad \begin{array}{r} 5.0 \\ 8 \end{array} \quad \begin{array}{r} 4.4 \\ -0.8 \end{array} \quad \begin{array}{r} 4.4 \\ 9 \end{array} \quad \begin{array}{r} 5.1 \\ 12 \end{array} \quad \begin{array}{r} 7.4 \\ 16 \end{array} \quad \begin{array}{r} 7.4 \\ 20.6 \end{array} \quad \begin{array}{r} 6.0 \\ 24 \end{array} \quad \begin{array}{r} 6.0 \\ 26.7 \end{array} \quad \begin{array}{r} 6.0 \\ 33 \end{array} \quad \begin{array}{r} F3.8 \\ 20.6 \end{array} \quad \begin{array}{r} 28.1.4 \\ 26.7 \end{array}$$

$$\begin{array}{r} DCO.9 \\ 22.4 \end{array} \quad \begin{array}{r} 3.6 \\ 33 \end{array} \quad \begin{array}{r} 3.5 \\ 22.4 \end{array} \quad \begin{array}{r} 3.8 \\ 13 \end{array} \quad \begin{array}{r} 4.7 \\ 11 \end{array} \quad \begin{array}{r} 3.5 \\ 9 \end{array} \quad \begin{array}{r} 3.0 \\ -0.6 \end{array} \quad \begin{array}{r} 3.0 \\ 8 \end{array} \quad \begin{array}{r} 3.5 \\ 10 \end{array} \quad \begin{array}{r} 7.3 \\ 17 \end{array} \quad \begin{array}{r} 7.4 \\ 19 \end{array} \quad \begin{array}{r} 6.6 \\ 21.4 \end{array} \quad \begin{array}{r} 6.0 \\ 23 \end{array} \quad \begin{array}{r} 6.0 \\ 26.3 \end{array} \quad \begin{array}{r} 6.0 \\ 33 \end{array} \quad \begin{array}{r} F4.2 \\ 21.4 \end{array} \quad \begin{array}{r} DCO.6 \\ 26.3 \end{array}$$

$$\begin{array}{r} F3.0 \\ 19 \end{array} \quad \begin{array}{r} 4.2 \\ 33 \end{array} \quad \begin{array}{r} 4.0 \\ 19 \end{array} \quad \begin{array}{r} 3.5 \\ 11 \end{array} \quad \begin{array}{r} 2.4 \\ 9 \end{array} \quad \begin{array}{r} 1.8 \\ -0.8 \end{array} \quad \begin{array}{r} 1.8 \\ 7 \end{array} \quad \begin{array}{r} 2.2 \\ 10 \end{array} \quad \begin{array}{r} 6.0 \\ 16 \end{array} \quad \begin{array}{r} 6.0 \\ 23 \end{array} \quad \begin{array}{r} 6.0 \\ 33 \end{array} \quad \begin{array}{r} F5.0 \\ 23 \end{array}$$

$$\begin{array}{r} F3.5 \\ 20 \end{array} \quad \begin{array}{r} 3.4 \\ 33 \end{array} \quad \begin{array}{r} 2.8 \\ 20 \end{array} \quad \begin{array}{r} 2.0 \\ 12 \end{array} \quad \begin{array}{r} 0.6 \\ 10 \end{array} \quad \begin{array}{r} 0.2 \\ -0.9 \end{array} \quad \begin{array}{r} 0.2 \\ 7 \end{array} \quad \begin{array}{r} 1.0 \\ 10 \end{array} \quad \begin{array}{r} 5.2 \\ 16 \end{array} \quad \begin{array}{r} 5.4 \\ 25.2 \end{array} \quad \begin{array}{r} 5.5 \\ 33 \end{array} \quad \begin{array}{r} F6.1 \\ 25.2 \end{array}$$

$$\begin{array}{r} F3.8 \\ 20.6 \end{array} \quad \begin{array}{r} 8.5 \\ 33 \end{array} \quad \begin{array}{r} 8.0 \\ 20.6 \end{array} \quad \begin{array}{r} 7.8 \\ 19 \end{array} \quad \begin{array}{r} 7.8 \\ 14 \end{array} \quad \begin{array}{r} 5.6 \\ 11 \end{array} \quad \begin{array}{r} 5.2 \\ -7.0 \end{array} \quad \begin{array}{r} 5.2 \\ 6 \end{array} \quad \begin{array}{r} 6.0 \\ 10 \end{array} \quad \begin{array}{r} 8.8 \\ 14 \end{array} \quad \begin{array}{r} 9.2 \\ 23 \end{array} \quad \begin{array}{r} 9.2 \\ 33 \end{array} \quad \begin{array}{r} F5.0 \\ 23 \end{array}$$

Sta	+	H.I. ✓	-	Elev.	G.R.
		960.89			
4+50		✓		58.8 ✓	2.1 -
T.P.	8.76	969.55	0.10	960.79	
5				61.2	8.4 -
+50				63.7	5.9 -
6		✓		66.2 ✓	3.4 -
T.P.	9.98	978.85	0.68	968.87	
+50				68.7	10.2 -
7		✓		71.2 ✓	7.7 -
T.P.	8.74	986.96	0.63	978.22	
+50				73.6 ✓	13.4 -
B.M.			9.30	977.66	977.65
8				75.6	11.4 -
+41				77.0	10.0 -
9				78.8	8.2 -
+50				80.0	7.0 -

<u>F3.1</u>		<u>6.6</u>	<u>5.2</u>	<u>4.2</u>	<u>3.2</u>	<u>3.0</u>	<u>2.9</u>	<u>3.5</u>	<u>4.8</u>	<u>4.4</u>	<u>3.5</u>		<u>F2.3</u>
<u>19.2</u>		<u>33</u>	<u>19.2</u>	<u>13</u>	<u>11</u>	<u>-0.9</u>	<u>6</u>	<u>8</u>	<u>10</u>	<u>17.6</u>	<u>33</u>		<u>17.6</u>

2.1

<u>DC08</u>	<u>11.0</u>	<u>9.6</u>	<u>9.2</u>	<u>10.4</u>	<u>10.4</u>	<u>9.5</u>	<u>9.2</u>	<u>9.1</u>	<u>10.0</u>	<u>10.0</u>	<u>6.4</u>	<u>5.9</u>	<u>5.0</u>	<u>C2.5</u>
<u>22.2</u>	<u>33</u>	<u>22.2</u>	<u>16</u>	<u>14</u>	<u>13</u>	<u>11</u>	<u>-0.8</u>	<u>6</u>	<u>11</u>	<u>16</u>	<u>2.0</u>	<u>2.78</u>	<u>33</u>	<u>27.8</u>

8.4

<u>DC16</u>	<u>8.0</u>	<u>6.3</u>	<u>5.0</u>	<u>7.0</u>	<u>6.5</u>	<u>6.2</u>	<u>6.1</u>	<u>7.4</u>	<u>7.2</u>	<u>4.7</u>	<u>3.0</u>	<u>2.1</u>	<u>2.0</u>	<u>C3.8</u>
<u>23.4</u>	<u>33</u>	<u>23.4</u>	<u>16</u>	<u>12</u>	<u>10</u>	<u>-0.3</u>	<u>8</u>	<u>13</u>	<u>16</u>	<u>19</u>	<u>19</u>	<u>29.7</u>	<u>33</u>	<u>29.7</u>

5.9

<u>DC07</u>	<u>6.4</u>	<u>4.7</u>	<u>3.7</u>	<u>4.2</u>	<u>3.4</u>	<u>3.0</u>	<u>3.1</u>	<u>3.7</u>	<u>3.9</u>	<u>2.6</u>	<u>2.0</u>	<u>2.0</u>	<u>1.8</u>	<u>C1.4</u>
<u>22.1</u>	<u>33</u>	<u>22.1</u>	<u>13</u>	<u>12</u>	<u>10</u>	<u>+0.4</u>	<u>9</u>	<u>12</u>	<u>19</u>	<u>21</u>	<u>24</u>	<u>26.1</u>	<u>33</u>	<u>26.1</u>

3.4

<u>DC08</u>		<u>12.5</u>	<u>11.4</u>	<u>10.3</u>	<u>9.4</u>	<u>9.8</u>	<u>10.8</u>	<u>10.8</u>	<u>9.8</u>	<u>8.7</u>	<u>8.5</u>		Large Tree
<u>22.2</u>		<u>33</u>	<u>22.2</u>	<u>13</u>	<u>+0.8</u>	<u>10</u>	<u>16</u>	<u>18</u>	<u>20</u>	<u>25</u>	<u>33</u>		<u>22'</u>

10.2

<u>C0.1</u>	<u>8.3</u>	<u>7.6</u>	<u>7.2</u>	<u>8.0</u>	<u>7.8</u>	<u>7.1</u>	<u>6.6</u>	<u>6.8</u>	<u>7.6</u>	<u>7.6</u>	<u>6.0</u>	<u>5.4</u>	<u>5.6</u>	<u>5.6</u>	<u>C2.1</u>
<u>24.2</u>	<u>33</u>	<u>24.2</u>	<u>18</u>	<u>16</u>	<u>13</u>	<u>11</u>	<u>+1.1</u>	<u>7</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>22</u>	<u>27.2</u>	<u>33</u>	<u>27.2</u>

7.7

<u>C2.6</u>	<u>11.3</u>	<u>10.8</u>	<u>10.1</u>	<u>10.0</u>	<u>11.4</u>	<u>13.6</u>	<u>13.0</u>	<u>12.4</u>	<u>12.7</u>	<u>13.1</u>	<u>13.1</u>	<u>7.5</u>	<u>6.4</u>	<u>7.0</u>	<u>7.0</u>	<u>C6.4</u>
<u>27.9</u>	<u>33</u>	<u>27.9</u>	<u>23</u>	<u>18</u>	<u>18</u>	<u>15</u>	<u>12</u>	<u>+1.0</u>	<u>6</u>	<u>8</u>	<u>11</u>	<u>17</u>	<u>19</u>	<u>33</u>	<u>36</u>	<u>33</u>

13.4

<u>Top of Rock</u>	<u>58' Lt</u>	<u>Sta</u>	<u>8+95</u>													
<u>C2.5</u>	<u>10.0</u>	<u>8.9</u>	<u>7.8</u>	<u>11.2</u>	<u>10.7</u>	<u>10.1</u>	<u>10.3</u>	<u>2.8</u>	<u>3.0</u>	<u>2.7</u>	<u>2.8</u>					<u>C8.7</u>
<u>27.8</u>	<u>33</u>	<u>27.8</u>	<u>22</u>	<u>15</u>	<u>13</u>	<u>+1.3</u>	<u>10</u>	<u>17</u>	<u>26</u>	<u>33</u>	<u>40</u>					<u>33</u>

11.4

<u>C1.0</u>	<u>10.0</u>	<u>9.0</u>	<u>8.5</u>	<u>10.0</u>	<u>9.4</u>	<u>9.0</u>	<u>9.3</u>	<u>8.4</u>	<u>1.2</u>	<u>1.2</u>	<u>1.0</u>	<u>1.0</u>				<u>C9.0</u>
<u>25.5</u>	<u>33</u>	<u>25.5</u>	<u>19</u>	<u>16</u>	<u>13</u>	<u>+1.0</u>	<u>6</u>	<u>10</u>	<u>17</u>	<u>25</u>	<u>33</u>	<u>40</u>				<u>33</u>

10.0

<u>DC03</u>	<u>10.1</u>	<u>9.9</u>	<u>9.8</u>	<u>9.4</u>	<u>8.8</u>	<u>8.5</u>	<u>8.6</u>	<u>9.0</u>	<u>9.0</u>	<u>7.0</u>	<u>6.0</u>	<u>5.5</u>		<u>C2.2</u>
<u>21.5</u>	<u>33</u>	<u>21.5</u>	<u>19</u>	<u>14</u>	<u>12</u>	<u>-0.3</u>	<u>5</u>	<u>7</u>	<u>10</u>	<u>14</u>	<u>27.3</u>	<u>33</u>		<u>27.3</u>

8.2

<u>F5.3</u>	<u>12.6</u>	<u>12.3</u>	<u>11.3</u>	<u>8.5</u>	<u>8.4</u>	<u>8.8</u>	<u>8.1</u>	<u>7.6</u>								<u>Dr09</u>
<u>23.6</u>	<u>33</u>	<u>23.6</u>	<u>15</u>	<u>11</u>	<u>-1.4</u>	<u>6</u>	<u>22.4</u>	<u>33</u>								<u>22.4</u>

7.0

986.96

10 80.8 6.2 -

+50 81.5 5.5 -

11 82.0 5.0 -

T.P. 10.55 994.06 3.45 983.51

+50 82.0 12.1 -

12 81.6 12.5 -

+43 80.8 13.3 -

T.P. 8.77 992.28 10.55 983.51

13 79.4 12.9 -

+33 78.0 14.3 -

T.P. 2.70 981.84 13.14 979.14

+37 77.9 3.9 -

14 76.6 6.2 -

T.P. 1.51 973.32 10.03 971.81

+50 73.7 +0.4 -

$$\begin{array}{r}
 F3.2 \\
 \hline
 19.4
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 4.2 \\
 \frac{9.3}{33} & \frac{9.9}{23} & \frac{9.4}{19.4} & \frac{8.9}{15} & \frac{8.2}{11} & \frac{8.1}{-1.9} & \frac{8.4}{5} & \frac{10.7}{7} & \frac{8.7}{11} & \frac{8.1}{2.12} & \frac{7.9}{33}
 \end{array}
 \quad
 \begin{array}{r}
 DC0.1 \\
 \hline
 21.2
 \end{array}$$

$$\begin{array}{r}
 F2.4 \\
 \hline
 17.8
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 5.5 \\
 \frac{7.8}{33} & \frac{7.9}{178} & \frac{7.2}{11} & \frac{7.3}{-1.8} & \frac{7.5}{3} & \frac{10.3}{7} & \frac{9.4}{10} & \frac{9.8}{2.16} & \frac{10.0}{33}
 \end{array}
 \quad
 \begin{array}{r}
 F4.3 \\
 \hline
 21.6
 \end{array}$$

$$\begin{array}{r}
 C00 \\
 \hline
 24
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 5.0 \\
 \frac{4.8}{33} & \frac{5.0}{24} & \frac{5.1}{17} & \frac{5.5}{14} & \frac{5.5}{-0.5} & \frac{6.0}{4} & \frac{6.5}{14} & \frac{6.5}{2.18} & \frac{7.3}{33}
 \end{array}
 \quad
 \begin{array}{r}
 DC0.5 \\
 \hline
 21.8
 \end{array}$$

$$\begin{array}{r}
 C2.4 \\
 \hline
 27.6
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 12.1 \\
 \frac{9.3}{33} & \frac{9.7}{27.6} & \frac{9.9}{21} & \frac{10.7}{12} & \frac{10.7}{+1.4} & \frac{10.9}{2} & \frac{11.2}{3} & \frac{10.9}{6} & \frac{7.1}{10} & \frac{6.3}{32.7} & \frac{6.6}{40}
 \end{array}
 \quad
 \begin{array}{r}
 C5.8 \\
 \hline
 32.7
 \end{array}$$

$$\begin{array}{r}
 C2.8 \\
 \hline
 28.2
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 12.5 \\
 \frac{9.8}{33} & \frac{9.7}{28.2} & \frac{9.8}{23} & \frac{10.7}{15} & \frac{10.6}{+1.9} & \frac{10.6}{3} & \frac{4.2}{12} & \frac{2.5}{17} & \frac{1.4}{40} & \frac{1.0}{50}
 \end{array}
 \quad
 \begin{array}{r}
 C11.1 \\
 \hline
 40
 \end{array}$$

$$\begin{array}{r}
 C33 \\
 \hline
 29
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 13.3 \\
 \frac{9.7}{33} & \frac{10.0}{29} & \frac{10.1}{23} & \frac{11.8}{18} & \frac{11.4}{+1.9} & \frac{10.0}{5} & \frac{3.0}{12} & \frac{1.3}{17} & \frac{1.0}{40} & \frac{0.6}{50}
 \end{array}
 \quad
 \begin{array}{r}
 C12.3 \\
 \hline
 40
 \end{array}$$

$$\begin{array}{r}
 C1.1 \\
 \hline
 25.7
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 12.9 \\
 \frac{11.1}{33} & \frac{11.8}{25.7} & \frac{11.8}{24} & \frac{12.8}{18} & \frac{12.8}{+0.1} & \frac{12.5}{2} & \frac{6.0}{12} & \frac{2.6}{33} & \frac{2.4}{39.8} & \frac{2.5}{50}
 \end{array}
 \quad
 \begin{array}{r}
 C10.5 \\
 \hline
 39.8
 \end{array}$$

$$\begin{array}{r}
 C0.2 \\
 \hline
 24.3
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 14.3 \\
 \frac{13.4}{33} & \frac{14.1}{24.3} & \frac{14.5}{20} & \frac{14.5}{-0.2} & \frac{12.6}{8} & \frac{9.9}{10} & \frac{9.2}{20} & \frac{7.6}{33} & \frac{7.3}{40}
 \end{array}
 \quad
 \begin{array}{r}
 C6.7 \\
 \hline
 33
 \end{array}$$

$$\begin{array}{r}
 \\
 \hline

 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 3.9 \\
 \frac{3.5}{33} & \frac{4.5}{20} & \frac{4.7}{5} & \frac{3.6}{+0.3} & \frac{2.6}{10} & \frac{0.9}{27} & \frac{0.4}{33}
 \end{array}
 \quad
 \begin{array}{r}
 C2.0 \\
 \hline
 27
 \end{array}$$

$$\begin{array}{r}
 F.5.7 \\
 \hline
 24.4
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 6.2 \\
 \frac{11.9}{33} & \frac{10.9}{28} & \frac{11.9}{24.4} & \frac{10.7}{20} & \frac{8.2}{17} & \frac{7.8}{2} & \frac{8.3}{-2.1} & \frac{9.0}{6} & \frac{9.6}{8} & \frac{8.2}{21} & \frac{6.9}{29} & \frac{5.7}{31} & \frac{5.7}{33}
 \end{array}
 \quad
 \begin{array}{r}
 DC00 \\
 \hline
 21
 \end{array}$$

$$\begin{array}{r}
 F10.1 \\
 \hline
 33
 \end{array}
 \quad
 \begin{array}{cccccccccccc}
 10.1 \\
 \frac{9.3}{40} & \frac{9.7}{33} & \frac{8.5}{25} & \frac{5.6}{20} & \frac{2.1}{16} & \frac{2.2}{-2.6} & \frac{7.4}{8} & \frac{7.4}{17} & \frac{5.1}{24} & \frac{2.8}{31.5} & \frac{0.3}{37}
 \end{array}
 \quad
 \begin{array}{r}
 F.5.5 \\
 \hline
 24
 \end{array}
 \quad
 \begin{array}{r}
 DC2.3 \\
 \hline
 31.5
 \end{array}$$

973.32 ✓

15				72.1	1.2 -
+50				70.9	2.4 -
16			Pitch RF	69.1 69.9	9.2 3.4 -
+68				69.2 69.1	9.1 4.2 -
17				69.3 68.9	9.0 4.4 -
+22				69.3 68.8	9.0 4.5 -
+50				69.4 68.9	8.9 4.4 -
18			-	69.5 69.1	8.8 4.2 -
+34				69.4 ✓	3.9 -
T.P.	10.80	978.84 ✓	5.28	968.04	
19				70.5	8.3 -
B.M.			1234	966.50	
+50				71.5	7.3 -

$\frac{F10.4}{33}$	$\frac{12.0}{40}$	$\frac{11.6}{33}$	$\frac{11.2}{29}$	$\frac{7.7}{19}$	$\frac{3.8}{16}$	$\frac{3.5}{2}$	$\frac{3.7}{-2.5}$	$\frac{4.3}{2}$	$\frac{11.0}{12}$	$\frac{11.0}{32.6}$	$\frac{10.4}{40}$	$\frac{F9.8}{32.6}$
--------------------	-------------------	-------------------	-------------------	------------------	------------------	-----------------	--------------------	-----------------	-------------------	---------------------	-------------------	---------------------

