RICE ST. & MAHNOMIN ROAD

CONSTRUCTION NOTES

CO. PROJ. 23-02 23-55

FILE NO. 4

Distances from Center of Roadway for Cross-Sectioning

Roadway 16 feet wide. Side Slopes 1 on 1.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be 30.6+(20—16)÷2 or 2 ft. added to 30.6 =32.6. For slopes of 1 on 1½ see inside of back cover.

Rice St. & Manomin Rd.

(23-02) INDEX (23-55)

Page	Description	Sta.
4	Curve Layout	172+37
5-6	Blue Tops.	68+50 - 56+00
7-9	Blue Tops & Ditch Stakes.	0+00 - 24+00
10	Reset " "	16+00 - 23+00 (Rest all moved in soft fill)
11-13	X-Sec. Staking & Slope Staking Borrow Pit	184+70 - 186+75 - 125' R
14	Reset (2 times) (23+50 + 24+00) Blue Tops. 1st Setting	24+50 - 31+00
15	Blue Tops	31+50 - 41+00
16	" "	41+50 46+50 Reset 46+00 & 46+50 (a/c destroyed) Check Levels for new B.M.'s Sta. 32+75 - 56+75!
17	Blue Tops	55+50 - 50+00 Void (a/c Later Grade Chge.)
18	" "	46+74 to 55+50 incl.
19	X-Sec. & & Cut or Fill	247+06 to 251+57
20	Staking Curve	247+06 to 251+57
21-22	X-Sec. & Slope Stakes	235+00 to 247+00 incl
23	" " "	227+00 " 234+00 "
24	Blue Tops	190+50 - 200+69
25-28	X-Sec. St. Stk & Bl. Tops.	200+69 - 171+00
29	Void	
30	Blue Tops.	170+50 -
51-76	Final X sec.	0+00 to 251+57
78	" "	Borrow pit 184+70-186+75
38	Original X-Sec.	Sta. 211 - 215
40	" " "	215 - 226
19	" " "	247 - 251+57

(23-02) Sta.	(23-55) + S	Culv. Layout 172+37 H.I. - S	Plan Elev.	Gr Rod -
B.M.	3.63	230.30	226.67	
172+37			225.1	5.2
172				
173				
197+07 ±	F.S.			
172+37				
170+77 ±				

Party { Deetsche, Weber, Mahoney, Franke

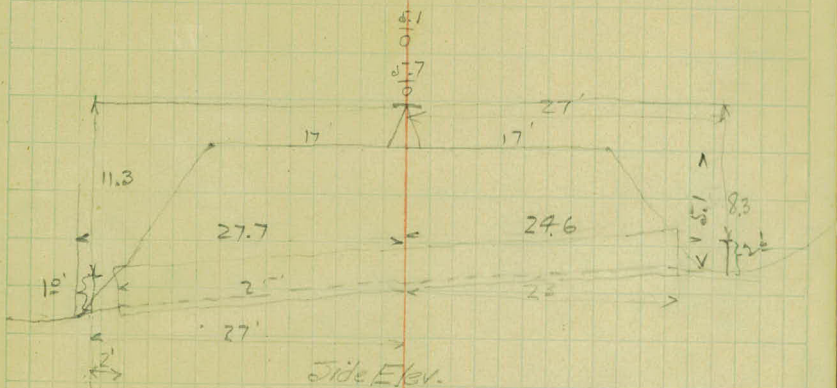
7-20-23
Hot Fair

4

L ℄ R

Top Monument ℄ Road. Sta. 170+77.5

7.3 / 18.8 — 10.3 / 18



Side Elev.

Stk L marked.
{Dist 27 Offset 2
{Outlet 1' down

Stk R marked
Dist 27' Offset 4'
Intake 2' down.

Plan.