$\frac{F10.2}{33}$	$\frac{12.5}{40}$	$\frac{12.6}{33}$	$\frac{11.7}{24}$	$\frac{8.6}{19}$	$\frac{5.4}{17}$	$\frac{4.8}{13}$	$\frac{4.5}{1}$	$\frac{4.8}{-2.4}$	$\frac{5.9}{6}$	$\frac{10.8}{13}$	$\frac{10.8}{24}$	$\frac{10.2}{28.6}$	$\frac{9.9}{33}$	$\frac{F7.8}{28.6}$
--------------------	-------------------	-------------------	-------------------	------------------	------------------	------------------	-----------------	--------------------	-----------------	-------------------	-------------------	---------------------	------------------	---------------------

$\frac{F8.0}{29}$	$\frac{11.5}{33}$	$\frac{11.4}{29}$	$\frac{11.1}{25}$	$\frac{8.5}{26}$	$\frac{5.8}{16}$	$\frac{5.2}{14}$	$\frac{4.9}{-1.5}$	$\frac{5.5}{9}$	$\frac{7.6}{13}$	$\frac{6.5}{32.7}$	$\frac{5.2}{40}$	$\frac{DC2.7}{32.7}$
-------------------	-------------------	-------------------	-------------------	------------------	------------------	------------------	--------------------	-----------------	------------------	--------------------	------------------	----------------------

$\frac{CS0}{31.5}$	$\frac{+0.5}{33}$	$\frac{+0.8}{31.5}$	$\frac{+1.5}{28}$	$\frac{0.0}{26}$	$\frac{5.8}{20}$	$\frac{6.2}{17}$	$\frac{5.9}{14}$	$\frac{5.7}{-1.5}$	$\frac{5.8}{8}$	$\frac{4.5}{13}$	$\frac{+0.5}{19}$	$\frac{+0.1}{33}$	$\frac{+0.7}{40}$	$\frac{DC9.2}{33}$
--------------------	-------------------	---------------------	-------------------	------------------	------------------	------------------	------------------	--------------------	-----------------	------------------	-------------------	-------------------	-------------------	--------------------

$\frac{F3.2}{19.4}$	$\frac{4.9}{33}$	$\frac{3.8}{26}$	$\frac{7.4}{22}$	$\frac{7.6}{19.4}$	$\frac{6.5}{15}$	$\frac{6.0}{2}$	$\frac{6.2}{-1.8}$	$\frac{6.3}{3}$	$\frac{6.6}{13}$	$\frac{1.9}{18}$	$\frac{1.2}{33}$	$\frac{0.7}{40}$	$\frac{DC7.8}{33}$
---------------------	------------------	------------------	------------------	--------------------	------------------	-----------------	--------------------	-----------------	------------------	------------------	------------------	------------------	--------------------

$\frac{F5.1}{23.2}$	$\frac{10.8}{33}$	$\frac{9.6}{23.2}$	$\frac{9.3}{22}$	$\frac{6.8}{16}$	$\frac{6.5}{-2.0}$	$\frac{6.7}{11}$	$\frac{7.0}{13}$	$\frac{6.3}{16}$	$\frac{5.2}{31.7}$	$\frac{4.3}{40}$	$\frac{DC3.8}{31.7}$
---------------------	-------------------	--------------------	------------------	------------------	--------------------	------------------	------------------	------------------	--------------------	------------------	----------------------

$\frac{F10.4}{33}$	$\frac{15.2}{40}$	$\frac{14.8}{33}$	$\frac{13.6}{26}$	$\frac{10.5}{21}$	$\frac{7.1}{17}$	$\frac{6.5}{7}$	$\frac{6.6}{-2.2}$	$\frac{7.2}{8}$	$\frac{8.0}{11}$	$\frac{8.0}{20.2}$	$\frac{7.8}{27.7}$	$\frac{7.3}{33}$	$\frac{F3.6}{20.2}$	$\frac{DC1.1}{27.7}$
--------------------	-------------------	-------------------	-------------------	-------------------	------------------	-----------------	--------------------	-----------------	------------------	--------------------	--------------------	------------------	---------------------	----------------------

$\frac{F9.0}{31}$	$\frac{13.6}{33}$	$\frac{13.2}{31}$	$\frac{12.3}{27}$	$\frac{9.5}{22}$	$\frac{7.4}{20}$	$\frac{6.6}{17}$	$\frac{6.0}{7}$	$\frac{6.1}{-1.9}$	$\frac{6.3}{8}$	$\frac{7.2}{12}$	$\frac{7.6}{18}$	$\frac{7.4}{19.4}$	$\frac{6.8}{33}$	$\frac{F3.2}{19.4}$
-------------------	-------------------	-------------------	-------------------	------------------	------------------	------------------	-----------------	--------------------	-----------------	------------------	------------------	--------------------	------------------	---------------------

$\frac{F2.1}{17.2}$	$\frac{11.1}{33}$	$\frac{9.9}{29}$	$\frac{6.7}{22}$	$\frac{6.1}{18}$	$\frac{6.0}{17.2}$	$\frac{5.5}{7}$	$\frac{5.3}{-1.4}$	$\frac{5.3}{4}$	$\frac{6.0}{13}$	$\frac{5.1}{19}$	$\frac{4.5}{23.1}$	$\frac{3.1}{33}$	$\frac{DC1.4}{23.1}$
---------------------	-------------------	------------------	------------------	------------------	--------------------	-----------------	--------------------	-----------------	------------------	------------------	--------------------	------------------	----------------------

$\frac{DC0.5}{21.8}$	$\frac{7.8}{33}$	$\frac{8.0}{28}$	$\frac{9.8}{25}$	$\frac{9.8}{21.8}$	$\frac{10.1}{20}$	$\frac{9.4}{17}$	$\frac{9.1}{7}$	$\frac{9.1}{-0.8}$	$\frac{9.1}{8}$	$\frac{9.4}{10}$	$\frac{7.8}{15}$	$\frac{2.8}{20}$	$\frac{2.2}{33}$	$\frac{1.8}{40}$	$\frac{C6.1}{33}$
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Top of Rock L+ 18+90														1.3
DC.05	6.8	7.2	8.4	8.8	9.1	8.3	8.1	8.0	8.7	8.2	8.0	7.8	DC1.3	
<u>21.8</u>	<u>33</u>	<u>29</u>	<u>27</u>	<u>21.8</u>	<u>20</u>	<u>16</u>	<u>-0.8</u>	<u>5</u>	<u>11</u>	<u>16</u>	<u>23</u>	<u>33</u>	<u>23</u>	

978.84 ✓

20
T.P. 6.60 981.13 4.31 72.5 ✓ 6.3 -
+50 73.6 7.5 -

21
+50 74.8 6.3 -
76.2 4.9 -

22
+29 77.7 3.4 -
78.7 2.4 -

+50 (79.4) 1.7 -

+68 79.9 1.2 -

23
T.P. 6.21 986.69 0.65 81.2 ✓ 10.1 -
+50 980.48

83.2 ✓ 3.5 -
T.P. 11.70 995.84 2.55 984.14

24 85.3 10.5 -

$$\begin{array}{r} \text{DC0.4} \\ \hline 21.9 \end{array} \quad \begin{array}{r} 9.5 \\ 33 \end{array} \quad \begin{array}{r} 7.7 \\ 21.9 \end{array} \quad \begin{array}{r} 7.7 \\ 20 \end{array} \quad \begin{array}{r} 7.1 \\ 17 \end{array} \quad \begin{array}{r} 7.1 \\ -0.8 \end{array} \quad \begin{array}{r} 7.8 \\ 9 \end{array} \quad \begin{array}{r} 11.6 \\ +1.5 \end{array} \quad \begin{array}{r} 12.3 \\ 25 \end{array} \quad \begin{array}{r} 12.4 \\ 33 \end{array} \quad \begin{array}{r} \text{FL0} \\ \hline 25 \end{array}$$

$$\begin{array}{r} \text{DC1.6} \\ \hline 23.4 \end{array} \quad \begin{array}{r} 8.5 \\ 33 \end{array} \quad \begin{array}{r} 7.8 \\ 26 \end{array} \quad \begin{array}{r} 7.9 \\ 23.4 \end{array} \quad \begin{array}{r} 8.3 \\ 21 \end{array} \quad \begin{array}{r} 7.8 \\ 19 \end{array} \quad \begin{array}{r} 7.2 \\ 7 \end{array} \quad \begin{array}{r} 7.4 \\ +0.1 \end{array} \quad \begin{array}{r} 7.6 \\ 5 \end{array} \quad \begin{array}{r} 8.0 \\ 11 \end{array} \quad \begin{array}{r} 7.1 \\ 13 \end{array} \quad \begin{array}{r} 8.0 \\ 23.3 \end{array} \quad \begin{array}{r} 8.5 \\ 33 \end{array} \quad \begin{array}{r} \text{DC1.5} \\ \hline 23.3 \end{array}$$

$$\begin{array}{r} \text{C0.2} \\ \hline 24.3 \end{array} \quad \begin{array}{r} 3.5 \\ 33 \end{array} \quad \begin{array}{r} 3.5 \\ 32 \end{array} \quad \begin{array}{r} 6.1 \\ 24.3 \end{array} \quad \begin{array}{r} 5.8 \\ 22 \end{array} \quad \begin{array}{r} 6.3 \\ 20 \end{array} \quad \begin{array}{r} 5.8 \\ 12 \end{array} \quad \begin{array}{r} 5.7 \\ 5 \end{array} \quad \begin{array}{r} 5.8 \\ +0.5 \end{array} \quad \begin{array}{r} 5.8 \\ 5 \end{array} \quad \begin{array}{r} 6.2 \\ 8 \end{array} \quad \begin{array}{r} 6.1 \\ 11 \end{array} \quad \begin{array}{r} 4.2 \\ 14 \end{array} \quad \begin{array}{r} 2.9 \\ 14 \end{array} \quad \begin{array}{r} 3.5 \\ 28.2 \end{array} \quad \begin{array}{r} 3.4 \\ 33 \end{array} \quad \begin{array}{r} \text{C2.8} \\ \hline 28.2 \end{array}$$

$$\begin{array}{r} \text{DC1.2} \\ \hline 22.8 \end{array} \quad \begin{array}{r} 2.4 \\ 33 \end{array} \quad \begin{array}{r} 5.0 \\ 27 \end{array} \quad \begin{array}{r} 5.7 \\ 22.8 \end{array} \quad \begin{array}{r} 5.6 \\ 22 \end{array} \quad \begin{array}{r} 6.1 \\ 20 \end{array} \quad \begin{array}{r} 5.7 \\ 17 \end{array} \quad \begin{array}{r} 5.3 \\ 11 \end{array} \quad \begin{array}{r} 5.2 \\ -0.3 \end{array} \quad \begin{array}{r} 5.8 \\ 10 \end{array} \quad \begin{array}{r} 3.8 \\ 14 \end{array} \quad \begin{array}{r} 2.4 \\ 15 \end{array} \quad \begin{array}{r} 3.1 \\ 26.7 \end{array} \quad \begin{array}{r} 3.6 \\ 33 \end{array} \quad \begin{array}{r} \text{C1.8} \\ \hline 26.7 \end{array}$$

$$\begin{array}{r} \text{F1.7} \\ \hline 16.4 \end{array} \quad \begin{array}{r} 6.3 \\ 33 \end{array} \quad \begin{array}{r} 6.1 \\ 31 \end{array} \quad \begin{array}{r} 7.0 \\ 26 \end{array} \quad \begin{array}{r} 7.0 \\ 23 \end{array} \quad \begin{array}{r} 5.1 \\ 16.4 \end{array} \quad \begin{array}{r} 4.8 \\ 12 \end{array} \quad \begin{array}{r} 4.8 \\ -1.4 \end{array} \quad \begin{array}{r} 5.2 \\ 7 \end{array} \quad \begin{array}{r} 9.3 \\ 14 \end{array} \quad \begin{array}{r} 12.1 \\ 30.4 \end{array} \quad \begin{array}{r} 12.7 \\ 40 \end{array} \quad \begin{array}{r} \text{F8.7} \\ \hline 38.4 \end{array}$$

$$\begin{array}{r} \text{F10.8} \\ \hline 34.6 \end{array} \quad \begin{array}{r} 13.4 \\ 40 \end{array} \quad \begin{array}{r} 13.2 \\ 34.6 \end{array} \quad \begin{array}{r} 12.6 \\ 28 \end{array} \quad \begin{array}{r} 9.0 \\ 22 \end{array} \quad \begin{array}{r} 5.6 \\ 19 \end{array} \quad \begin{array}{r} 4.6 \\ 16 \end{array} \quad \begin{array}{r} 4.2 \\ 11 \end{array} \quad \begin{array}{r} 4.4 \\ -2.0 \end{array} \quad \begin{array}{r} 5.7 \\ 6 \end{array} \quad \begin{array}{r} 10.2 \\ 13 \end{array} \quad \begin{array}{r} 16.9 \\ 23 \end{array} \quad \begin{array}{r} 17.4 \\ 27 \end{array} \quad \begin{array}{r} 16.2 \\ 40 \end{array} \quad \begin{array}{r} 15.1 \\ 50 \end{array} \quad \begin{array}{r} \text{F13.8} \\ \hline 40 \end{array}$$

$$\begin{array}{r} \text{F17.3} \\ \hline 40 \end{array} \quad \begin{array}{r} 19.7 \\ 50 \end{array} \quad \begin{array}{r} 19.0 \\ 40 \end{array} \quad \begin{array}{r} 17.4 \\ 31 \end{array} \quad \begin{array}{r} 5.7 \\ 17 \end{array} \quad \begin{array}{r} 4.2 \\ 15 \end{array} \quad \begin{array}{r} 3.7 \\ 11 \end{array} \quad \begin{array}{r} 3.8 \\ -2.1 \end{array} \quad \begin{array}{r} 4.6 \\ 6 \end{array} \quad \begin{array}{r} 9.6 \\ 13 \end{array} \quad \begin{array}{r} 12.8 \\ 26 \end{array} \quad \begin{array}{r} 18.4 \\ 31 \end{array} \quad \begin{array}{r} 18.0 \\ 40 \end{array} \quad \begin{array}{r} 16.9 \\ 50 \end{array} \quad \begin{array}{r} \text{F16.3} \\ \hline 40 \end{array}$$

$$\begin{array}{r} \text{F18.7} \\ \hline 40 \end{array} \quad \begin{array}{r} 21.3 \\ 50 \end{array} \quad \begin{array}{r} 19.9 \\ 40 \end{array} \quad \begin{array}{r} 18.0 \\ 32 \end{array} \quad \begin{array}{r} 9.8 \\ 20 \end{array} \quad \begin{array}{r} 4.2 \\ 14 \end{array} \quad \begin{array}{r} 3.4 \\ 12 \end{array} \quad \begin{array}{r} 3.5 \\ -2.3 \end{array} \quad \begin{array}{r} 3.8 \\ 5 \end{array} \quad \begin{array}{r} 5.3 \\ 8 \end{array} \quad \begin{array}{r} 16.4 \\ 25 \end{array} \quad \begin{array}{r} 17.4 \\ 32 \end{array} \quad \begin{array}{r} 17.6 \\ 40 \end{array} \quad \begin{array}{r} 17.1 \\ 50 \end{array} \quad \begin{array}{r} \text{F16.4} \\ \hline 40 \end{array}$$

$$\begin{array}{r} \text{F16.9} \\ \hline 40 \end{array} \quad \begin{array}{r} 17.9 \\ 50 \end{array} \quad \begin{array}{r} 16.8 \\ 40 \end{array} \quad \begin{array}{r} 16.1 \\ 33 \end{array} \quad \begin{array}{r} 13.3 \\ 26 \end{array} \quad \begin{array}{r} 6.9 \\ 18 \end{array} \quad \begin{array}{r} 3.7 \\ 15 \end{array} \quad \begin{array}{r} 2.3 \\ 13 \end{array} \quad \begin{array}{r} 2.0 \\ -2.1 \end{array} \quad \begin{array}{r} 2.1 \\ 3 \end{array} \quad \begin{array}{r} 2.8 \\ 6 \end{array} \quad \begin{array}{r} 5.0 \\ 10 \end{array} \quad \begin{array}{r} 13.9 \\ 23 \end{array} \quad \begin{array}{r} 14.2 \\ 30 \end{array} \quad \begin{array}{r} 13.4 \\ 40 \end{array} \quad \begin{array}{r} 12.7 \\ 50 \end{array} \quad \begin{array}{r} \text{F13.5} \\ \hline 40 \end{array}$$

$$\begin{array}{r} \text{F7.4} \\ \hline \end{array} \quad \begin{array}{r} 11.5 \\ 33 \end{array} \quad \begin{array}{r} 10.9 \\ 28 \end{array} \quad \begin{array}{r} 9.1 \\ 19 \end{array} \quad \begin{array}{r} 6.1 \\ 15 \end{array} \quad \begin{array}{r} 5.2 \\ 12 \end{array} \quad \begin{array}{r} 5.0 \\ -1.5 \end{array} \quad \begin{array}{r} 4.9 \\ 2 \end{array} \quad \begin{array}{r} 6.0 \\ 10 \end{array} \quad \begin{array}{r} 6.3 \\ 18.6 \end{array} \quad \begin{array}{r} 6.9 \\ 33 \end{array} \quad \begin{array}{r} \text{F2.8} \\ \hline 18.6 \end{array}$$

$$\begin{array}{r} \text{F2.5} \\ \hline 18 \end{array} \quad \begin{array}{r} 12.5 \\ 33 \end{array} \quad \begin{array}{r} 11.5 \\ 24 \end{array} \quad \begin{array}{r} 13.1 \\ 22 \end{array} \quad \begin{array}{r} 13.0 \\ 18 \end{array} \quad \begin{array}{r} 11.9 \\ 13 \end{array} \quad \begin{array}{r} 11.6 \\ -1.1 \end{array} \quad \begin{array}{r} 11.5 \\ 4 \end{array} \quad \begin{array}{r} 12.0 \\ 7 \end{array} \quad \begin{array}{r} 11.4 \\ 15 \end{array} \quad \begin{array}{r} 8.7 \\ 19 \end{array} \quad \begin{array}{r} 5.6 \\ 21 \end{array} \quad \begin{array}{r} 6.5 \\ 24 \end{array} \quad \begin{array}{r} 6.5 \\ 30 \end{array} \quad \begin{array}{r} 6.6 \\ 33 \end{array} \quad \begin{array}{r} \text{C4.0} \\ \hline 30 \end{array}$$

995.84

24+50

T.P.

13.56

1003.86

5.54

87.6

8.2 -

990.30

25

90.0

13.9 -

+50

92.5

11.4 -

26

B.M.

7.60

1006.50

4.96

94.6

9.3 -

998.90

+14

95.1

11.4 -

+20

96.8

+26

96.9

+32

97.1

+42

97.4

+46

95.8

10.7 -

27

96.5

10.0 -

4-27-32

8.2

$\frac{C 4.1}{30.2}$	$\frac{5.7}{40}$	$\frac{4.1}{30.2}$	$\frac{3.8}{24}$	$\frac{8.7}{18}$	$\frac{8.3}{5}$	$\frac{8.4}{-0.2}$	$\frac{8.1}{6}$	$\frac{8.5}{11}$	$\frac{7.3}{17}$	$\frac{1.2}{23}$	$\frac{2.0}{25}$	$\frac{2.4}{32.7}$	$\frac{3.0}{40}$	$\frac{C 5.8}{32.7}$
----------------------	------------------	--------------------	------------------	------------------	-----------------	--------------------	-----------------	------------------	------------------	------------------	------------------	--------------------	------------------	----------------------

13.9

$\frac{C 8.1}{33}$	$\frac{5.7}{40}$	$\frac{5.8}{33}$	$\frac{5.6}{28}$	$\frac{13.3}{16}$	$\frac{13.5}{11}$	$\frac{13.3}{+0.6}$	$\frac{13.0}{6}$	$\frac{13.4}{13}$	$\frac{7.6}{21}$	$\frac{8.4}{32.3}$	$\frac{9.4}{40}$	$\frac{C 5.5}{32.3}$
--------------------	------------------	------------------	------------------	-------------------	-------------------	---------------------	------------------	-------------------	------------------	--------------------	------------------	----------------------

11.4

$\frac{C 8.4}{33}$	$\frac{2.5}{40}$	$\frac{3.0}{33}$	$\frac{3.4}{24}$	$\frac{9.7}{17}$	$\frac{10.8}{14}$	$\frac{10.6}{12}$	$\frac{10.5}{+0.9}$	$\frac{10.4}{5}$	$\frac{11.0}{10}$	$\frac{11.1}{13}$	$\frac{10.0}{17}$	$\frac{7.1}{18}$	$\frac{7.9}{29.3}$	$\frac{8.2}{33}$	$\frac{C 3.5}{29.3}$
--------------------	------------------	------------------	------------------	------------------	-------------------	-------------------	---------------------	------------------	-------------------	-------------------	-------------------	------------------	--------------------	------------------	----------------------

9.3

$\frac{C 8.0}{33}$	$\frac{0.7}{40}$	$\frac{1.3}{33}$	$\frac{2.2}{25}$	$\frac{6.8}{20}$	$\frac{8.4}{15}$	$\frac{8.2}{12}$	$\frac{7.9}{+1.4}$	$\frac{8.0}{5}$	$\frac{8.6}{10}$	$\frac{7.7}{14}$	$\frac{5.6}{17}$	$\frac{4.2}{18}$	$\frac{4.5}{31.2}$	$\frac{4.3}{40}$	$\frac{C 4.8}{31.8}$
--------------------	------------------	------------------	------------------	------------------	------------------	------------------	--------------------	-----------------	------------------	------------------	------------------	------------------	--------------------	------------------	----------------------

Top of Rock 65' Pt. 26+95

11.4

$\frac{C 7.4}{33}$	$\frac{3.5}{40}$	$\frac{3.5}{33}$	$\frac{4.6}{24}$	$\frac{8.5}{21}$	$\frac{10.6}{17}$	$\frac{9.9}{3}$	$\frac{10.0}{+1.4}$	$\frac{10.0}{6}$	$\frac{10.4}{10}$	$\frac{8.9}{15}$	$\frac{5.8}{16}$	$\frac{4.8}{33}$	$\frac{5.0}{40}$	$\frac{C 6.6}{33}$
--------------------	------------------	------------------	------------------	------------------	-------------------	-----------------	---------------------	------------------	-------------------	------------------	------------------	------------------	------------------	--------------------

$\frac{8.0}{40}$	$\frac{8.0}{27}$	$\frac{11.0}{18}$	$\frac{9.7}{-}$	$\frac{10.0}{7}$	$\frac{10.1}{10}$	$\frac{8.6}{15}$	$\frac{4.6}{19}$	$\frac{5.2}{33}$	$\frac{5.1}{40}$
------------------	------------------	-------------------	-----------------	------------------	-------------------	------------------	------------------	------------------	------------------

$\frac{12.6}{40}$	$\frac{11.0}{19}$	$\frac{9.5}{3}$	$\frac{9.6}{-}$	$\frac{9.6}{6}$	$\frac{10.1}{10}$	$\frac{8.8}{14}$	$\frac{4.8}{19}$	$\frac{5.0}{40}$
-------------------	-------------------	-----------------	-----------------	-----------------	-------------------	------------------	------------------	------------------

$\frac{12.6}{40}$	$\frac{11.4}{27}$	$\frac{9.8}{12}$	$\frac{9.4}{-}$	$\frac{9.5}{5}$	$\frac{9.9}{11}$	$\frac{8.8}{14}$	$\frac{5.2}{18}$	$\frac{5.2}{40}$
-------------------	-------------------	------------------	-----------------	-----------------	------------------	------------------	------------------	------------------

$\frac{5.7}{40}$	$\frac{6.0}{35}$	$\frac{7.4}{24}$	$\frac{10.4}{18}$	$\frac{8.6}{13}$	$\frac{9.1}{-}$	$\frac{9.3}{6}$	$\frac{9.5}{12}$	$\frac{7.7}{15}$	$\frac{5.1}{17}$	$\frac{5.1}{40}$
------------------	------------------	------------------	-------------------	------------------	-----------------	-----------------	------------------	------------------	------------------	------------------

10.7

$\frac{C 7.6}{33}$	$\frac{2.7}{40}$	$\frac{3.1}{33}$	$\frac{3.4}{27}$	$\frac{8.3}{21}$	$\frac{9.8}{17}$	$\frac{9.3}{12}$	$\frac{9.0}{+1.7}$	$\frac{9.6}{11}$	$\frac{7.0}{15}$	$\frac{4.9}{17}$	$\frac{5.4}{22}$	$\frac{5.3}{32.1}$	$\frac{5.0}{40}$	$\frac{C 5.4}{32.1}$
--------------------	------------------	------------------	------------------	------------------	------------------	------------------	--------------------	------------------	------------------	------------------	------------------	--------------------	------------------	----------------------

10.0

$\frac{C 6.4}{33}$	$\frac{3.7}{40}$	$\frac{3.6}{33}$	$\frac{3.8}{24}$	$\frac{8.4}{18}$	$\frac{9.1}{15}$	$\frac{8.9}{10}$	$\frac{8.4}{+1.6}$	$\frac{8.8}{7}$	$\frac{9.2}{12}$	$\frac{7.5}{15}$	$\frac{6.1}{16}$	$\frac{6.4}{22}$	$\frac{6.9}{28.7}$	$\frac{6.9}{33}$	$\frac{6.8}{40}$	$\frac{C 3.1}{33}$
--------------------	------------------	------------------	------------------	------------------	------------------	------------------	--------------------	-----------------	------------------	------------------	------------------	------------------	--------------------	------------------	------------------	--------------------

1006.50

27+50

96.2

10.3-

28

95.2

11.3-

+50

93.4

13.1-

29

91.2

15.3-

+50

89.0

17.5-

30

86.8

19.7-

+50

84.7

21.8-

T.P.

0.43

993.27

13.66

992.84

29

91.2

2.1-

+50

89.0

4.3-

30

86.8

6.5-

+50

84.7

8.6-

$$\begin{array}{cccccccccccccccc} \text{C5.5} & \frac{4.5}{32.3} & \frac{4.8}{40} & \frac{5.1}{32.3} & \frac{5.8}{27} & \frac{6.1}{26} & \frac{7.3}{17} & \frac{9.3}{14} & \frac{9.3}{9} & \frac{10.3}{8.9} & \frac{9.4}{7} & \frac{9.9}{10} & \frac{10.1}{14} & \frac{8.2}{17} & \frac{9.5}{25.2} & \frac{10.0}{33} & \frac{10.4}{40} & \frac{\text{C0.3}}{33} \end{array}$$

$$\begin{array}{cccccccccccccccc} \text{C5.8} & \frac{4.6}{32.7} & \frac{5.5}{40} & \frac{5.5}{32.7} & \frac{6.6}{25} & \frac{7.7}{16} & \frac{10.9}{13} & \frac{10.8}{8} & \frac{10.6}{+0.7} & \frac{10.9}{8} & \frac{11.7}{12} & \frac{11.4}{15} & \frac{10.3}{17} & \frac{11.3}{24} & \frac{12.6}{33} & \frac{13.6}{40} & \frac{\text{DC0.7}}{33} \end{array}$$

$$\begin{array}{cccccccccccccccc} \text{C6.9} & \frac{5.7}{33} & \frac{6.2}{10} & \frac{7.2}{33} & \frac{7.2}{21} & \frac{8.5}{15} & \frac{11.3}{14} & \frac{12.9}{10} & \frac{12.8}{7} & \frac{12.6}{+0.5} & \frac{12.8}{9} & \frac{13.5}{14} & \frac{12.9}{16} & \frac{14.6}{21.8} & \frac{17.6}{33} & \frac{\text{DC0.5}}{21.8} \end{array}$$

$$\begin{array}{cccccccccccc} \text{C12.0} & \frac{1.3}{33} & \frac{2.4}{50} & \frac{3.4}{40} & \frac{5.1}{32} & \frac{6.0}{30} & \frac{9.3}{19} & \frac{13.2}{18} & \frac{15.1}{8} & \frac{14.9}{+0.4} & \text{(5.3)} \end{array}$$

$$\begin{array}{cccccccccccc} \text{C13.2} & \frac{1.3}{33} & \frac{2.7}{45} & \frac{4.5}{40} & \frac{6.9}{32} & \frac{7.7}{30} & \frac{11.5}{19} & \frac{14.8}{15} & \frac{17.4}{11} & \frac{17.4}{+0.1} & 1.1 \end{array}$$

$$\begin{array}{cccccc} \text{C10.0} & \frac{4.5}{50} & \frac{7.5}{40} & \frac{9.7}{33} & \frac{12.0}{31} & \frac{12.6}{21} & 19.7 \end{array}$$

$$\begin{array}{cccccc} \text{C9.5} & \frac{6.0}{50} & \frac{9.5}{40} & \frac{12.3}{33} & \frac{14.7}{30} & \frac{15.9}{21} & 21.8 \end{array}$$

$$\begin{array}{cccccc} 2.1 & \frac{1.7}{8} & \frac{2.6}{15} & \frac{4.1}{19.7} & \frac{8.9}{33} & \frac{\text{DC0.0}}{19.7} \end{array}$$

$$\begin{array}{cccccc} 4.7 & \frac{4.9}{9} & \frac{6.7}{14} & \frac{10.3}{22} & \frac{13.3}{31} & \frac{16.1}{40} & \frac{\text{F9.0}}{31} \end{array}$$

$$\begin{array}{cccccc} 6.5 & \frac{0.9}{18} & \frac{4.8}{17} & \frac{7.2}{13} & \frac{7.3}{-0.8} & \frac{7.5}{5} & \frac{8.4}{8} & \frac{10.9}{11} \end{array}$$

$$\begin{array}{cccccc} 8.6 & \frac{6.0}{20} & \frac{8.7}{16} & \frac{9.8}{12} & \frac{9.7}{-1.1} & \frac{10.0}{5} & \frac{12.0}{9} \end{array}$$

993.27 ✓

996.92 ✓

987.38 ✓

T.P. 9.54

5.89

31

82.8

14.1

+50

81.2

15.7

+70

80.6

16.3

T.P. 0.36

984.17 ✓

13.11

983.81 ✓

30+00

86.8

+2.6

B.M.

6.41

977.76 ✓

+50

84.7

+0.5

31

82.8

1.4

+50

81.2

3.0

+70

80.6

3.6

32

79.7

4.5

+50

78.5

5.7

33

77.5

6.7

13.7	14.3	7.1	6.2	6.8	9.3	11.9	14.0	15.2	15.1	
37	33	31	30	26	26	23	19	13	-1.0	14.1

C/3.0	2.0	2.7	3.5	5.6	8.0	12.9	
37	36	33	31	28	28	22	15.7

C/3.6	1.7	2.7	7.4	13.3	
33	36	33	33	25	16.3

x2.6	6.3	9.3	13.2	15.6	18.3	
	17	21	33	40	50	F18.2
						40

Spt. in 18" Tree 33' / 31+45

+0.5	11.2	13.4	16.3	18.2	19.8	
	20	22	33	40	45	F18.7
						40

1.4	3.0	4.1	4.0	4.9	6.5	14.0	16.1	17.8	F14.7
	5	10	14	18	21	33	40	50	40

3.0	1.7	3.3	3.2	3.4	3.9	5.4	7.5	8.9	10.3	F5.9
	20	13	4	-0.4	4	12	18	24.8	33	24.8

3.6	2.1	3.6	3.4	3.6	3.8	4.1	5.0	7.2	9.2	11.3	F5.6
	22	17	14	5	-0.2	3	6	17	24.2	33	24.2

4.5	7.3	0.0	0.0	4.7	4.9	4.8	4.4	4.1	4.3	4.7	5.9	7.2	9.2	12.3	F4.7
33	40	33	31	26	23.4	19	13	4	+0.2	4	11	13	22.4	33	22.4

5.1	C/1.2	3.8	4.5	5.8	5.9	5.9	5.3	5.0	5.5	5.7	7.6	9.2	9.6	13.9	15.5	F8.2
	33	36	33	27	23.7	21	16	5	+0.2	4	11	14	19	29.4	33	29.4

6.1	C/2.2	2.4	4.5	5.6	6.3	6.5	6.2	5.8	6.3	6.9	8.3	8.6	8.4	8.9	12.9	F1.7
	33	36	33	30	24.6	20	17	6	+0.4	7	10	14	16.4	21	33	16.4

984.17 ✓

T.P.

1.83

979.36 ✓

6.64

977.53 ✓

33+50

76.6

2.8 -

34

75.7

3.7 -

~~+16~~~~75.4~~

+50

75.1

4.3 -

35

75.0

4.4 -

+50

75.6

3.8 -

36

76.6 ✓

2.8 -

T.P.

9.26

986.67 ✓

1.95

977.41 ✓

+50

78.3

8.4 -

37

80.6

6.1 -

+50

83.1

3.6 -

38

85.6

1.1 -

2.8

6.5
9.5
2.7
1.5

11

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 2.8 & & & & & & & & & \\
 C5.6 & +5.0 & +2.8 & 0.0 & 1.2 & 2.7 & 2.5 & 2.0 & 2.3 & 2.5 & 3.2 & 4.7 & 4.7 & 5.3 & 8.3 & & F1.9 \\
 33 & 36 & 33 & 30 & 26.4 & 22 & 16 & 7 & +0.5 & 3 & 8 & 13 & 16.8 & 22 & 33 & & 16.8
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 3.1 & & & & & & & & & \\
 C2.9 & +1.7 & 0.8 & 3.1 & 3.9 & 4.0 & 3.5 & 3.0 & 3.3 & 3.8 & 4.4 & 7.8 & 9.7 & 12.4 & 15.9 & 19.1 & F12.2 \\
 33 & 36 & 33 & 28 & 23.7 & 23 & 17 & 8 & +0.4 & 5 & 8 & 15 & 17 & 28 & 37.4 & 45 & 37.4
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 4.3 & & & & & & & & & \\
 C.1.6 & 1.7 & 2.7 & 5.6 & 5.0 & 4.5 & 4.1 & 4.8 & 5.0 & 6.2 & 20.4 & 22.5 & 25.8 & 28.2 & & F21.5 \\
 33 & 36 & 33 & 29 & 23 & 20 & 9 & -0.5 & 2 & 5 & 24 & 29 & 45 & 60 & & 45
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 4.4 & & & & & & & & & \\
 DC.0.4 & 4.5 & 6.0 & 6.2 & 5.3 & 4.6 & 4.6 & 4.9 & 5.3 & 4.1 & 7.5 & 21.9 & 22.6 & 24.9 & 25.7 & 27.2 & F21.3 \\
 33 & 36 & 33 & 30 & 22.7 & 17 & 10 & 2 & -0.9 & 3 & 6 & 24 & 29 & 36 & 45 & 60 & 45
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 3.8 & & & & & & & & & \\
 DC0.4 & 5.6 & 5.4 & 5.4 & 5.1 & 4.3 & 4.1 & 4.5 & 5.5 & 7.5 & 19.8 & 20.5 & 22.4 & 23.0 & 24.4 & F19.2 \\
 33 & 36 & 33 & 23 & 22.1 & 18 & 9 & -0.7 & 4 & 8 & 22 & 28 & 36 & 45 & 60 & 45
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 2.8 & & & & & & & & & \\
 C2.8 & +2.3 & 0.0 & 3.7 & 3.6 & 2.8 & 2.5 & 2.8 & 3.5 & 3.9 & 5.3 & 8.5 & 12.8 & 13.3 & & F10.0 \\
 33 & 36 & 33 & 28 & 23.8 & 15 & 8 & 00 & 3 & 7 & 10 & 13 & 33 & 40 & & 33
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 4.4 & & & & & & & & & \\
 C7.4 & +2.2 & 1.0 & 3.9 & 8.5 & 8.7 & 7.8 & 7.5 & 7.6 & 8.3 & 8.9 & 9.8 & 10.4 & 12.7 & & DC00 & \\
 33 & 34 & 33 & 30.7 & 22 & 18 & 14 & 6 & +0.8 & 8 & 13 & 19 & 20.6 & 33 & & 20.6
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 6.1 & & & & & & & & & \\
 C4.1 & +0.9 & 1.4 & 3.8 & 5.5 & 6.2 & 5.9 & 5.5 & 4.8 & 4.9 & 5.0 & 6.0 & 6.6 & 7.8 & 10.0 & & DC003 \\
 33 & 36 & 33 & 30 & 24.9 & 22 & 16 & 14 & 6 & +2.2 & 4 & 13 & 18 & 21.5 & 33 & & 21.5
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 3.6 & & & & & & & & & \\
 C6.6 & +5.8 & +5.0 & 0.0 & 2.7 & 3.5 & 3.0 & 2.4 & 2.5 & 3.1 & 4.5 & 6.3 & 8.8 & & & F1.1 \\
 33 & 36 & 33 & 29 & 25.4 & 23 & 14 & 6 & +1.1 & 5 & 15.2 & 20 & 33 & & & 15.2
 \end{array}$$

$$\begin{array}{cccccccccccccccc}
 & & & & & & & & 1.1 & & & & & & & & & \\
 C1.0 & +4.7 & 0.1 & 1.2 & 1.1 & 0.8 & 1.0 & 1.0 & 2.0 & 4.1 & 6.2 & 8.5 & 9.1 & & & F7.4 \\
 25.5 & 33 & 25.5 & 22 & 15 & 6 & +0.1 & 3 & 7 & 11 & 18 & 27.8 & 33 & & & 27.8
 \end{array}$$

986.67 ✓

38+50

88.1 +1.4-

39

90.6 +3.9-

+50

93.1 ✓ +6.4-

T.P.

12.30

998.85 ✓

0.12

986.55

38+50

88.1 10.8-

39

90.6 8.3-

+50

93.1 5.8-

40

95.4 3.3-

+50

98.1 ✓ 0.8-

T.P.