Top Mont = 226.67

(23-02)(23-55) Blue Tops

Sta	+S	H.I.	-S	Profile Grade +0.52	St. Rod 15' L&R
B.M.	2.57	234.30		231.73	
68+50				32.52 ✓	1.78 ✓
68				31.72 ✓	2.58 ✓
+50				31.12 ✓	3.18 ✓
67+00				30.12 ✓	4.18 ✓
+50				29.42 ✓	4.88 ✓
66+00				28.72 ✓	5.58 ✓
+50				28.02 ✓	6.28 ✓
65+00				27.82 ✓	6.48 ✓
+50				27.72 ✓	6.58 ✓
64+00				27.82 ✓	6.48 ✓
+50				27.97 ✓	6.33 ✓
63+00				28.12 ✓	6.18 ✓
+50				28.27 ✓	6.03 ✓
T.P.	2.99	233.72	3.57	230.73	
62+00				28.42 ✓	5.30 ✓
+50				28.57 ✓	5.15 ✓
61+00				28.72 ✓	5.00 ✓
+50				28.87 ✓	4.85 ✓
60+00				29.02 ✓	4.70 ✓
+50				29.17 ✓	4.55 ✓
59+00				29.32 ✓	4.40 ✓
TP & B.M.	4.03	233.35	4.40	229.32 ✓	229.32 ✓
+50				29.47 ✓	3.88 ✓
58+00				29.62 ✓	3.73 ✓

Deutsche
Weber
Mahoney
Frantz

7-20-23
Hof Fair

5

L & R

Top. Mont. Koehler Rds Rice St.

Sp. Tel. pl. R Sta. 62+40 End. 7-20-23
Start 7-21-23

Sp. 12" Twin Oak R Sta. 55+75

(23-02)(23-55)

Sta.	+S	Blue Tops H.I.	-S	Profile Grade +0.52	Grade Rod. 15' L & R
		Cont'd fr. prec. page			
57+50		233.35		229.77 ✓	3.58 ✓
57+00				29.92 ✓	3.43 ✓
+50				29.82 ✓	3.53 ✓
56+00				29.32 ✓	4.03 ✓
		Reset Blue tops			
	5.12	236.85		231.73	
68+50				32.52 ✓	4.33
68+00				31.72 ✓	5.13

Same party page 5

7-21-23

6

End. 7-21-23 No lunch either 1:10 P.M.

(23-02)	(23-55)	Blue tops	& Dr. Stk	Profile Grade	Grade Rod.
Sta.	+S	H.I.	-S	+0.52	15' L & R
B.M.	3.67	237.91		234.24	
0+00				233.1 .52 33.62	4.8 4.29
+50				33.2 .52 33.72	4.7 4.19
1+00				33.3 .52 33.82	4.6 4.09
+50				33.4 .52 33.92	3.99
2+00				33.5 .52 34.02	4.4 3.89
+50				33.6 .52 34.12	3.79
3+00				33.7 .52 34.22	4.2 3.69
+50				33.8 .52 34.32	3.59
4+00				33.9 .52 34.42	4.0 3.49
+50				33.67 .52 34.19	3.72
5+00				33.4 .52 33.92	4.5 3.99
6+00				32.3	5.6
T.P.			3.67		
B.M.	3.75	234.04		230.29	
5+50				32.85 .52 33.37	1.1 0.67
6+00				32.3 .52 32.82	1.22
+50				31.75 .52 32.27	1.77
7+00				31.2 .52 31.72	2.8 2.32
+50				31.17	2.87
8+00				30.1 .52 30.62	3.9 3.42
+50				30.07	3.97
9+00				29.00 .52 29.52	5.0 4.52
+50				28.97	5.07
10+00				28.42	5.62
B.M.			3.75 ✓		

Porta. { Deutsche / Franke / Connelly

7-24-23 Hot Fair 1.

L & R

Sp. 30" Cottonwood 40' R Sta. 1+62

(DC 1.6 / 26.6)

(DC 1.8 / 26.8)

(C 0.5 / 27.5)

(DC 1.6 / 26.6)

(C 0.3 / 27.3)

(DC 1.3 / 26.3)

(DC 1.8 / 26.8)

This [illegible] of previously

(DC 1.6 / 26.6)

This side set C & P ok.

(DC 1.6 / 26.6)

End. 7-24-23

Old (206+60)

Sp. 20" Oak L New Sta. 9+70

Start 7-25-23

(DC 1.4 / 26.4)

(DC 0.6 / 25.6)

(DC 1.0 / 26.0)

(DC 0.9 / 25.9)

Sp. 20" Oak L Sta. 9+70.