13.77

1012.29 ✓

0.33

998.52

41

1000.6 11.7-

+50

03.1 9.2-

42

05.6 6.7-

$$+1.4 \quad \frac{11}{7} \quad \frac{3.9}{16} \quad \frac{5.4}{19} \quad \frac{8.5}{32.8} \quad \frac{10.1}{40} \quad \frac{F9.9}{32.8}$$

$$+3.9 \quad \frac{3.0}{14} \quad \frac{4.5}{19} \quad \frac{7.7}{26} \quad \frac{9.5}{33} \quad \frac{11.4}{40} \quad \frac{13.2}{45} \quad \frac{F15.3}{40}$$

$$+6.4 \quad \frac{8.4}{19} \quad \frac{10.3}{28} \quad \frac{11.6}{33} \quad \frac{13.0}{40} \quad \frac{13.9}{50} \quad \frac{F19.4}{40}$$

$$\frac{DC05}{21.8} \quad \frac{7.3}{33} \quad \frac{12.4}{27} \quad \frac{12.3}{21.8} \quad \frac{11.5}{15} \quad \frac{11.3}{8} \quad \frac{11.3}{-0.5} \quad \frac{11.7}{6} \quad 10.8$$

$$\frac{DC04}{21.9} \quad \frac{7.1}{33} \quad \frac{10.2}{27} \quad \frac{10.4}{24} \quad \frac{9.7}{21.9} \quad \frac{9.1}{18} \quad \frac{9.0}{9} \quad \frac{9.2}{-0.9} \quad \frac{9.4}{3} \quad \frac{10.5}{6}$$

$$\frac{DC06}{21.9} \quad \frac{4.5}{33} \quad \frac{7.4}{28} \quad \frac{7.7}{24} \quad \frac{7.2}{21.8} \quad \frac{6.8}{19} \quad \frac{6.9}{10} \quad \frac{7.3}{-1.5} \quad \frac{8.4}{3} \quad \frac{10.8}{7}$$

$$\frac{DC05}{21.8} \quad \frac{3.5}{33} \quad \frac{5.4}{30} \quad \frac{5.6}{25} \quad \frac{4.8}{21.8} \quad \frac{4.4}{19} \quad \frac{4.6}{11} \quad \frac{5.2}{-1.9} \quad \frac{5.5}{3} \quad \frac{8.1}{7} \quad \frac{13.0}{13} \quad \frac{15.4}{18} \quad \frac{16.2}{23} \quad \frac{13.6}{33.6} \quad \frac{12.8}{40} \quad \frac{F10.3}{33.6}$$

$$\frac{DC01}{21.2} \quad \frac{2.1}{33} \quad \frac{3.7}{28} \quad \frac{3.7}{25} \quad \frac{2.7}{21.2} \quad \frac{2.3}{19} \quad \frac{2.3}{10} \quad \frac{2.8}{-2.0} \quad \frac{5.0}{4} \quad \frac{7.2}{9} \quad \frac{8.0}{14} \quad \frac{6.5}{24.4} \quad \frac{5.4}{33} \quad \frac{F5.7}{24.4}$$

$$\frac{DC00}{18.5} \quad \frac{13.4}{28} \quad \frac{14.1}{26} \quad \frac{14.3}{21} \quad \frac{13.7}{18.5} \quad \frac{13.5}{10} \quad \frac{13.5}{-1.8} \quad \frac{14.0}{3} \quad \frac{16.2}{7} \quad \frac{16.5}{14} \quad \frac{16.0}{21.6} \quad \frac{14.2}{33} \quad \frac{F4.3}{21.6}$$

$$\frac{F2.0}{17} \quad \frac{10.3}{27} \quad \frac{11.5}{24} \quad \frac{11.7}{21} \quad \frac{11.2}{17} \quad \frac{11.0}{8} \quad \frac{11.0}{-1.8} \quad \frac{11.4}{5} \quad \frac{13.6}{8} \quad \frac{14.7}{17} \quad \frac{14.4}{23.4} \quad \frac{12.6}{33} \quad \frac{F5.2}{23.4}$$

$$\frac{F3.9}{24.9} \quad \frac{2.5}{33} \quad \frac{2.8}{24.9} \quad \frac{3.3}{27} \quad \frac{4.7}{24} \quad \frac{8.5}{20} \quad \frac{8.5}{17} \quad \frac{8.2}{15} \quad \frac{8.1}{7} \quad \frac{8.0}{-1.3} \quad \frac{8.3}{4} \quad \frac{9.2}{8} \quad \frac{9.3}{10} \quad \frac{8.8}{13} \quad \frac{8.7}{17} \quad \frac{8.9}{33} \quad \frac{F2.0}{17}$$

✓
1012.29

42+50

08.1

4.2-

+68

09.0

3.3-

B.M.

2.27

1010.02

43

10.6

1.7-

T.P.

13.73

✓
1025.22

0.80

1011.49

42+50

08.1

17.1-

+68

09.0

16.2-

43+50

13.1

12.1-

44

15.6

9.6-

+50

17.9

7.3-

45

19.7

5.5-

T.P.

6.18

✓
1027.12

4.28

✓
1020.94

+50

21.0

6.1-

46

21.8

5.3-

4.2

$$\begin{array}{r} 2.3 \\ 23 \end{array} \quad \begin{array}{r} 5.2 \\ 19 \end{array} \quad \begin{array}{r} 4.9 \\ 13 \end{array} \quad \begin{array}{r} 4.7 \\ 4 \end{array} \quad \begin{array}{r} 4.8 \\ -0.6 \\ 4 \end{array} \quad \begin{array}{r} 4.6 \\ 4 \end{array} \quad \begin{array}{r} 6.3 \\ 10 \end{array} \quad \begin{array}{r} 6.3 \\ 12 \end{array} \quad \begin{array}{r} 5.8 \\ 13 \end{array} \quad \begin{array}{r} 6.2 \\ 18.5 \end{array} \quad \begin{array}{r} 7.4 \\ 28 \end{array} \quad \begin{array}{r} DC00 \\ 18.5 \end{array}$$

3.3

$$\begin{array}{r} 2.0 \\ 24 \end{array} \quad \begin{array}{r} 4.0 \\ 21 \end{array} \quad \begin{array}{r} 3.2 \\ 4 \end{array} \quad \begin{array}{r} 3.3 \\ 00 \end{array} \quad \begin{array}{r} 3.2 \\ 5 \end{array} \quad \begin{array}{r} 4.1 \\ 8 \end{array} \quad \begin{array}{r} 8.1 \\ 14 \end{array} \quad \begin{array}{r} 10.2 \\ 22 \end{array} \quad \begin{array}{r} 11.7 \\ 29.8 \end{array} \quad \begin{array}{r} 12.1 \\ 33 \end{array} \quad \begin{array}{r} F8.4 \\ 29.8 \end{array}$$

1.1

$$\begin{array}{r} DC1.8 \\ 23.7 \end{array} \quad \begin{array}{r} 1.2 \\ 33 \end{array} \quad \begin{array}{r} 1.9 \\ 23.7 \end{array} \quad \begin{array}{r} 2.0 \\ 17 \end{array} \quad \begin{array}{r} 1.1 \\ 14 \end{array} \quad \begin{array}{r} 0.8 \\ 2 \end{array} \quad \begin{array}{r} 0.8 \\ +0.9 \end{array} \quad \begin{array}{r} 1.3 \\ 9 \end{array} \quad \begin{array}{r} 5.8 \\ 17 \end{array} \quad \begin{array}{r} 6.3 \\ 22.2 \end{array} \quad \begin{array}{r} 8.0 \\ 33 \end{array} \quad \begin{array}{r} F4.6 \\ 22.2 \end{array}$$

$$\begin{array}{r} C7.5 \\ 33 \end{array}$$

$$\begin{array}{r} 9.6 \\ 40 \end{array} \quad \begin{array}{r} 9.6 \\ 33 \end{array} \quad \begin{array}{r} 9.9 \\ 29 \end{array} \quad \begin{array}{r} 12.0 \\ 26 \end{array} \quad 17.1$$

$$\begin{array}{r} C5.4 \\ 32.1 \end{array}$$

$$\begin{array}{r} 11.0 \\ 40 \end{array} \quad \begin{array}{r} 10.8 \\ 32.1 \end{array} \quad \begin{array}{r} 10.8 \\ 29 \end{array} \quad 16.2$$

12.1

$$\begin{array}{r} C4.9 \\ 31.4 \end{array} \quad \begin{array}{r} 8.1 \\ 37 \end{array} \quad \begin{array}{r} 7.2 \\ 31.4 \end{array} \quad \begin{array}{r} 7.0 \\ 17 \end{array} \quad \begin{array}{r} 10.2 \\ 15 \end{array} \quad \begin{array}{r} 11.5 \\ 12 \end{array} \quad \begin{array}{r} 10.9 \\ 8 \end{array} \quad \begin{array}{r} 10.5 \\ +1.6 \end{array} \quad \begin{array}{r} 10.8 \\ 9 \end{array} \quad \begin{array}{r} 11.0 \\ 15 \end{array} \quad \begin{array}{r} 8.9 \\ 17 \end{array} \quad \begin{array}{r} 10.2 \\ 26.9 \end{array} \quad \begin{array}{r} 11.6 \\ 33 \end{array} \quad \begin{array}{r} C1.9 \\ 26.9 \end{array}$$

9.6

$$\begin{array}{r} 5.1 \\ 18 \end{array} \quad \begin{array}{r} 8.1 \\ 14 \end{array} \quad \begin{array}{r} 8.1 \\ 7 \end{array} \quad \begin{array}{r} 7.7 \\ +1.7 \end{array} \quad \begin{array}{r} 7.8 \\ 5 \end{array} \quad \begin{array}{r} 8.6 \\ 15 \end{array} \quad \begin{array}{r} 8.4 \\ 24 \end{array} \quad \begin{array}{r} 4.1 \\ 28 \end{array} \quad \begin{array}{r} 4.7 \\ 31.4 \end{array} \quad \begin{array}{r} 5.0 \\ 33 \end{array} \quad \begin{array}{r} C4.9 \\ 31.4 \end{array}$$

7.3

$$\begin{array}{r} 0.5 \\ 20 \end{array} \quad \begin{array}{r} 5.0 \\ 11 \end{array} \quad \begin{array}{r} 5.7 \\ 8 \end{array} \quad \begin{array}{r} 5.4 \\ +1.9 \end{array} \quad \begin{array}{r} 5.2 \\ 4 \end{array} \quad \begin{array}{r} 6.1 \\ 14 \end{array} \quad \begin{array}{r} 6.9 \\ 23 \end{array} \quad \begin{array}{r} 4.1 \\ 25 \end{array} \quad \begin{array}{r} 4.5 \\ 28.2 \end{array} \quad \begin{array}{r} 6.2 \\ 33 \end{array} \quad \begin{array}{r} C2.8 \\ 28.2 \end{array}$$

5.5

$$\begin{array}{r} 0.0 \\ 17 \end{array} \quad \begin{array}{r} 4.2 \\ 11 \end{array} \quad \begin{array}{r} 3.7 \\ +1.8 \end{array} \quad \begin{array}{r} 3.6 \\ 3 \end{array} \quad \begin{array}{r} 4.1 \\ 10 \end{array} \quad \begin{array}{r} 4.7 \\ 15 \end{array} \quad \begin{array}{r} 3.8 \\ 17 \end{array} \quad \begin{array}{r} 7.0 \\ 21.8 \end{array} \quad \begin{array}{r} 11.0 \\ 33 \end{array} \quad \begin{array}{r} DC05 \\ 21.8 \end{array}$$

6.1

$$\begin{array}{r} 3.7 \\ 17 \end{array} \quad \begin{array}{r} 4.4 \\ 13 \end{array} \quad \begin{array}{r} 4.4 \\ 8 \end{array} \quad \begin{array}{r} 4.3 \\ +1.8 \end{array} \quad \begin{array}{r} 5.2 \\ 10 \end{array} \quad \begin{array}{r} 5.5 \\ 12 \end{array} \quad \begin{array}{r} 5.6 \\ 14 \end{array} \quad \begin{array}{r} 5.0 \\ 15 \end{array} \quad \begin{array}{r} 6.5 \\ 18 \end{array} \quad \begin{array}{r} 7.4 \\ 22.1 \end{array} \quad \begin{array}{r} 9.5 \\ 33 \end{array} \quad \begin{array}{r} DC07 \\ 22.1 \end{array}$$

5.3

$$\begin{array}{r} 0.9 \\ 19 \end{array} \quad \begin{array}{r} 3.8 \\ 15 \end{array} \quad \begin{array}{r} 4.4 \\ 12 \end{array} \quad \begin{array}{r} 4.3 \\ 7 \end{array} \quad \begin{array}{r} 3.8 \\ +1.5 \end{array} \quad \begin{array}{r} 4.3 \\ 9 \end{array} \quad \begin{array}{r} 5.1 \\ 12 \end{array} \quad \begin{array}{r} 5.1 \\ 14 \end{array} \quad \begin{array}{r} 3.7 \\ 16 \end{array} \quad \begin{array}{r} 5.0 \\ 24.5 \end{array} \quad \begin{array}{r} 6.8 \\ 33 \end{array} \quad \begin{array}{r} C03 \\ 24.5 \end{array}$$

✓
1027.12

46+50

T.P.

12.23

✓
1038.92

0.43

22.3

4.8 -

✓
1026.69

44

15.6

23.3 -

+50

17.9

21.0 -

45

19.7

19.2 -

+50

21.0

17.9 ✓

46

21.8

17.1 -

+38

22.0

16.9

+50

22.3

16.6 -

T.P.

0.23

✓
1026.92

12.23

✓
1026.69

46+38

22.0

4.9

47

22.2

4.7 -

+50

21.9

5.0 -

4.8

$$\begin{array}{cccccccccccc} \frac{2.1}{18} & \frac{4.7}{14} & \frac{4.9}{4} & \frac{4.3}{40.5} & \frac{4.8}{9} & \frac{5.5}{12} & \frac{5.5}{16} & \frac{1.8}{17} & \frac{3.0}{26.7} & \frac{3.4}{33} & \frac{41.8}{26.7} \end{array}$$

$$\begin{array}{cccccc} \frac{C10.4}{39.6} & \frac{14.3}{50} & \frac{12.9}{39.6} & \frac{11.5}{32} & \frac{11.5}{28} & 23.3 \end{array}$$

$$\begin{array}{cccccc} \frac{C17.0}{40} & \frac{4.6}{50} & \frac{4.0}{40} & \frac{3.5}{30} & \frac{9.1}{27} & 21.0 \end{array}$$

$$\begin{array}{cccccc} \frac{C16.2}{40} & \frac{1.7}{50} & \frac{3.0}{40} & \frac{4.5}{32} & \frac{5.8}{30} & \frac{8.3}{21} & \frac{11.1}{19} & 19.2 \end{array}$$

$$\begin{array}{cccccc} \frac{C15.2}{40} & \frac{1.8}{50} & \frac{2.7}{40} & \frac{3.7}{34} & \frac{8.1}{19} & 17.9 \end{array}$$

$$\begin{array}{cccccc} \frac{C12.1}{40} & \frac{5.1}{50} & \frac{5.0}{40} & \frac{5.1}{34} & \frac{6.8}{30} & \frac{8.8}{21} & 17.1 \end{array}$$

$$\begin{array}{ccc} \frac{7.6}{50} & \frac{10.5}{40} & \frac{13.4}{27} & 16.9 \end{array}$$

$$\begin{array}{ccc} \frac{C8.1}{36.2} & \frac{8.0}{40} & \frac{8.5}{36.2} & \frac{8.9}{33} & 16.6 \end{array}$$

4.9

$$\begin{array}{cccccccc} \frac{2.0}{20} & \frac{4.3}{14} & \frac{3.9}{9} & \frac{4.6}{9} & \frac{5.3}{11} & \frac{4.8}{15} & \frac{1.5}{17} & \frac{2.0}{22} & \frac{3.2}{33} \end{array}$$

4.7

$$\begin{array}{cccccccc} \frac{DC03}{21.5} & \frac{5.8}{33} & \frac{6.4}{21.5} & \frac{5.9}{17} & \frac{5.7}{13} & \frac{5.1}{11} & \frac{5.1}{-0.4} & \frac{5.7}{8} & \frac{7.8}{14} & \frac{9.0}{21.6} & \frac{9.3}{33} & \frac{F4.3}{21.6} \end{array}$$

5.0

$$\begin{array}{cccccccc} \frac{F4.3}{21.6} & \frac{9.0}{33} & \frac{9.3}{21.6} & \frac{9.2}{17} & \frac{6.1}{11} & \frac{5.1}{-0.6} & \frac{6.2}{7} & \frac{6.7}{12} & \frac{8.8}{15} & \frac{8.5}{20} & \frac{10.6}{33} & \frac{F3.5}{20} \end{array}$$

1026.92 ✓

48				21.6 ✓	5.3 -
T.P.	4.74	1026.85 ✓	4.81	1022.11	
+50				21.3	5.6 -
49				21.0 ..	5.9 -
+50				20.3	6.6 -
50				18.8	8.1 -
+50				16.6 ✓	10.3 -
T.P.	0.00	1019.20 ✓	7.65	1019.20	
51				13.6	5.6 -
+50				10.2	9.0 -
52				06.8 ✓	12.4 -
T.P.	6.36	1012.48 ✓	13.08	1006.12	
+40				04.1 ✓	8.4 -
B.M.	1.43	1004.27 ✓	9.64	1002.84	
53				1000.1	4.2 -

✓
1004.27

53+50

97.8

6.5 ✓

54

96.6

7.7 ✓

+50

96.4

7.9 ✓

55

97.3

7.0 ✓

+25

98.2

6.1 ✓

B.M.

1.43

✓
1002.84

5-2-32

$$\begin{array}{cccccccccccccc}
 & & & & & & 6.5 & & & & & & & & & \\
 F6.0 & 11.6 & 12.5 & 12.4 & 11.9 & 7.6 & 7.7 & 8.2 & 11.6 & 12.5 & 12.8 & 12.4 & & F6.3 \\
 \hline 25 & 33 & 25 & 21 & 15 & 9 & -1.2 & 3 & 9 & 17 & 25.6 & 33 & & 25.6
 \end{array}$$

$$\begin{array}{cccccccccccccc}
 & & & & & & 7.7 & & & & & & & \\
 F6.6 & 14.7 & 14.3 & 13.5 & 9.1 & 9.2 & 9.6 & 9.9 & 11.2 & 11.3 & 11.0 & 10.1 & & F6.3 \\
 \hline 26.2 & 33 & 26.2 & 18 & 10 & 1 & -1.9 & 2 & 5 & 10 & 19.6 & 33 & & 19.6
 \end{array}$$

$$\begin{array}{cccccccccccccc}
 & & & & & & 7.9 & & & & & & & \\
 F4.9 & 13.5 & 12.8 & 12.6 & 9.1 & 9.0 & 9.5 & 9.6 & 9.2 & 9.0 & 8.4 & 5.8 & 4.7 & F0.5 \\
 \hline 22.8 & 33 & 22.8 & 21 & 12 & 3 & 1 & -1.7 & 4 & 10 & 13.8 & 27.2 & 33 & 13.8
 \end{array}$$

$$\begin{array}{cccccccccccccc}
 & & & & & & 7.0 & & & & & & & \\
 F1.0 & 11.2 & 10.0 & 8.5 & 8.0 & 7.6 & 7.4 & 7.5 & 7.3 & 5.7 & 0.5 & & & \\
 \hline 15 & 33 & 22 & 18 & 15 & 14 & 4 & -0.5 & 2 & 4 & 33 & & &
 \end{array}$$

$$\begin{array}{cccccccccc}
 & & & & & & 6.1 & & & & \\
 10.3 & 7.8 & 6.6 & 6.7 & 5.9 & 5.5 & 3.6 & 1.8 & 0.0 \\
 \hline 33 & 19 & 13 & 4 & 5 & 3 & 5 & 17 & 27
 \end{array}$$

Mont.

B.M.	13.60	980.10		966.50
T.P.	13.23	992.84	0.49	979.61

22+50				79.4	13.44✓
-------	--	--	--	------	--------

23				81.2	11.64✓
----	--	--	--	------	--------

+50				83.2	9.44✓
-----	--	--	--	------	-------

24				85.3	7.54✓
----	--	--	--	------	-------

+50				87.6	5.24✓
-----	--	--	--	------	-------

25				90.0	2.84✓
----	--	--	--	------	-------

+50				92.5	0.34✓
-----	--	--	--	------	-------

26	10.87	1003.14	0.57	94.6	8.54✓
----	-------	---------	------	------	-------

+50				96.0	7.14✓
-----	--	--	--	------	-------

27				96.5	6.64✓
----	--	--	--	------	-------

+50				96.2	
-----	--	--	--	------	--

B.M.			4.27	998.87	998.90
------	--	--	------	--------	--------

$$\begin{array}{r} 966.50 \\ 13.60 \\ \hline 980.10 \\ 0.49 \\ \hline 979.61 \\ 13.23 \\ \hline 992.84 \\ 1.57 \\ \hline 992.27 \\ 10.87 \\ \hline 1003.14 \\ 4.27 \\ \hline 998.87 \end{array}$$

B.M.	1.84	1000.74		998.90	
27				96.5	4.24
+50				96.2	4.54 ✓
28				95.2	5.54 ✓
+50				93.4	7.34 ✓
29				91.2	9.54 ✓
+50				89.0	11.74 ✓
T.P.	0.92	988.21	13.45	987.29	
30				86.8	1.41 ✓
+50				84.7	3.51 ✓
31				82.8	5.41 ✓
+50				81.2	7.01 ✓
32				79.7	8.51 ✓
B.M.	5.70	983.46	10.42	977.79	977.74
+50				78.5	4.96 ✓
33				77.5	5.96 ✓
+50				76.6	6.86 ✓
34				75.7	7.76 ✓
+50				75.1	8.36 ✓
35				75.0	8.46 ✓
+50				75.6	7.86 ✓
36				76.6	6.86 ✓
+50				78.3	5.16 ✓
T.P.	13.40	991.70	5.14	978.30	
37				80.6	11.1 ✓
+50				83.1	8.6 ✓
38				85.6	6.1 ✓

10.45

18

$$\begin{array}{r} 977.76 \\ 5.70 \\ \hline 983.46 \\ 5.16 \\ \hline 978.30 \\ 13.40 \\ \hline 991.70 \end{array}$$

$$\begin{array}{r} 998.90 \\ 1.84 \\ \hline 1000.74 \\ 13.45 \\ \hline 987.29 \\ .92 \\ \hline 988.21 \\ 10.42 \\ \hline 977.79 \end{array}$$

$$\begin{array}{r} .01.2 \\ 60 \\ \hline .720 \\ 47.6 \\ \hline 48.3 \end{array}$$

991.70

38+50

88.1

3.6✓

39

90.6

1.1✓

T.P.

11.53

1002.12

1.11

990.59

+50

93.1

9.02✓

40

95.6

6.52✓

+50

98.1

4.02✓

41

00.6

1.52✓

T.P.

13.77

1014.37

1.52

1000.60

+50

03.1

11.27✓

42

05.6

8.77✓

+50

08.1

6.27✓

43

10.6

3.77✓

+50

13.1

1.27✓

T.P.

9.67

1022.78

1.26

1013.11

44

15.6

7.18✓

+50

17.9.

4.88✓

45

19.7

3.08✓

T.P.

3.86

1023.54

3.10

1019.68

+50

21.0

2.54✓

46

21.8

1.74✓

+50

22.3

1.24✓

47

22.2

1.34✓

+50

21.9

1.64✓

48

21.6

1.94✓

+50

21.3

2.24✓

49

21.0

2.54✓

$$\begin{array}{r}
 991.70 \\
 \underline{1.11} \\
 990.59 \\
 \underline{11.53} \\
 1002.12 \\
 \underline{1.52} \\
 1000.60 \\
 \underline{13.77} \\
 1014.37 \\
 \underline{1.24} \\
 1013.11 \\
 \underline{9.67} \\
 1022.78 \\
 \underline{3.10} \\
 1019.68 \\
 \underline{3.86} \\
 1023.54
 \end{array}$$

$$\begin{array}{r}
 1019.68 \\
 \underline{3.86} \\
 1023.54 \\
 \underline{5.64} \\
 1017.90
 \end{array}$$

$$7.2$$

$$2.4$$

$$\underline{4.8}$$

1023.54

49+50

20.3

3.24 ✓

50

18.8

4.74 ✓

+50

16.6

4.94 ✓

51

13.6

9.94 ✓

+50

10.2

13.34 ✓

T.P.

0.78

1010.98

13.34

1010.20

52

06.8

4.18 ✓

+50

03.4

7.58 ✓

B.M.

8.16

1011.00

8.16

1002.82

1002.84

53

00.1

10.90 ✓

+50

97.8

13.20 ✓

T.P.

3.83

1001.64

13.19

997.81

54

96.6

5.04 ✓

+50

96.4

5.24 ✓

55

97.3

B.M.

7.77

974.27

966.50

16+00

64.1

10.17

$$\begin{array}{r}
 1023.54 \\
 \underline{13.34} \\
 1010.20 \\
 \underline{.78} \\
 1010.98
 \end{array}$$

$$\begin{array}{r}
 .002 \\
 \underline{.20} \\
 .040 \\
 74.3 \\
 \underline{69.9} \\
 4.4
 \end{array}$$

$$10.17$$

$$10.27$$

$$10.25$$

$$10.29$$

$$\begin{array}{r}
 1002.84 \\
 \underline{8.16} \\
 1011.00 \\
 \underline{13.19} \\
 997.81 \\
 \underline{3.83} \\
 1001.64
 \end{array}$$

$$\begin{array}{r}
 966.50 \\
 \underline{7.77} \\
 974.27
 \end{array}$$

$$4.9$$

$$7.8$$

$$\underline{4}$$

$$13.8$$

$$\underline{13}$$

$$26.8$$

$$33.0$$

$$\underline{25.8}$$

$$7.2$$

$$5.8$$

$$11.6$$

$$\underline{4.}$$

$$15.6$$

$$\underline{13}$$

$$28.6$$

$$33$$

$$\underline{27.6}$$

$$5.4$$

B.M.	8.08	974.58		966.50	
16				69.9	4.68✓
+50				69.3	5.28✓
17				68.9	5.68✓
+50				68.9	5.68✓
18				69.1	5.48✓
+50				69.7	4.88✓
19				70.5	4.08✓
+50				71.5	3.08✓
20				72.5	2.08✓
+50				73.6	0.98✓
T.P.	9.40	982.99	0.99	973.59	
21				74.8	8.19✓
+50				76.2	6.79✓
22				77.7	5.29✓
+50				79.4	3.59✓
23				81.2	

B.M.	11.56	978.06		966.50	
13+50				72.6	0.46✓
14				75.6	2.46✓
+50				73.7	4.36✓
15				72.1	5.96✓
+50				70.9	7.16✓

966.50

8.08

974.58

.99

973.59

9.40

982.99

3.75

.04

.1500

$$\begin{array}{r} 250 \overline{) 50.0} \\ \underline{50.0} \\ 0 \end{array}$$

966.50

11.56

978.06

65.57

3.75

69.32

69.57

.25

69.42

B.M.	8.33	985.99		977.66	
12 +50				81.1	4.89 ✓
13				79.6	6.39 ✓
+50				77.6	8.39 ✓
T.P.	0.75	978.36	8.38	977.61	
14				75.7	2.66 ✓
+50				74.1	4.24 ✓
15				72.7	5.66 ✓
+50				71.6	6.76 ✓
16				70.7	7.66 ✓
+50				70.1	8.26 ✓
17				69.7	8.66 ✓
+50				69.6	8.76 ✓
18				69.7	8.66 ✓
+50				70.0	8.36 ✓
19				70.6	7.76 ✓
+50				71.5	6.86 ✓
		985.99			
10 +50				81.5	
11				82.2	3.79 ✓
+50				82.4	3.59 ✓
12				82.3	3.69 ✓

977.66

8.33

985.99

8.38

977.61

.75

978.36

86.0

82.0

4.0

4.4

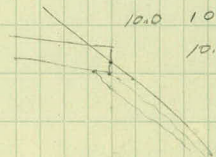
$$\begin{array}{r} 1.25 \\ 4 \overline{) 5.4} \\ \underline{4} \end{array}$$

B.M.	9.64	957.83		948.19	
0+00				47.6	10.23
+50				48.2	9.63 ✓
1				48.8	9.03 ✓
+50				49.5	8.33 ✓
2				50.5	7.33 ✓
+50				51.7	6.13 ✓
3				53.1	4.73 ✓
+50				54.8	3.03 ✓
4				56.7	1.13 ✓
T.P.	12.87	969.57	1.13	956.70	
+50				58.8	10.77 ✓
5				61.2	8.37 ✓
+50				63.7	5.87 ✓
6				66.2	3.37 ✓
+50				68.7	0.87 ✓
T.P.	13.39	982.09	0.87	968.70	
7				71.2	10.89 ✓
+50				73.4	8.49 ✓
8				76.6	6.49 ✓
+50				77.3	4.79 ✓
B.M.			4.42	977.67	977.66
9				78.8	3.29 ✓
+50				80.0	2.09 ✓
10				80.8	1.29 ✓
+50				81.5	.59 ✓
T.P.	6.13	987.63	0.59	981.50	
11				82.2	5.43 ✓
+50				82.4	5.23 ✓

$$\begin{array}{r}
 948.19 \\
 9.64 \\
 \hline
 957.83 \\
 1.13 \\
 \hline
 956.70 \\
 12.87 \\
 \hline
 969.57 \\
 .87 \\
 \hline
 968.70 \\
 12.39 \\
 \hline
 982.09 \\
 0.89 \\
 \hline
 981.50 \\
 6.13 \\
 \hline
 987.63
 \end{array}$$

$$\begin{array}{r}
 982.09 \\
 14.42 \\
 \hline
 977.67
 \end{array}$$

10.1
 9.3 10.2
 9.6 10.3
 10.0 10.4
 10.5



987.63

12

82.3

5.33 ✓

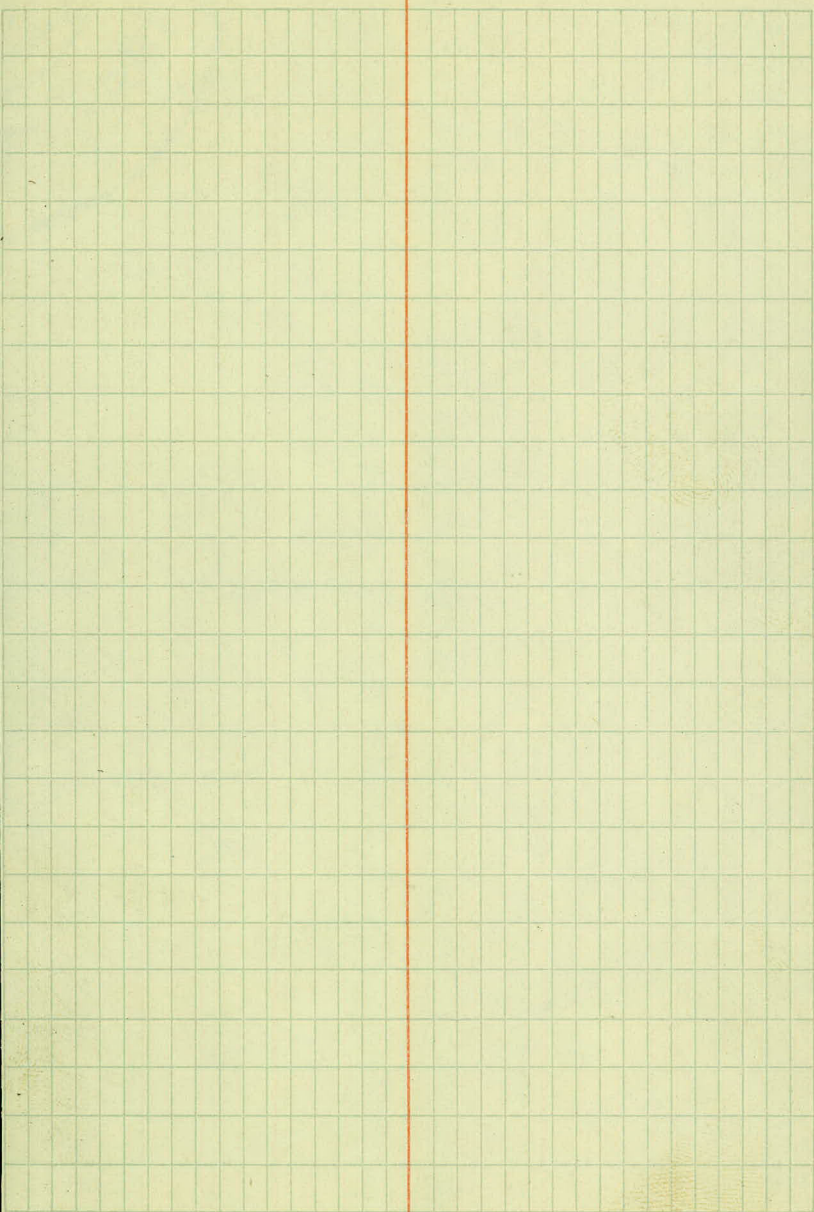
+50

81.1

6.53 ✓

13

79.6



B.M	6.81	955.00		948.19
-----	------	--------	--	--------

0+00				
------	--	--	--	--

+13				
-----	--	--	--	--

+19				
-----	--	--	--	--

+50				
-----	--	--	--	--

+59	X-Drain	24" X 48'	P3	
-----	---------	-----------	----	--

1				
---	--	--	--	--

+50				
-----	--	--	--	--

2				
---	--	--	--	--

+50				
-----	--	--	--	--

3				
---	--	--	--	--

+50				
-----	--	--	--	--

T.P.	12.75	967.51	0.24	954.76
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4				
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7-2-32

Spk. in P.P. N.E. Cor. Snelling & "G"

$$\frac{8.5}{50} \quad 7.0 \quad \frac{5.4}{50}$$

$$\frac{8.7}{50} \quad 7.0 \quad \frac{5.5}{50}$$

$$\frac{11.0}{50} \quad \frac{8.8}{41} \quad \frac{7.8}{23} \quad 1.2 \quad \frac{6.4}{22} \quad \frac{6.3}{50}$$

$$\frac{11.4}{26} \quad \frac{6.8}{15} \quad 6.4 \quad \frac{6.5}{19} \quad \frac{11.3}{29}$$

$$\frac{12.2}{24} \quad \frac{12.4}{21} \quad \frac{6.1}{13} \quad 6.2 \quad \frac{6.1}{13} \quad \frac{10.0}{21} \quad \frac{10.0}{25} \quad \frac{7.9}{29}$$

$$\frac{8.3}{19} \quad \frac{5.6}{13} \quad 5.1 \quad \frac{5.3}{13} \quad \frac{9.1}{20} \quad \frac{9.0}{25} \quad \frac{5.9}{29}$$

$$\frac{7.0}{19} \quad \frac{4.5}{13} \quad 4.5 \quad \frac{4.5}{13} \quad \frac{8.1}{21} \quad \frac{8.2}{24} \quad \frac{6.8}{27}$$

$$\frac{4.5}{22} \quad \frac{5.4}{21} \quad \frac{5.2}{18} \quad \frac{3.3}{13} \quad 3.3 \quad \frac{2.9}{13} \quad \frac{7.6}{22} \quad \frac{7.7}{25} \quad \frac{7.0}{26}$$

$$\frac{4.8}{19} \quad \frac{1.9}{13} \quad 1.9 \quad \frac{1.9}{13} \quad \frac{6.8}{23}$$

$$\frac{3.8}{20} \quad \frac{0.2}{13} \quad 0.2 \quad \frac{0.1}{13} \quad \frac{6.3}{26}$$

$$\frac{14.7}{22} \quad \frac{10.8}{13} \quad 10.8 \quad \frac{10.7}{13} \quad \frac{15.8}{23}$$

967.51

4+50

5

+50

T.P.	6.84	973.91	0.44	967.07
------	------	--------	------	--------

6

+50

7

T.P.	9.60	982.28	1.23	972.68
------	------	--------	------	--------

+50

B.M.	9.68	987.33	4.63	977.65
------	------	--------	------	--------

8

+41

9

+50

$$\frac{11.8}{19} \quad \frac{8.7}{13} \quad 8.7 \quad \frac{8.8}{13} \quad \frac{11.3}{18} \quad \frac{11.4}{22} \quad \frac{10.6}{23}$$

$$\frac{8.1}{25} \quad \frac{9.2}{23} \quad \frac{9.0}{19} \quad \frac{6.4}{13} \quad 6.3 \quad \frac{6.5}{13} \quad \frac{8.7}{17} \quad \frac{8.7}{21} \quad \frac{3.8}{28}$$

$$\frac{4.5}{25} \quad \frac{6.6}{22} \quad \frac{6.6}{18} \quad \frac{4.1}{13} \quad 7.4 \quad \frac{3.8}{13} \quad \frac{6.1}{18} \quad \frac{6.1}{21} \quad \frac{0.0}{30}$$

$$\frac{9.4}{24} \quad \frac{10.4}{22} \quad \frac{10.4}{18} \quad \frac{7.9}{13} \quad 7.7 \quad \frac{7.7}{13} \quad \frac{9.7}{17} \quad \frac{9.7}{22} \quad \frac{6.3}{26}$$

$$\frac{6.6}{25} \quad \frac{8.0}{22} \quad \frac{8.0}{18} \quad \frac{5.3}{13} \quad 5.2 \quad \frac{5.2}{13} \quad \frac{7.0}{17} \quad \frac{7.0}{18} \quad \frac{4.8}{20}$$

$$\frac{2.8}{24} \quad \frac{4.8}{20} \quad \frac{4.7}{17} \quad \frac{2.9}{13} \quad 2.1 \quad \frac{2.7}{13} \quad \frac{4.5}{17} \quad \frac{4.5}{20} \quad \frac{1.0}{24}$$

$$\frac{6.4}{28} \quad \frac{10.7}{21} \quad \frac{10.7}{18} \quad \frac{8.8}{13} \quad 8.8 \quad \frac{8.6}{13} \quad \frac{10.7}{17} \quad \frac{10.7}{21} \quad \frac{2.3}{33}$$

Top of Rock 58' L + Sta. 8+95

$$\frac{9.5}{28} \quad \frac{13.6}{21} \quad \frac{13.6}{18} \quad \frac{11.6}{13} \quad 11.7 \quad \frac{11.4}{13} \quad \frac{13.2}{18} \quad \frac{13.2}{21} \quad \frac{5.1}{33}$$

$$\frac{9.4}{26} \quad \frac{12.0}{21} \quad \frac{12.0}{18} \quad \frac{10.0}{13} \quad 10.3 \quad \frac{10.0}{13} \quad \frac{12.0}{17} \quad \frac{12.0}{21} \quad \frac{1.3}{33}$$

$$\frac{10.2}{22} \quad \frac{10.8}{21} \quad \frac{10.7}{18} \quad \frac{8.4}{13} \quad 8.5 \quad \frac{8.4}{13} \quad \frac{10.7}{18} \quad \frac{10.7}{21} \quad \frac{6.4}{28}$$

$$\frac{12.7}{24} \quad \frac{7.4}{13} \quad 7.3 \quad \frac{7.3}{13} \quad \frac{10.2}{18} \quad \frac{10.3}{21} \quad \frac{8.5}{24}$$

987.33

10

+50

11

T.P.

8.35

993.45

2.23

985.10

+50

12

+43

13

T.P.

3.58

988.68

8.35

985.10

+33

+37

T.P.