(23-02) (23-55) Blue Tops & Ditch

Sta.	+ S	H. I.	- S	Profile Stks Grade + 0.52	Gr Rods 15 Lt R
	Cont'd fr p. 7	234.04			
10+50				27.35 52 27.87	6.17
11+00				26.8 52 27.32	7.2 6.72
+50				26.23 ✓ 52 26.75	✓ 7.29
12+00				25.6 ✓ 52 26.12	✓ 7.92
+50				24.98 ✓ 52 25.50	✓ 8.54
13+00				24.3 ✓ 52 24.82	✓ 9.22
T.P.	2.21 ✓	227.48	8.77	225.27	
+50				23.6 52 24.12	3.36
14+00				22.9 52 23.42	4.06
+50				22.2 52 22.72	4.76
15+00				21.5 52 22.02	6.0 5.46
+50				20.8 52 21.32	6.16
16+00				220.1 52 220.62	7.4 6.86
+50				219.28 52 219.80	7.68
T.P.			2.21 ✓	225.27	
B.M.	8.19	213.80		205.61	
T.P.	7.67	220.89	0.58	213.22	
16+50				219.28 52 219.80	1.6 1.09
17+00				218.2 52 18.72	2.7 2.17
+50				16.95 52 17.47	3.42
18+00				15.4 52 15.92	5.5 4.97
+50				13.69 52 14.21	7.2 * 6.68
19+00				11.7 52 12.22	9.2 * 8.67
+50				209.6 52 210.12	* 10.77
T.P.	0.21	213.43	7.67	213.22	

Party { Deutsche / Weber / Franke / Connelly } ℄ 7-25-23 Hot Fair 8

L R

$\left(\frac{C\,0.8}{27.8}\right)$

Top. stk 12' R Sta. 12+00

$\left(\frac{C\,1.5}{28.5}\right)$

$\left(\frac{C\,2.1}{29.1}\right)$

Left side only set

Top stk 12' R Sta. 12+00 End. 7-25-23

T.p. 24" Oak L. Sta. 22+00 Start 7-30-23 (Same weather / Same party)

Top Stk 12' L Sta. 19.

$\left(\frac{C\,2.4}{29.4}\right)$

$\left(\frac{C\,0.3}{27.3}\right)$

Notes — ✕ Blue top 15' R not set % no fill

$\left(\frac{C\,0.4}{27.4}\right)$

Top. Stk 12' L Sta. 19.

(23-02)(23-55) Blue tops & Ditch Stks

Sta.	+S	H.I.	-S	Profile Grade +0.52	Grade Rods 18'L 3R
Cont'd fr pre page		213.43			
				207.5	5.9
				5.2	
20+00				208.02	5.41
				20 5.4	
+50				5.2	
				5.9 2	7.51
				203.3	10.1
				5.2	
21+00				3.8 4	9.61
				201.28	
				5.2	
21+50				201.80	11.63
T.P.	6.22	208.02	11.63	201.80	
B.M.	0.87	202.67	2.41	205.61	205.61
				199.4	3.3
				5.2	
22+00				199.92	2.75
				197.71	
				5.2	
+50				198.25	4.44
				196.1	6.6
				5.2	
23+00				196.82	6.05
				194.76	
				5.2	
+50				195.28	7.39
				93	9.2
				5.2	
24+00				194.02	8.65
T.P.			0.87	201.80	

Party { Deutsche, Weber, Connelly, Franke }

7-30-23
Hot Fair

9

℄

R

(C 0.7 / 27.7)

(C 0.3 / 27.3)

Top Stk 15'L Sta. 21+50
Sp. 24" OaK L Sta. 22+00
(C 0.2 / 27.2)

(DC 1.4 / 26.4)

(DC 0.7 / 25.7)

Top Stk 15'L Sta. 21+50 End. 7-30-23

(23-02)(23-55) Reset Bluetops

Sta.	+S	H.I.	-S	Profile Grade +0.52	Grade Rod. 15'L & R
B.M.	1.20	231.49		230.29	
T.P.	0.62	26.84	5.27	226.22	
16+00				220.1 5.2 = 20.62	6.22
+50				219.28 5.2 = 219.80	7.04
17+00				18.2 5.2 = 18.72	8.12
+50				16.95 5.2 = 17.47	9.37
18+00				15.4 5.2 = 15.92	10.92
T.P.	0.31	216.60	10.55	216.29	
+50				14.21	2.39
19+00				12.22	4.38
+50				10.12	6.48
20+00				208.02	8.58
+50				05.92	10.68
T.P.	1.56	207.48	10.68	205.92	✓
B.M.			1.87	205.61	205.61
21+00				203.82	3.66
+50				201.80	5.68
22+00				199.92	7.56
+50				198.23	9.25
23+00				196.62	10.86
B.M.			1.87	205.61	205.61

Party { Deutsche, Weber, Connelly, Franke

7-31-23
Cool. Fair. 10

L ℄ R

Sp. 20" Oak L Sta. 9+70
" T. pl. 24' L " 14+42

Top stk 15' L Sta. 18+25

Sp. 24" Oak L Sta. 22+00

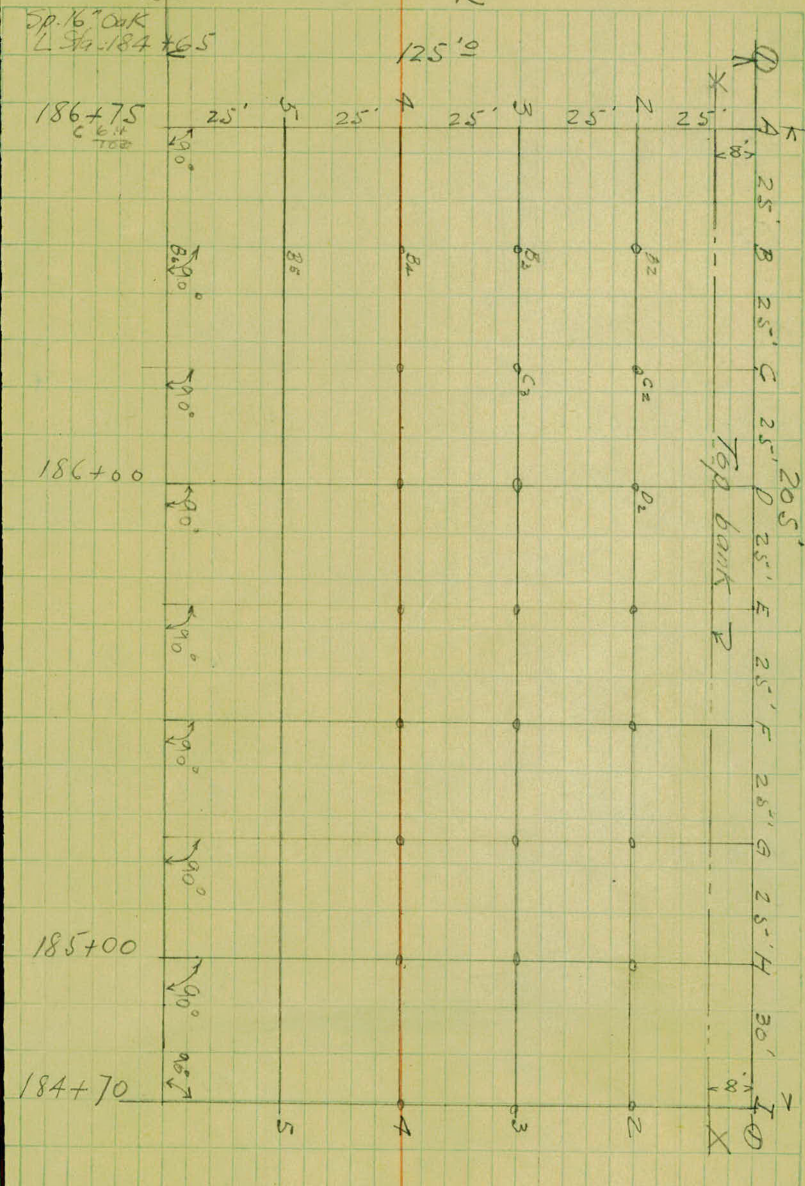
Sta. 23+50 & 24+00 are DK.
Sp. 24" Oak L Sta. 22+00