1.49

977.21

12.96

975.72

14

+50

7-5-32

$$\begin{array}{ccccccc} & & 6.7 & & & & \\ \frac{10.0}{20} & \frac{6.6}{13} & 6.6 & \frac{6.5}{13} & \frac{10.0}{20} & \frac{10.0}{23} & \frac{8.6}{25} \end{array}$$

$$\begin{array}{ccccccc} & & 4.8 & & & & \\ \frac{8.4}{20} & \frac{5.8}{13} & 5.8 & \frac{5.8}{13} & \frac{10.0}{21} & & \end{array}$$

$$\begin{array}{ccccccc} & & 4.3 & & & & \\ \frac{5.4}{25} & \frac{7.6}{21} & \frac{7.6}{18} & \frac{5.0}{13} & 5.0 & \frac{5.1}{13} & \frac{8.0}{18} & \frac{8.0}{22} & \frac{7.0}{23} \end{array}$$

$$\begin{array}{ccccccc} & & 11.5 & & & & \\ \frac{9.0}{28} & \frac{13.0}{21} & \frac{13.0}{18} & \frac{10.7}{13} & 10.7 & \frac{11.1}{13} & \frac{13.8}{17} & \frac{13.8}{22} & \frac{5.7}{33} \end{array}$$

$$\begin{array}{ccccccc} & & 11.9 & & & & \\ \frac{9.1}{28} & \frac{13.5}{21} & \frac{13.5}{17} & \frac{11.5}{13} & 11.3 & \frac{11.3}{13} & \frac{13.5}{18} & \frac{13.5}{22} & \frac{0.8}{40} \end{array}$$

$$\begin{array}{ccccccc} & & 12.7 & & & & \\ \frac{9.3}{29} & \frac{14.7}{21} & \frac{14.7}{17} & \frac{12.2}{13} & 12.0 & \frac{12.1}{13} & \frac{14.0}{18} & \frac{14.0}{22} & \frac{0.5}{40} \end{array}$$

$$\begin{array}{ccccccc} & & 14.1 & & & & \\ \frac{13.1}{26} & \frac{14.0}{21} & \frac{14.0}{17} & \frac{13.9}{13} & 13.9 & \frac{14.0}{13} & \frac{16.1}{18} & \frac{16.1}{22} & \frac{3.6}{40} \end{array}$$

$$\begin{array}{ccccccc} & & 10.7 & & & & \\ \frac{10.6}{25} & \frac{13.0}{22} & \frac{13.0}{18} & \frac{10.4}{13} & 10.3 & \frac{10.2}{13} & \frac{12.3}{18} & \frac{12.4}{22} & \frac{4.0}{33} \end{array}$$

$$\begin{array}{ccccccc} & & 10.8 & & & & \\ \frac{10.8}{25} & \frac{13.3}{22} & \frac{13.1}{18} & \frac{10.4}{13} & 10.4 & \frac{10.3}{13} & \frac{12.3}{18} & \frac{12.4}{22} & \frac{7.8}{27} \end{array}$$

$$\begin{array}{ccccccc} & & 1.6 & & & & \\ \frac{7.0}{23} & \frac{1.5}{13} & 1.2 & \frac{1.5}{13} & \frac{4.0}{17} & \frac{4.0}{21} & \frac{3.5}{22} \end{array}$$

$$\begin{array}{ccccccc} & & 3.7 & & & & \\ \frac{13.5}{33} & \frac{3.3}{13} & 3.1 & \frac{3.1}{13} & \frac{9.0}{24} & \frac{9.0}{28} & \frac{6.6}{31} \end{array}$$

977.21

15

+30

X-Drain - 24" X 60' P²

+50

16

+68

17

+22

+50

18

+34

19

+50

$$\begin{array}{r} 15.6 \\ 33 \end{array} \quad \begin{array}{r} 4.4 \\ 13 \end{array} \quad \begin{array}{r} 4.2 \\ 4.5 \end{array} \quad \begin{array}{r} 4.6 \\ 13 \end{array} \quad \begin{array}{r} 15.0 \\ 33 \end{array}$$

$$\begin{array}{r} 15.9 \\ 31 \end{array} \quad \begin{array}{r} 15.1 \\ 29 \end{array}$$

$$\begin{array}{r} 16.2 \\ 13 \end{array} \quad \begin{array}{r} 5.7 \\ 13 \end{array} \quad \begin{array}{r} 5.7 \\ 13 \end{array} \quad \begin{array}{r} 5.6 \\ 13 \end{array} \quad \begin{array}{r} 14.0 \\ 28 \end{array} \quad \begin{array}{r} 14.3 \\ 33 \end{array} \quad \begin{array}{r} 13.5 \\ 35 \end{array}$$

$$\begin{array}{r} 15.3 \\ 29 \end{array} \quad \begin{array}{r} 6.5 \\ 13 \end{array} \quad \begin{array}{r} 6.5 \\ 13 \end{array} \quad \begin{array}{r} 6.6 \\ 13 \end{array} \quad \begin{array}{r} 13.2 \\ 22 \end{array} \quad \begin{array}{r} 12.2 \\ 27 \end{array} \quad \begin{array}{r} 10.4 \\ 32 \end{array}$$

$$\begin{array}{r} 3.0 \\ 31 \end{array} \quad \begin{array}{r} 10.4 \\ 22 \end{array} \quad \begin{array}{r} 10.0 \\ 18 \end{array} \quad \begin{array}{r} 7.3 \\ 13 \end{array} \quad \begin{array}{r} 4.1 \\ 7.0 \end{array} \quad \begin{array}{r} 7.0 \\ 13 \end{array} \quad \begin{array}{r} 12.1 \\ 21 \end{array} \quad \begin{array}{r} 12.1 \\ 25 \end{array} \quad \begin{array}{r} 3.7 \\ 33 \end{array}$$

$$\begin{array}{r} 7.6 \\ 27 \end{array} \quad \begin{array}{r} 11.1 \\ 22 \end{array} \quad \begin{array}{r} 11.0 \\ 18 \end{array} \quad \begin{array}{r} 7.6 \\ 13 \end{array} \quad \begin{array}{r} 7.3 \\ 7.4 \end{array} \quad \begin{array}{r} 7.3 \\ 13 \end{array} \quad \begin{array}{r} 12.3 \\ 21 \end{array} \quad \begin{array}{r} 12.3 \\ 25 \end{array} \quad \begin{array}{r} 5.0 \\ 33 \end{array}$$

$$\begin{array}{r} 13.5 \\ 24 \end{array} \quad \begin{array}{r} 7.8 \\ 13 \end{array} \quad \begin{array}{r} 7.4 \\ 7.4 \end{array} \quad \begin{array}{r} 7.4 \\ 13 \end{array} \quad \begin{array}{r} 12.3 \\ 21 \end{array} \quad \begin{array}{r} 12.4 \\ 26 \end{array} \quad \begin{array}{r} 9.1 \\ 32 \end{array}$$

$$\begin{array}{r} 18.6 \\ 33 \end{array} \quad \begin{array}{r} 7.6 \\ 13 \end{array} \quad \begin{array}{r} 7.3 \\ 7.3 \end{array} \quad \begin{array}{r} 7.7 \\ 13 \end{array} \quad \begin{array}{r} 12.2 \\ 21 \end{array} \quad \begin{array}{r} 12.5 \\ 26 \end{array} \quad \begin{array}{r} 11.6 \\ 28 \end{array}$$

$$\begin{array}{r} 17.1 \\ 31 \end{array} \quad \begin{array}{r} 7.4 \\ 13 \end{array} \quad \begin{array}{r} 7.3 \\ 7.3 \end{array} \quad \begin{array}{r} 7.7 \\ 13 \end{array} \quad \begin{array}{r} 11.3 \\ 20 \end{array}$$

$$\begin{array}{r} 10.0 \\ 19 \end{array} \quad \begin{array}{r} 7.3 \\ 13 \end{array} \quad \begin{array}{r} 7.2 \\ 13 \end{array} \quad \begin{array}{r} 7.2 \\ 18 \end{array} \quad \begin{array}{r} 10.0 \\ 22 \end{array} \quad \begin{array}{r} 10.0 \\ 22 \end{array} \quad \begin{array}{r} 8.0 \\ 24 \end{array}$$

$$\begin{array}{r} 8.2 \\ 22 \end{array} \quad \begin{array}{r} 8.8 \\ 21 \end{array} \quad \begin{array}{r} 8.8 \\ 18 \end{array} \quad \begin{array}{r} 6.6 \\ 13 \end{array} \quad \begin{array}{r} 6.4 \\ 6.5 \end{array} \quad \begin{array}{r} 6.4 \\ 13 \end{array} \quad \begin{array}{r} 8.7 \\ 18 \end{array} \quad \begin{array}{r} 8.8 \\ 22 \end{array} \quad \begin{array}{r} 0.5 \\ 33 \end{array}$$

$$\begin{array}{r} 7.2 \\ 23 \end{array} \quad \begin{array}{r} 8.0 \\ 22 \end{array} \quad \begin{array}{r} 8.0 \\ 18 \end{array} \quad \begin{array}{r} 6.0 \\ 13 \end{array} \quad \begin{array}{r} 5.7 \\ 5.7 \end{array} \quad \begin{array}{r} 5.6 \\ 13 \end{array} \quad \begin{array}{r} 8.8 \\ 18 \end{array} \quad \begin{array}{r} 8.8 \\ 22 \end{array} \quad \begin{array}{r} 6.4 \\ 25 \end{array}$$

977.21

B.M. 13.61 980.14 10.68 966.53 966.50

20

+50

21

+50

22

+29

+50

+58 X-Drain 24"X84"PS

+68

T.P. 4.09 983.87 0.36 979.78

23

+50

T.P. 11.47 993.99 1.35 982.52

24

Top of Rock Lt 18+90

$$\frac{9.0}{23} \quad \frac{9.7}{22} \quad \frac{9.7}{18} \quad \frac{7.8}{13} \quad \frac{1.0}{7.4} \quad \frac{7.5}{13} \quad \frac{13.6}{25}$$

$$\frac{6.8}{24} \quad \frac{8.6}{21} \quad \frac{8.6}{17} \quad \frac{6.5}{13} \quad \frac{6.5}{6.3} \quad \frac{6.3}{13} \quad \frac{8.4}{18} \quad \frac{8.4}{21} \quad \frac{6.8}{24}$$

$$\frac{4.9}{25} \quad \frac{7.5}{22} \quad \frac{7.4}{18} \quad \frac{5.3}{13} \quad \frac{5.3}{5.2} \quad \frac{5.2}{13} \quad \frac{7.3}{18} \quad \frac{7.3}{22} \quad \frac{2.4}{28}$$

$$\frac{4.5}{23} \quad \frac{6.1}{21} \quad \frac{6.1}{17} \quad \frac{3.9}{13} \quad \frac{3.9}{3.9} \quad \frac{3.8}{13} \quad \frac{5.7}{17} \quad \frac{5.7}{22} \quad \frac{2.3}{27}$$

$$\frac{6.1}{24} \quad \frac{2.3}{13} \quad \frac{2.3}{2.4} \quad \frac{2.3}{13} \quad \frac{11.1}{30}$$

$$\frac{12.3}{35} \quad \frac{1.6}{13} \quad \frac{1.4}{1.2} \quad \frac{1.4}{13} \quad \frac{15.1}{39}$$

$$\frac{18.0}{40} \quad \frac{0.6}{13} \quad \frac{0.7}{0.5} \quad \frac{0.5}{13} \quad \frac{16.7}{40}$$

$$\frac{18.7}{42} \quad \frac{16.9}{42} \quad \frac{18.9}{40} \quad \frac{0.0}{13} \quad \frac{0.2}{+0.1} \quad \frac{0.0}{13} \quad \frac{16.6}{40}$$

$$\frac{14.6}{40} \quad \frac{2.6}{13} \quad \frac{2.7}{2.6} \quad \frac{2.7}{13} \quad \frac{15.8}{40}$$

$$\frac{8.2}{28} \quad \frac{0.7}{13} \quad \frac{0.7}{0.6} \quad \frac{0.8}{13} \quad \frac{3.5}{19}$$

$$\frac{10.8}{18} \quad \frac{8.6}{13} \quad \frac{8.7}{8.6} \quad \frac{8.5}{13} \quad \frac{10.8}{18} \quad \frac{10.8}{22} \quad \frac{4.6}{30}$$

993.99

24+50

T.P.	10.71	1000.72	3.98	990.01
25				
+50				
T.P.	9.72	1004.72	5.72	995.00
26				
+14				
+20				
+26				
+32				
+42				
+46				
27				

1004.72

27+50

28

B. M.	5.83	1004.73	5.83	998.89	998.90
+50					

29

+50

30

+50

T.P.	2.94	994.12	13.55	991.18
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29

+50

30

+50

$$\begin{array}{ccccccc} \frac{3.0}{32} & \frac{10.7}{22} & \frac{10.7}{18} & \frac{8.7}{13} & 4.5 & \frac{8.5}{13} & \frac{10.3}{17} & \frac{10.4}{30} & \frac{8.4}{33} \\ & & & & 8.4 & & & & \end{array}$$

$$\begin{array}{ccccccc} \frac{3.7}{33} & \frac{11.8}{22} & \frac{11.8}{18} & \frac{9.6}{13} & 4.5 & \frac{9.5}{13} & \frac{11.5}{18} & \frac{11.2}{32} & \frac{10.8}{33} \\ & & & & 9.8 & & & & \end{array}$$

Top of Rock 65' R.A. 26+95

$$\begin{array}{ccccccc} \frac{4.4}{33} & \frac{13.8}{22} & \frac{13.8}{18} & \frac{11.5}{13} & 11.3 & \frac{11.5}{13} & \frac{13.8}{18} & \frac{14.5}{28} \\ & & & & 11.5 & & & \end{array}$$

$$\frac{1.5}{33} \quad 13.5$$

$$\frac{2.3}{33} \quad 15.7$$

$$\frac{7.6}{33} \quad 17.9$$

$$\frac{10.1}{33} \quad 20.0$$

$$\begin{array}{ccccccc} \frac{4.6}{21} & \frac{4.6}{17} & \frac{2.8}{13} & 2.9 & \frac{2.9}{13} & \frac{7.5}{26} \\ & & & 2.7 & & \end{array}$$

$$\begin{array}{ccccccc} \frac{6.5}{21} & \frac{6.7}{17} & \frac{5.1}{13} & 5.1 & \frac{5.1}{13} & \frac{14.1}{31} \\ & & & 5.0 & & \end{array}$$

$$\begin{array}{ccccccc} \frac{8.7}{21} & \frac{8.7}{17} & \frac{7.3}{13} & 13 & \frac{7.6}{13} \\ & & & 7.2 & \end{array}$$

$$\begin{array}{ccccccc} \frac{11.2}{21} & \frac{11.2}{17} & \frac{9.6}{13} & 9.4 & \frac{9.7}{13} \\ & & & 9.6 & \end{array}$$

994.12

31

+50

+70

T.P. 0.26 981.58 12.80 981.32

30

B.M. 3.81 981.57 3.81 977.77 977.76

+50

31

+50

+70

32

+50

33

$$\begin{array}{r} 0.5 \\ 33 \end{array} \quad \begin{array}{r} 13.3 \\ 21 \end{array} \quad \begin{array}{r} 13.4 \\ 17 \end{array} \quad \begin{array}{r} 11.4 \\ 13 \end{array} \quad \begin{array}{r} 11.3 \\ 11.4 \end{array} \quad \begin{array}{r} 11.4 \\ 13 \end{array}$$

$$\begin{array}{r} +0.3 \\ 34 \end{array} \quad \begin{array}{r} 14.8 \\ 21 \end{array} \quad \begin{array}{r} 14.8 \\ 17 \end{array} \quad \begin{array}{r} 12.8 \\ 13 \end{array} \quad \begin{array}{r} 12.9 \\ 12.8 \end{array} \quad \begin{array}{r} 13.1 \\ 13 \end{array}$$

$$\begin{array}{r} +0.7 \\ 35 \end{array} \quad \begin{array}{r} 15.4 \\ 21 \end{array} \quad \begin{array}{r} 15.4 \\ 17 \end{array} \quad \begin{array}{r} 13.4 \\ 13 \end{array} \quad \begin{array}{r} 13.5 \\ 13.4 \end{array} \quad \begin{array}{r} 13.7 \\ 13 \end{array}$$

$$+5.2 \quad \begin{array}{r} 13.1 \\ 40 \end{array}$$

Spk. in 18" Willow 33' Rt. 31+45

$$+3.1 \quad \begin{array}{r} 15.6 \\ 40 \end{array}$$

$$+1.2 \quad \begin{array}{r} 13.5 \\ 40 \end{array}$$

$$0.4 \quad \begin{array}{r} 6.2 \\ 25 \end{array}$$

$$1.0 \quad \begin{array}{r} 6.8 \\ 25 \end{array}$$

$$\begin{array}{r} +2.7 \\ 34 \end{array} \quad \begin{array}{r} 3.7 \\ 25 \end{array} \quad \begin{array}{r} 3.7 \\ 17 \end{array} \quad \begin{array}{r} 1.9 \\ 13 \end{array} \quad \begin{array}{r} 1.9 \\ 1.7 \end{array} \quad \begin{array}{r} 1.9 \\ 13 \end{array} \quad \begin{array}{r} 7.7 \\ 25 \end{array}$$

$$\begin{array}{r} 1.9 \\ 33 \end{array} \quad \begin{array}{r} 4.6 \\ 27 \end{array} \quad \begin{array}{r} 5.1 \\ 18 \end{array} \quad \begin{array}{r} 3.1 \\ 13 \end{array} \quad \begin{array}{r} 3.1 \\ 2.9 \end{array} \quad \begin{array}{r} 3.0 \\ 13 \end{array} \quad \begin{array}{r} 11.3 \\ 30 \end{array}$$

$$\begin{array}{r} 2.5 \\ 32 \end{array} \quad \begin{array}{r} 5.7 \\ 27 \end{array} \quad \begin{array}{r} 6.1 \\ 18 \end{array} \quad \begin{array}{r} 4.1 \\ 13 \end{array} \quad \begin{array}{r} 4.1 \\ 4.0 \end{array} \quad \begin{array}{r} 4.1 \\ 13 \end{array} \quad \begin{array}{r} 6.8 \\ 22 \end{array}$$

981.57

33+50

34

+50

35

35+00

T.P.

X-Drain

8.81

24" X 36' P.3

982.75

7.63

973.94

+50

36

+50

37

T.P.

9.16

989.69

2.22

980.53

+50

38

$$\begin{array}{r} 0.0 \\ 32 \end{array} \quad \begin{array}{r} 6.9 \\ 26 \end{array} \quad \begin{array}{r} 6.9 \\ 18 \end{array} \quad \begin{array}{r} 4.9 \\ 13 \end{array} \quad \begin{array}{r} 5.0 \\ 4.7 \end{array} \quad \begin{array}{r} 4.8 \\ 13 \end{array} \quad \begin{array}{r} 7.4 \\ 20 \end{array}$$

$$\begin{array}{r} 3.7 \\ 33 \end{array} \quad \begin{array}{r} 7.9 \\ 28 \end{array} \quad \begin{array}{r} 8.1 \\ 18 \end{array} \quad \begin{array}{r} 5.8 \\ 13 \end{array} \quad \begin{array}{r} 5.9 \\ 5.7 \end{array} \quad \begin{array}{r} 5.8 \\ 13 \end{array} \quad \begin{array}{r} 18.0 \\ 38 \end{array}$$

$$\begin{array}{r} 4.6 \\ 33 \end{array} \quad \begin{array}{r} 8.9 \\ 29 \end{array} \quad \begin{array}{r} 8.8 \\ 19 \end{array} \quad \begin{array}{r} 6.3 \\ 13 \end{array} \quad \begin{array}{r} 6.5 \\ 6.7 \end{array} \quad \begin{array}{r} 7.0 \\ 13 \end{array} \quad \begin{array}{r} 28.0 \\ 45 \end{array}$$

$$\begin{array}{r} 8.5 \\ 32 \end{array} \quad \begin{array}{r} 9.0 \\ 18 \end{array} \quad \begin{array}{r} 6.5 \\ 13 \end{array} \quad \begin{array}{r} 6.6 \\ 6.7 \end{array} \quad \begin{array}{r} 7.0 \\ 13 \end{array} \quad \begin{array}{r} 28.0 \\ 45 \end{array}$$

$$\begin{array}{r} 8.7 \\ 32 \end{array} \quad \begin{array}{r} 9.4 \\ 30 \end{array} \quad \begin{array}{r} 9.0 \\ 17 \end{array} \quad \begin{array}{r} 7.0 \\ 13 \end{array} \quad \begin{array}{r} 11.2 \\ 7.0 \end{array} \quad \begin{array}{r} 7.4 \\ 13 \end{array} \quad \begin{array}{r} 26.4 \\ 45 \end{array}$$

$$\begin{array}{r} 7.9 \\ 27 \end{array} \quad \begin{array}{r} 8.1 \\ 18 \end{array} \quad \begin{array}{r} 5.9 \\ 13 \end{array} \quad \begin{array}{r} 6.2 \\ 5.9 \end{array} \quad \begin{array}{r} 6.1 \\ 13 \end{array} \quad \begin{array}{r} 14.2 \\ 33 \end{array}$$

$$\begin{array}{r} P \\ 33 \end{array} \quad \begin{array}{r} 6.5 \\ 25 \end{array} \quad \begin{array}{r} 6.8 \\ 19 \end{array} \quad \begin{array}{r} 4.3 \\ 13 \end{array} \quad \begin{array}{r} 4.5 \\ 4.3 \end{array} \quad \begin{array}{r} 4.3 \\ 13 \end{array} \quad \begin{array}{r} 7.4 \\ 23 \end{array} \quad \begin{array}{r} 8.1 \\ 29 \end{array}$$

$$\begin{array}{r} P \\ 33 \end{array} \quad \begin{array}{r} 4.2 \\ 25 \end{array} \quad \begin{array}{r} 4.2 \\ 20 \end{array} \quad \begin{array}{r} 2.2 \\ 13 \end{array} \quad \begin{array}{r} 2.0 \\ 2.2 \end{array} \quad \begin{array}{r} 2.3 \\ 13 \end{array} \quad \begin{array}{r} 4.7 \\ 19 \end{array} \quad \begin{array}{r} 5.4 \\ 29 \end{array}$$

$$\begin{array}{r} P \\ 33 \end{array} \quad \begin{array}{r} 9.0 \\ 25 \end{array} \quad \begin{array}{r} 9.0 \\ 20 \end{array} \quad \begin{array}{r} 6.5 \\ 13 \end{array} \quad \begin{array}{r} 6.6 \\ 6.7 \end{array} \quad \begin{array}{r} 6.9 \\ 13 \end{array} \quad \begin{array}{r} 9.0 \\ 19 \end{array}$$

$$\begin{array}{r} P \\ 33 \end{array} \quad \begin{array}{r} 6.4 \\ 25 \end{array} \quad \begin{array}{r} 6.4 \\ 20 \end{array} \quad \begin{array}{r} 3.8 \\ 13 \end{array} \quad \begin{array}{r} 4.1 \\ 4.0 \end{array} \quad \begin{array}{r} 4.1 \\ 13 \end{array} \quad \begin{array}{r} 11.6 \\ 28 \end{array}$$