(23-02 \ 23-53) X-Sec. Borrow Pit. 184+70 - 186+75 - 125' R

Point or Sta.	+S	H.I.	-S	Rod.
BM	10.30	235.62		225.32
A 1				3.9
A 2				3.2
A 3				5.1
A 4				9.8
A 5				14.9
B 5				14.1
B 4				8.1
B 3				5.7
B 2				3.8
B 1				3.9
C 1				3.5
C 2				3.3
C 3				4.1
C 4				5.3
C 5				12.9
D 5				12.5
D 4				7.1
D 3				5.2
D 2				1.4
D 1				2.8
E 1				-1.7
E 2				+0.4
E 3				-6.3
E 4				8.2
E 5				12.8

℄ Rd.   Party { Deutsche, Weber, Connelly, Franke }   Col. Fair 8-1-23

R



X-Sec Borrow Pit Etc

Point or Sta-	+ S	H.I.	- S	Rod	Elev
F5	Contd fr. pre. page - 235.62			13.5	
T.P.	4.93	239.98	0.57	235.05	
F4				5.6	
F3				2.2	
F2				2.6	
F1				3.9	
G1				2.0	
G2				2.3	
G3				3.4	
G4				7.2	
G5				18.2	Std level as aid
H5				18.6	Std level as aid
H4				10.1	
H3				6.4	
H2				4.9	
H1				3.4	
I-1				7.1	
I-2				10.3	
I-3				13.0	
I-4				16.5	
I-5				18.1	Std level aid
AX				7.7	232.3
BX				8.0	232.0
CX				7.7	232.3
DX				6.9	233.1
EX				5.3	34.7

Same party page 11 E

Cool, Fair
8-1-23 12

R

See page 11 for location of points

Sp. 20" Oak 110'R Retw. D2 & E2

C 3.7
100

C 6.9
117.0

X-Sec. Borrow Pit Etc

Sta.	+S	H.I.	-S		
		Contd fr. prec. page			
F x		239.98		3.1	236.9
G x				2.0	238.0
H x				3.4	36.6
I-x				8.2	31.8

℄

R

C $\frac{10.4}{117}$

(23-02)(23-53) Blue Tops.

Sta.	+ S	H.I.	- S	Profile Grade +0.52	Gr. Rod. 15'L3R
B.M.	+ 1.74	207.35		205.61	
T.P.	1.02	197.45	10.92	196.43	
* 23+50				195.28	2.17
* 24+00				194.02	3.43
+50				192.97	4.48 ✓
25+00				192.02	5.43
+50				191.28	6.17
26+00				190.62	6.83
+50				190.22	7.23
27+00				189.92	7.53
+50		VOID		189.79	7.66
28+00		VOID		189.82	7.63
+50				189.92	7.53
T.P.	4.50 ✓	194.06	7.89 ✓	189.56	
27+50				189.79	4.27
28+00				189.82	4.24
+50				189.92	4.14
29+00				190.02	4.04
+50				190.17	3.94
30+00				190.22	3.84
T.P.	1.66.	194.71	1.01	193.05	
B.M.			0.01	194.70 ✓	194.70 ✓
B.M.	0.59	195.29		194.70	
30+50				190.32	4.97
31+00				190.42	4.87

Party { Deutsche, Weber, Connelly, Franke }

℄

L R

8-1-23 14
Cool - Fair.

Sp. 24" Oak L Sta. 22+00

" Tel. pl. " " 23+55

* Note = Reset. a/c Knocked out. (2nd time)

Sp. Tel. pl. L Sta. 27+50

Top stump L 31+15 So. Edge.