Cut Was Taken Out
To 33' But Caved In

989.69

38+50

39

+50

T.P.	13.06	1001.01	1.74	987.95
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39

+50

40

+50

41

T.P.	13.73	1014.24	0.50	1000.51
------	-------	---------	------	---------

+50

42

$$\begin{array}{ccccccc} & & & & 1.6 & & \\ \frac{P}{33} & \frac{4.3}{26} & \frac{4.3}{20} & \frac{1.7}{13} & & \frac{1.7}{13} & \frac{1.5}{34} \\ & & & 1.6 & & & \end{array}$$

$$\frac{14.4}{40}$$

$$\frac{16.0}{40}$$

$$\begin{array}{ccccccc} & & & & 10.4 & & \\ \frac{11.6}{28} & \frac{13.0}{26} & \frac{13.0}{19} & \frac{10.3}{13} & & \frac{10.6}{13} & \\ & & & 10.4 & & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 7.9 & & \\ \frac{9.0}{28} & \frac{10.7}{26} & \frac{10.7}{20} & \frac{7.8}{13} & & \frac{7.9}{13} & \\ & & & 7.9 & & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 5.4 & & \\ \frac{7.7}{28} & \frac{8.0}{19} & \frac{5.6}{13} & & \frac{5.4}{13} & \frac{16.3}{31} & \\ & & & 5.3 & & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 7.9 & & \\ \frac{5.8}{27} & \frac{5.4}{19} & \frac{2.7}{13} & & \frac{2.9}{13} & \frac{8.6}{24} & \\ & & & 2.7 & & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 0.3 & & \\ \frac{2.4}{18} & \frac{0.1}{13} & & & \frac{0.4}{13} & \frac{4.5}{22} & \\ & & & 0.0 & & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 11.1 & & \\ \frac{13.3}{18} & \frac{11.0}{13} & & & \frac{11.1}{13} & \frac{16.2}{24} & \\ & & & 11.0 & & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 8.7 & & \\ \frac{4.7}{31} & \frac{10.7}{22} & \frac{10.7}{18} & \frac{8.4}{13} & & \frac{8.5}{13} & \frac{10.7}{18} \\ & & & 8.5 & & \frac{11.0}{26} & \frac{10.6}{27} \end{array}$$

1014.24

42+50

+68

43

T.P.

12.62

1025.71

1.15

1013.09

+50

44

+50

45

+50

46

+38

+50

$\frac{+1.6}{32}$	$\frac{8.1}{21}$	$\frac{8.2}{17}$	$\frac{5.9}{13}$	$\frac{6.1}{5.8}$	$\frac{5.8}{13}$	$\frac{9.0}{22}$	$\frac{9.3}{25}$	$\frac{8.8}{26}$
-------------------	------------------	------------------	------------------	-------------------	------------------	------------------	------------------	------------------

$\frac{0.0}{32}$	$\frac{7.2}{21}$	$\frac{7.3}{17}$	$\frac{4.9}{13}$	$\frac{5.2}{4.9}$	$\frac{5.0}{13}$	$\frac{13.7}{30}$
------------------	------------------	------------------	------------------	-------------------	------------------	-------------------

$\frac{3.8}{24}$	$\frac{5.2}{21}$	$\frac{5.1}{17}$	$\frac{3.3}{13}$	$\frac{3.6}{3.4}$	$\frac{3.6}{13}$	$\frac{8.7}{24}$
------------------	------------------	------------------	------------------	-------------------	------------------	------------------

$\frac{7.9}{31}$	$\frac{14.1}{21}$	$\frac{14.1}{17}$	$\frac{12.5}{13}$	$\frac{11.6}{12.0}$	$\frac{12.3}{13}$	$\frac{14.1}{17}$	$\frac{14.4}{22}$	$\frac{10.7}{28}$
------------------	-------------------	-------------------	-------------------	---------------------	-------------------	-------------------	-------------------	-------------------

$\frac{+0.3}{40}$	$\frac{12.2}{21}$	$\frac{12.2}{17}$	$\frac{10.1}{13}$	$\frac{11.1}{9.6}$	$\frac{10.0}{13}$	$\frac{11.7}{17}$	$\frac{11.7}{21}$	$\frac{5.3}{31}$
-------------------	-------------------	-------------------	-------------------	--------------------	-------------------	-------------------	-------------------	------------------

$\frac{10.1}{21}$	$\frac{10.1}{17}$	$\frac{7.6}{13}$	$\frac{11.8}{7.3}$	$\frac{7.8}{13}$	$\frac{9.8}{17}$	$\frac{9.8}{21}$	$\frac{5.1}{28}$
-------------------	-------------------	------------------	--------------------	------------------	------------------	------------------	------------------

$\frac{8.0}{21}$	$\frac{8.0}{17}$	$\frac{6.0}{13}$	$\frac{6.0}{5.6}$	$\frac{6.0}{13}$	$\frac{8.0}{17}$	$\frac{8.0}{25}$	$\frac{10.4}{30}$
------------------	------------------	------------------	-------------------	------------------	------------------	------------------	-------------------

$\frac{6.3}{21}$	$\frac{6.3}{17}$	$\frac{4.7}{13}$	$\frac{4.7}{4.2}$	$\frac{4.7}{13}$	$\frac{6.5}{17}$	$\frac{6.6}{21}$	$\frac{5.8}{23}$	$\frac{6.0}{27}$	$\frac{7.4}{30}$
------------------	------------------	------------------	-------------------	------------------	------------------	------------------	------------------	------------------	------------------

$\frac{6.0}{21}$	$\frac{5.9}{17}$	$\frac{4.0}{13}$	$\frac{3.9}{3.3}$	$\frac{3.8}{13}$	$\frac{5.6}{17}$	$\frac{5.6}{20}$	$\frac{3.9}{24}$	$\frac{5.4}{33}$
------------------	------------------	------------------	-------------------	------------------	------------------	------------------	------------------	------------------

$\frac{5.6}{22}$	$\frac{5.6}{17}$	$\frac{3.4}{13}$	$\frac{2.9}{3.0}$	$\frac{3.4}{13}$	$\frac{5.2}{17}$	$\frac{5.2}{20}$	$\frac{1.1}{27}$
------------------	------------------	------------------	-------------------	------------------	------------------	------------------	------------------

$\frac{5.7}{24}$	$\frac{5.7}{17}$	$\frac{3.4}{13}$	$\frac{3.4}{3.3}$	$\frac{3.5}{13}$	$\frac{5.5}{17}$	$\frac{5.5}{20}$	$\frac{1.4}{27}$
------------------	------------------	------------------	-------------------	------------------	------------------	------------------	------------------

2 Readings Taken on Top of Clay
Shoulder Readings Are Grade

1025.71

T.P. 13.19 1038.33 0.57 1025.14

44+50

45

+50

46

+38

+50

T.P. 1.23 1026.37 13.19 1025.14

47

+50

48

+50

49

$$\frac{3.4}{40}$$

29.4

$$\frac{2.3}{40}$$

18.6

$$\frac{2.0}{40}$$

17.3

$$\frac{4.5}{40}$$

16.5

$$\frac{10.4}{38} \quad \frac{11.4}{34}$$

16.3

$$\frac{7.8}{36}$$

16.0

$$\frac{5.0}{32}$$

$$\frac{6.8}{28}$$

$$\frac{7.2}{18}$$

$$\frac{4.4}{13}$$

4.2

$$\frac{4.5}{13}$$

$$\frac{8.6}{22}$$

$$\frac{8.6}{21}$$

$$\frac{4.5}{13}$$

4.5

$$\frac{4.7}{13}$$

4 Drive

$$\frac{9.2}{21}$$

$$\frac{4.9}{13}$$

4.8

$$\frac{4.8}{13}$$

$$\frac{10.0}{24}$$

$$\frac{6.9}{23}$$

$$\frac{7.4}{21}$$

$$\frac{7.5}{17}$$

$$\frac{5.1}{13}$$

5.1

$$\frac{5.3}{13}$$

$$\frac{7.4}{17}$$

$$\frac{7.2}{20}$$

$$\frac{7.4}{21}$$

$$\frac{2.1}{29}$$

$$\frac{7.6}{22}$$

$$\frac{2.6}{18}$$

$$\frac{5.4}{13}$$

5.4

$$\frac{5.4}{13}$$

$$\frac{7.9}{18}$$

$$\frac{8.2}{21}$$

$$\frac{7.0}{23}$$

1026.37

49+50

50

+50

T.P.	0.65	1017.28	9.74	1016.63
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51

+50

52

T.P.	3.04	1009.87	10.45	1006.83
------	------	---------	-------	---------

+40

B.M.	0.38	1003.22	7.05	1002.82	1002.84
------	------	---------	------	---------	---------

53

+50

+66 X-Drain 24" X 48' P3

54

+50

+75 End of Project.

B.M.			0.38	1002.84
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$$\frac{1.0}{32} \quad \frac{8.5}{21} \quad \frac{8.4}{18} \quad \frac{6.0}{13} \quad \frac{6.1}{6.0} \quad \frac{6.2}{13} \quad \frac{8.2}{17} \quad \frac{8.3}{21} \quad \frac{2.0}{23}$$

$$\frac{5.5}{27} \quad \frac{9.7}{21} \quad \frac{9.6}{17} \quad \frac{7.6}{13} \quad \frac{7.6}{7.4} \quad \frac{7.5}{13} \quad \frac{9.4}{17} \quad \frac{9.6}{21} \quad \frac{8.7}{24}$$

$$\frac{9.3}{25} \quad \frac{11.9}{21} \quad \frac{11.9}{17} \quad \frac{9.7}{13} \quad \frac{9.7}{9.7} \quad \frac{9.7}{13} \quad \frac{12.5}{20}$$

$$\frac{0.5}{29} \quad \frac{5.5}{21} \quad \frac{5.5}{17} \quad \frac{3.4}{13} \quad \frac{2.7}{3.4} \quad \frac{3.7}{13} \quad \frac{11.8}{29}$$

$$\frac{1.3}{32} \quad \frac{8.6}{21} \quad \frac{8.6}{17} \quad \frac{6.7}{13} \quad \frac{7.1}{6.7} \quad \frac{6.9}{13} \quad \frac{12.3}{24}$$

$$\frac{3.9}{33} \quad \frac{12.3}{20} \quad \frac{12.2}{17} \quad \frac{10.5}{13} \quad \frac{10.5}{10.4} \quad \frac{10.5}{13} \quad \frac{13.1}{20} \quad \frac{13.4}{32}$$

$$\frac{0.2}{33} \quad \frac{7.7}{21} \quad \frac{7.7}{17} \quad \frac{5.8}{13} \quad \frac{5.8}{5.8} \quad \frac{5.9}{13} \quad \frac{8.8}{20} \quad \frac{8.8}{31} \quad \frac{8.0}{33}$$

N. W. Cor. Mont.

$$\frac{1.0}{33} \quad \frac{5.1}{25} \quad \frac{5.1}{18} \quad \frac{3.1}{13} \quad \frac{3.1}{3.2} \quad \frac{3.1}{13} \quad \frac{9.8}{27}$$

$$\frac{11.2}{23} \quad \frac{5.5}{13} \quad \frac{5.5}{5.3} \quad \frac{5.5}{13} \quad \frac{11.8}{24}$$

$$\frac{12.6}{24} \quad \frac{12.0}{24}$$

$$\frac{13.3}{26} \quad \frac{7.0}{13} \quad \frac{6.6}{6.7} \quad \frac{6.8}{13} \quad \frac{10.0}{20}$$

$$\frac{11.6}{23} \quad \frac{7.3}{13} \quad \frac{6.8}{7.0} \quad \frac{7.0}{13} \quad \frac{7.3}{14}$$

0+59	X-Drain	24" X 48' P3	
6+22	£ Dr. Rt.	18" X 22' C.M.	
6+80	£ Dr. Lt.	18" X 20' C.M.	
13+42	£ Dr. Rt.	18" X 22' C.M.	
15+30	X-Drain	24" X 60' P3	
16+00	£ Dr. Rt.	15" X 24' C.M.	4' old Pipe 20' New "
22+58	X-Drain	24" X 84' P3	
23+56	£ Dr. Rt.	15" X 20' C.M.	
24+38	£ Dr. Lt.	15" X 20' C.M.	
31+25	£ Dr. Rt.		
35+00	X-Drain	24" X 36' P3	
42+92	£ Dr. Lt.	15" X 20' C.M.	
47+55	£ Dr. Rt.		
53+66	X-Drain	24" X 48' P3	

C

F

2' X 3' X 20' Fill

6

2' X 5' X 20' "

7

3' X 5' X 20' "

13' X 22' X 0.5' Cut

7 ~~11~~ 11

5' X 10' X 20' Fill

37

2' X 6' X 18' Fill

8

2' X 5' X 18' "

7

15' X 66' X 1' "

37

6' X 38' Stone Gutter @ Invert

6' X 18' X 2.5' Fill

10

20' X 50' X 0.5' "

18

B.M. 4.83 953.02 948.19

0+00	} Rad. Pt.	3.0 ✓
+08		3.32 ✓
+16		3.63 ✓
+24		3.94 ✓
+32		4.25 ✓
+40		4.56 ✓
+48		4.54 ✓
+56		4.52 ✓
+64		4.50 ✓
+72		4.48 ✓
+80		4.46 ✓
+88		4.44 ✓
+96 = 0+75		48.6 4.42 ✓

0+00	} Rad. Lt.	6.72 ✓
+08		6.42 ✓
+16		6.12 ✓
+24		5.82 ✓
+32		5.52 ✓
+40		5.22 ✓
+48		5.08 ✓
+56		4.94 ✓
+64		4.80 ✓
+72		4.66 ✓
+80 = 0+75		48.5 4.52 ✓

6.72

6.50

6.28

6.06

5.84

5.62

5.40

5.18

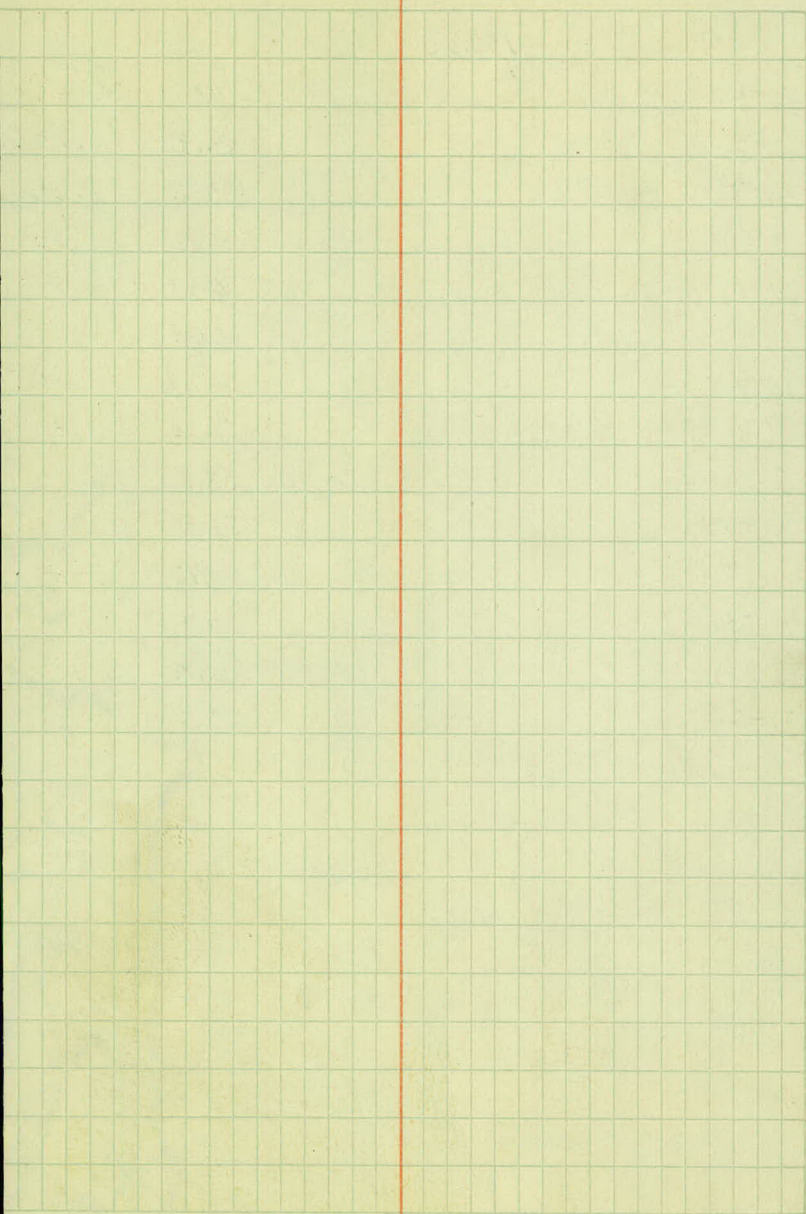
4.96

4.74

4.52

953.02

1400			48.8 ✓	48.8	4.22 ✓
+25			49.1 ✓	49.13	3.89 ✓
+50			49.4 ✓	49.52	3.50 ✓
+75			49.7 ✓	49.97	3.05 ✓
2			50.0 ✓	50.47	2.55 ✓
+25			50.3 ✓	51.05	1.97 ✓
B.M.	11.02	959.21		948.19	
+50			50.6 ✓	51.67	7.54 ✓
+75			50.9 ✓	52.36	6.85 ✓
3			51.2 ✓	53.1	6.11 ✓
+25			51.5 ✓	53.9	5.31 ✓
+50			51.8 ✓	54.77	4.44 ✓
+75			52.1 ✓	55.7	3.51 ✓
4			52.4 ✓	56.68	2.53 ✓
+25			52.7	57.72	1.49 ✓
+50			53.0	58.82	0.39 ✓



B.M.	6.00	983.65		977.65	
9+25			79.95	79.41	4.24 ✓
+50			80.1	79.95	3.70 ✓
+75			80.45	80.41	3.24 ✓
10			80.8	80.8	2.85 ✓
+25				81.15	2.50 ✓
+50				81.5	2.15 ✓
+75				81.85	1.80 ✓
11				82.2	1.45 ✓
T.P.	1.53	979.21	5.97	977.68	
13+75		.03	74.6	76.63	2.58 ✓
14		.12	75.4	75.72	3.49 ✓
+25		.28	74.6	74.88	4.33 ✓
+50		.50	73.6	74.10	5.11 ✓
+75		.79	72.6	73.39	5.82 ✓
15		1.14	71.6	72.74	6.47 ✓
+25		1.54	70.6	72.14	7.07 ✓
+50		2.00	69.6	71.60	7.61 ✓
+75		2.53	68.6	71.13	8.08 ✓
16		3.13	67.6	70.73	8.48 ✓
+25		3.79	66.6	70.39	8.82 ✓
+50		4.50	65.6	70.10	9.11 ✓
+75		3.79	66.1	69.89	9.32 ✓
17		3.13	66.6	69.73	9.48 ✓

$$\begin{array}{r} 977.68 \\ 1.53 \\ \hline 979.21 \end{array}$$

979.21

T.P.	8.70	978.43	9.48	969.73	
17+25		2.53	67.1	69.63	8.80 ✓
+50		2.00	67.6	69.60	8.83 ✓
+75		1.54	68.1	69.64	8.79 ✓
18		1.14	68.6	69.74	8.69 ✓
+25		.79	69.1	69.89	8.54 ✓
+50		.50	69.6	70.10	8.33 ✓
19+50				71.5	6.93 ✓
+75				72.0	6.43 ✓
20				72.5	5.93 ✓
+25				73.02	5.41 ✓
T.P.	8.10	985.59	0.94	977.49	
21+75		.94	76.0	76.94	8.65 ✓
22		1.21	76.5	77.71	7.88 ✓
+25		1.52	77.0	78.52	7.07 ✓
+50		1.88	77.5	79.38	6.21 ✓
+75		2.28	78.0	80.28	5.31 ✓
23		2.72	78.5	81.22	4.37 ✓
+25		3.20	79.0	82.20	3.39 ✓
+50		3.70	79.5	83.20	2.39 ✓
+75		4.25	80.0	84.25	1.34 ✓
24		4.85	80.5	85.25	0.34 ✓

979.21	78.43
<u>8.48</u>	<u>966.80</u>
969.73	1193
<u>8.70</u>	
978.43	
<u>.94</u>	
977.49	
<u>8.10</u>	
985.59	

B.M.	0.02	998.92		998.90	
T.P.	0.79	994.48	5.23	993.69	
28+50				93.4	1.08 ✓
+75				92.3	
29				91.2	3.28 ✓
+25				90.1	
+50				89.0	5.48 ✓
+75				87.9	
30				86.8	7.68 ✓
+25				85.73	8.75 ✓
+50				84.71	9.77 ✓
+75				83.75	10.73 ✓
31				82.84	11.64 ✓
+25	2.00	983.99	12.49	981.99	12.49 ✓
+50				81.20	2.79 ✓
+75				80.43	3.56 ✓
32				79.73	4.26 ✓
+25				79.10	4.89 ✓
+50				78.5	5.49 ✓
+75				77.98	6.01 ✓
33				77.50	6.49 ✓
+25				77.05	6.94 ✓
+50				76.60	7.39 ✓
+75				76.15	7.84 ✓

998.92

5.23

993.69

1.79

994.48

31+60

28+60

240

28+60 Beg

240'

32+90

31+50

140

01

12 5156

12

20

32+94

31+50

144

End

Beg

144'

+94 End

+48 Beg

983.99

34				75.70	8.29 ✓
+25				75.32	8.67 ✓
+50				75.08	8.91 ✓
+75				74.99	9.00 ✓
35				75.04	8.95 ✓
+25				75.22	8.77 ✓
+50				75.55	8.44 ✓
+75				76.02	7.97 ✓
36				76.63	7.36 ✓
+25				77.37	6.62 ✓
+50				78.30	
T.P.	10.77	994.15	0.61	983.38	
37+50				83.1	11.05 ✓
38				85.6	8.55 ✓
+50				88.1	6.05 ✓
39				90.6	3.55 ✓
+50	11.88	1004.98	1.05	993.1	1.05 ✓
40				95.6	9.38 ✓
+50				98.1	6.88 ✓
41				00.6	4.38 ✓
+50	11.09	1014.19	1.88	1003.1	1.88 ✓
42				05.6	8.59 ✓
+25				06.85	7.34 ✓
+50				08.1	6.09 ✓
43				10.6	3.59 ✓
+25				11.85	2.34 ✓
				12.1	

276'

+24 End

+52 Beg.

432'

+84 End

+45 Beg.

+05 End

983.38

10.77

994.15

1.05

995.10

11.88

36+20 1004.98

33+48 1.88

12/282 1003.10

24

42

36

6

36+24

33+48

12/276 (23)

24

36

1003.10

11.09

1014.19

41+84

37+52

12/432 (36)

36

72

T.P.	0.92	1026.06		1025.14	
47+25				22.05	4.01 ✓
+50				21.90	4.16 ✓
+75				21.75	4.31 ✓
48				21.60	4.46 ✓
+25				21.45	4.61 ✓
+50				21.30	4.76 ✓
T.P.	1.44	1019.29	8.21	1017.85	
50+25				17.83	1.46 ✓
+50				16.61	2.68 ✓
+75				15.20	4.09
51				13.60	5.69 ✓
+25				11.90	
+50				10.20	9.09 ✓
+75				08.50	
52			12.49	10 06.80	12.49 ✓
+25				05.10	
+50				03.40	
+75				01.7	
53				00.13	
+25				98.85	
+50				97.83	
+75				97.05	
54				96.58	
+25				96.35	
+50				96.40	
+75				96.70	

1026.06 8.21 1017.85 1.44 1019.29

0+00 to 0+75 Lt. 80'-8' Ctr. } 2 Anchors
0+75 to 1+59 " 84'-12' Ctr. }

0+00 to 0+75 Rt. 96'-8' Ctr. } 2 Anchors
0+75 to 4+23 " 348'-12' Ctr. }

9+27 to 9+99 Lt. 72' ✓ 2

10+10 to 10+82 Rt. 72' ✓ 2

13+87 to 16+27 Lt. 240' ✓ 2

14+19 to 15+87 Rt. 168' ✓ 2

16+21 to 18+01 Rt. 180' ✓ 2

17+20 to 18+40 Lt. 120' ✓ 2

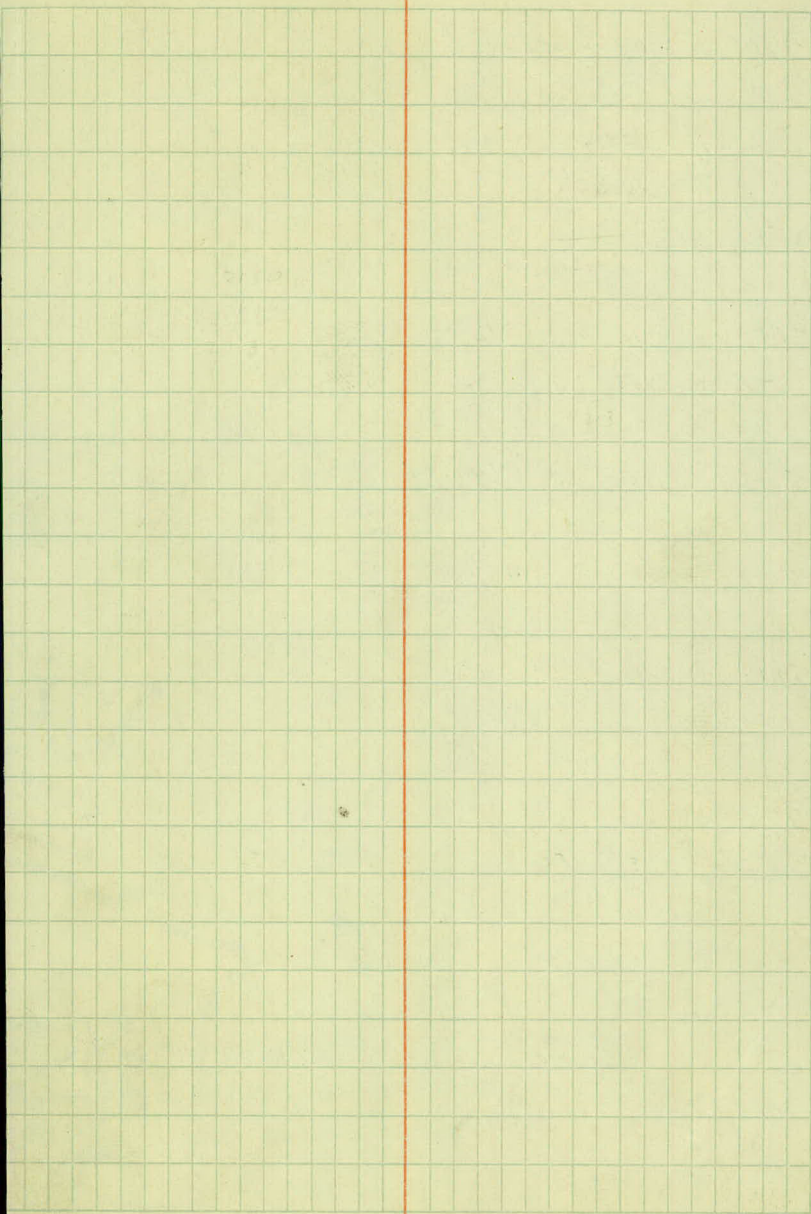
19+48 to 20+20 Rt. 72' ✓ 2

21+80 to 23+36 Rt. 156' ✓ 2

22+12 to 23+80 Lt. 168' ✓ 2

28+60 to 31+00 Rt. 240' ✓ 2

31+50 to 32+94 Rt. 144' ✓ 2



33+48 to 36+24 Rt. 276' ✓ 2 Anchors

37+52 to 41+84 Rt. 432' ✓ 2

42+45 to 43+05 Rt. 60' ✓ 2

47+30 to 48+26 Lt. 96' ✓ 2

47+78 to 48+26 Rt. 48' ✓ 2

50+36 to 51+80 Rt. 144' ✓ 2

52+50 to 53+94 Rt. 144' ✓ 2

52+97 to 54+29 Lt. 132' ✓ 2

3396' ✓ - 12' CFS

176' ✓ - 8' "

3572 ✓
42

Anchors

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 $23^{\circ} 20' = 120.87$

$120.87 \div 12 = 10.07$. Say a 10° Curve.

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

$1183.1 \div 10 = 118.31$.

Tab. V. correction for A. $23^{\circ} 20'$ for a 10° Cur.=0.16

$118.31 + 0.16 = 118.47 = \text{corrected Tangent.}$

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

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

$2^{\circ} 19\frac{1}{2}' = \text{def. for sta.}$	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° Curve.

Def. for 36.86 ft.= $1^{\circ} 50\frac{1}{2}'$ for a 10° Curve

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

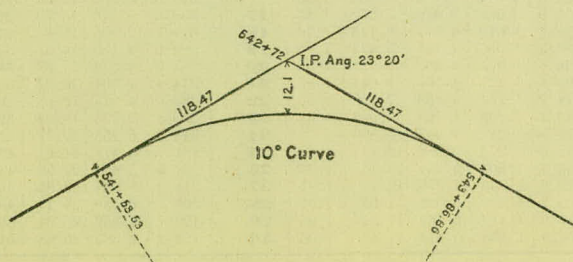


TABLE I. — Minutes in Decimals of a Degree.

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	$\frac{1}{8}$	3-16	$\frac{1}{4}$	5-16	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
.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.	.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	8	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	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	9	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	10	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	11	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	12	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	16	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.781	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	17	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	19	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	21	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	22	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	23	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	24	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	25	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	29	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	30	193.2	6.583	25.88	51.76	9.00

TABLE IV. — Tangents and External 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	300.28	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
31°	1589.0	216.3	41°	2142.2	387.4	51°	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
32	1643.0	230.9	42	2199.4	407.6	52	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
33	1697.2	246.1	43	2257.0	428.5	53	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
34	1751.7	261.8	44	2314.9	450.0	54	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
35	1806.6	278.1	45	2373.3	472.1	55	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	483.4	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
36	1861.7	294.9	46	2432.1	494.8	56	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
37	1917.1	312.2	47	2491.3	518.2	57	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
38	1972.9	330.2	48	2551.0	542.2	58	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
39	2029.0	348.6	49	2611.2	566.9	59	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
40	2085.4	367.7	50	2671.8	592.3	60	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
61°	3375.0	920.2	71°	4086.9	1308.2	81°	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
62	3442.7	954.8	72	4162.8	1352.6	82	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
63	3511.1	990.2	73	4239.7	1398.0	83	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	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64	3580.3	1026.6	74	4317.6	1444.6	84	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
65	3650.2	1063.9	75	4396.5	1492.4	85	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
66	3720.9	1102.2	76	4476.5	1541.4	86	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
67	3792.4	1141.4	77	4557.6	1591.6	87	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
68	3864.7	1181.6	78	4639.8	1643.0	88	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
69	3937.9	1222.7	79	4723.2	1695.8	89	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
70	4011.9	1265.0	80	4807.7	1749.9	90	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 Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	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
92	5933.2	2518.5	102	7075.5	3374.9	112	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
93	6037.8	2594.0	103	7203.2	3474.4	113	8656.6	4651.3
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
94	6144.3	2671.6	104	7333.6	3576.8	114	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
95	6252.8	2751.3	105	7467.0	3682.3	115	8993.8	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
96	6363.4	2833.2	106	7603.5	3791.0	116	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
97	6476.2	2917.3	107	7743.2	3902.9	117	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
98	6591.2	3003.8	108	7886.2	4018.2	118	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
99	6708.6	3092.7	109	8032.7	4137.1	119	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
100	6828.3	3184.1	110	8182.8	4259.7	120	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	.70	.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	4.49	4.98	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 Externals 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	.029	.032	.035	.039	.043	.047	.051
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	.046	.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	.711	.845	.922	1.01
70°		.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°		.095	.182	.286	.383	.480	.578	.678	.777	.877	.977	1.07	1.18	1.29	1.39
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	.985	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 sin. def. ang.	$\frac{1}{2}$ sub chord R = sin of def. angle				Length of arc 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.

$$T = R \tan \frac{1}{2} I$$

$$T = \frac{50 \tan \frac{1}{2} I}{\sin D}$$

$$\sin D = \frac{50}{R}$$

$$\sin D = \frac{50 \tan \frac{1}{2} I}{T}$$

$$R = T \cot \frac{1}{2} I$$

$$R = \frac{50}{\sin D}$$

$$E = R \sec \frac{1}{2} I$$

$$E = T \tan \frac{1}{4} I$$

$$\text{Chord def.} = \frac{\text{chord}^2}{R}$$

$$\text{No. chords} = \frac{\frac{1}{2} I}{D}$$

$$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$$

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. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 = \text{Base}$.

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 7.

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	40	6428	6450	6472	6494	6517	6539	49
1	0175	0204	0233	0262	0291	0320	88	41	6561	6583	6604	6626	6648	6670	48
2	0349	0378	0407	0436	0465	0494	87	42	6691	6713	6734	6756	6777	6799	47
3	0523	0552	0581	0610	0640	0669	86	43	6820	6841	6862	6884	6905	6926	46
4	0698	0727	0756	0785	0814	0843	85	44	6947	6967	6988	7009	7030	7050	45
5	0872	0901	0929	0958	0987	1016	84	45	7071	7092	7112	7133	7153	7173	44
6	1045	1074	1103	1132	1161	1190	83	46	7193	7214	7234	7254	7274	7294	43
7	1219	1248	1276	1305	1334	1363	82	47	7314	7333	7353	7373	7392	7412	42
8	1392	1421	1449	1478	1507	1536	81	48	7431	7451	7470	7490	7509	7528	41
9	1564	1593	1622	1650	1679	1708	80	49	7547	7566	7585	7604	7623	7642	40
10	1736	1765	1794	1822	1851	1880	79	50	7660	7679	7698	7716	7735	7753	39
11	1908	1937	1965	1994	2022	2051	78	51	7771	7790	7808	7826	7844	7862	38
12	2079	2108	2136	2164	2193	2221	77	52	7880	7898	7916	7934	7951	7969	37
13	2250	2278	2306	2334	2363	2391	76	53	7986	8004	8021	8039	8056	8073	36
14	2419	2447	2476	2504	2532	2560	75	54	8090	8107	8124	8141	8158	8175	35
15	2588	2616	2644	2672	2700	2728	74	55	8192	8208	8225	8241	8258	8274	34
16	2756	2784	2812	2840	2868	2896	73	56	8290	8307	8323	8339	8355	8371	33
17	2924	2952	2979	3007	3035	3062	72	57	8387	8403	8418	8434	8450	8465	32
18	3090	3118	3145	3173	3201	3228	71	58	8480	8496	8511	8526	8542	8557	31
19	3256	3283	3311	3338	3365	3393	70	59	8572	8587	8601	8616	8631	8646	30
20	3420	3448	3475	3502	3529	3557	69	60	8660	8675	8689	8704	8718	8732	29
21	3584	3611	3638	3665	3692	3719	68	61	8746	8760	8774	8788	8802	8816	28
22	3746	3773	3800	3827	3854	3881	67	62	8829	8843	8857	8870	8884	8897	27
23	3907	3934	3961	3987	4014	4041	66	63	8910	8923	8936	8949	8962	8975	26
24	4067	4094	4120	4147	4173	4200	65	64	8988	9001	9013	9026	9038	9051	25
25	4226	4253	4279	4305	4331	4358	64	65	9063	9075	9088	9100	9112	9124	24
26	4384	4410	4436	4462	4488	4514	63	66	9135	9147	9159	9171	9182	9194	23
27	4540	4566	4592	4617	4643	4669	62	67	9205	9216	9228	9239	9250	9261	22
28	4695	4720	4746	4772	4797	4823	61	68	9272	9283	9293	9304	9315	9325	21
29	4848	4874	4899	4924	4950	4975	60	69	9336	9346	9356	9367	9377	9387	20
30	5000	5025	5050	5075	5100	5125	59	70	9397	9407	9417	9426	9436	9446	19
31	5150	5175	5200	5225	5250	5275	58	71	9455	9465	9474	9483	9492	9502	18
32	5299	5324	5348	5373	5398	5422	57	72	9511	9520	9528	9537	9546	9555	17
33	5446	5471	5495	5519	5544	5568	56	73	9563	9572	9580	9588	9596	9605	16
34	5592	5616	5640	5664	5688	5712	55	74	9613	9621	9628	9636	9644	9652	15
35	5736	5760	5783	5807	5831	5854	54	75	9659	9667	9674	9681	9689	9696	14
36	5878	5901	5925	5948	5972	5995	53	76	9703	9710	9717	9724	9730	9737	13
37	6018	6041	6065	6088	6111	6134	52	77	9744	9750	9757	9763	9769	9775	12
38	6157	6180	6202	6225	6248	6271	51	78	9781	9787	9793	9799	9805	9811	11
39	6293	6316	6338	6361	6383	6406	50	79	9816	9822	9827	9833	9838	9843	10
DEG.	60'	50'	40'	30'	20'	10'	DEG.	60'	50'	40'	30'	20'	10'	DEG.	
80	9848	9853	9858	9863	9868	9872	9	9872	9						
81	9877	9881	9886	9890	9894	9899	8	9899	8						
82	9903	9907	9911	9914	9918	9922	7	9922	7						
83	9925	9929	9932	9936	9939	9942	6	9942	6						
84	9945	9948	9951	9954	9957	9959	5	9959	5						
85	9962	9964	9967	9969	9971	9974	4	9974	4						
86	9976	9978	9980	9981	9983	9985	3	9985	3						
87	9986	9988	9989	9990	9992	9993	2	9993	2						
88	9994	9995	9996	9997	9997	9998	1	9998	1						
89	9998	9999	9999	9999	I.0000	I.0000	0	I.0000	0						
DEG.	60'	50'	40'	30'	20'	10'	DEG.								

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	89	40	8391	8441	8491	8541	8591	8642	49
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952	48
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271	47
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601	46
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942	45
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295	44
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0661	43
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041	42
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	41
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847	40
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	39
11	1944	1974	2004	2035	2065	2095	78	51	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723	38
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190	37
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3432	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	35
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733	34
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	33
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900	32
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	31
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205	30
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917	29
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676	28
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486	27
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	26
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	25
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	24
26	4877	4913	4950	4986	5022	5059	63	66	2.2460	2.2637	2.2817	2.2998	2.3183	2.3369	23
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545	22
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826	21
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	20
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8239	2.8502	2.8770	19
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9319	2.9600	2.9887	3.0178	3.0475	18
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	17
33	6494	6536	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	16
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891	15
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8667	3.9136	3.9617	14
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	13
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	12
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658	11
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764	10
deg.	60'	50'	40'	30'	20'	10'	deg.	60'	50'	40'	30'	20'	10'	deg.	

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	10.711	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	42.964	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.

Natural Cotangents

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.

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