Sp. Oak. L Sta. 32+95

" " " " "

End 8-1-23

Start 8-2-23

(23-02)(23-55) Blue Tops

Sta.	+ S	H.I.	- S	Profile Grade +0.52	Gr. Rod 15' L & R
		Contd fr. p. 14- 195.29			
				190.0 .52	
31+50				190.52	4.77
				190.1 .52	
32+00				190.62	4.67
				190.25 .52	
+50				190.77	4.52
				90 .52	
33+00				91.02	4.27
				190.81 .52	
+50				91.37	3.92
				91.3 .52	
34+00				91.82	3.47
BM & T.P.	1.72 ✓	196.42	0.59	194.70 / 191.82 .52	194.30
+50				92.37	4.05
				92.5 .52	
35+00				93.02	3.40
				193.52	
+50				93.64	2.78
				93.6 .52	
36+00				94.12	2.30
				93.9 .52	
+50				94.42	2.00
				94.05 .52	
37+00				94.57	1.85
				94.05 .52	
+50				94.57	1.85
				93.9 .52	
38+00				94.42	2.00
				93.58 .52	
+50				94.10	2.32
				93 .52	
39+00				93.62	2.80
B.M.			1.22	195.20	
				92.55 .52	
39+50				93.07	3.35
				192.98 .93	
40+00				192.52	3.90
T.P. B.M.	4.25	199.45		195.20	
B.M.			7.41	192.04	
BM	7.36	199.40		192.04	
40+50				91.97	7.43
				90.9 .85	
41+00				91.42	7.98

Party { Deutsche, Weber, Connelly, Franke

℄

Cool. Fair.
8-2-23

15

L R

→ Sp Oak L Sta. 32+95

Sp. 8" Oak 40' R Sta- 37+25 (Set 8-2-23)

Sp. 8" Oak 40' R Sta- 37+25 .

Top Barrel at ℄ culv. at ℄ W. End Culv. at Sta. 40+21 End. 8-2-23

" " " " " " " " " " " " +21

(OC 1.8 / ZL 8)

(23-02) Sta.	(23-55) +S	Blue Tops H.I. Cont'd to page 15	-S	Profile Grade +0.52	Gr Rod. 15'L&R
		199.40			
41+50				190.35 .52 = 190.87	8.53
42+00				89.8 .52 = 90.32	9.08
T.P. & B.M.	1.41	193.45		192.04 89.32 .52 = 89.84	3.61
+50				89.0 .52 = 89.52	3.93
43+00				88.81 .52 = 89.33	4.12
+50				88.8 .52 = 89.32	4.13
44+00				88.84 .52 = 89.36	4.09
+50				88.9 .52 = 89.42	4.03
45+00				88.95 .52 = 89.47	3.98
+50				89.0 .52 = 89.52	3.93
46+00				89.05 .52 = 89.57	3.88
+50					
B.M.	1.40	193.44			
T.P.			0.87	192.57	
T.P.	3.18	195.75			
T.P.			1.84	193.91	
Reset 46+00				89.52	6.23
Reset +50				89.57	6.18
46+74				89.01 .52 = 89.53	6.16
		Check Levels.			
T.P.	7.65	201.56	0.45	201.11	
T.P.	8.90	210.01	0.59	209.42	
T.P.	9.90	219.32	0.61	218.71	
T.P.	11.92	230.63			
B.M.			1.30	229.33	229.32 ✓ Profile Elev.

Party { Deutsche
Weber
Connelly
Franke

8-3-23
Hot. Fair

℄

L R

Top W. End Wall. Inters. of ℄ & ℄ Culv. Sta. 40+21

End. 8-3-23

R.R. Sp. 9" poplar 35'R Sta. 45+03

" " " " " " " " " Start 8-4-23

{ End Horiz drift bolt in 16" pile under W. pier of S. ℄ ine Br. 12 A½ -
= S ℄ ine B.M. Their elev = 886.32

Top stk

" " 16'R 52+08

" " Top. stk 17'R Sta. 53+55

Sp. Twin. Oak. 16") R. Sta. 55+75

(23-02)(23-55) Blue Tops

Sta.	+ S	H.I.	- S	Profile Grade +0.52	Grade Rod
B.M.	1.01	230.33		229.32	
55+50				226.80	
55+00				26.52 / 23.00	3.81
54+50				24.34 / 22.08	6.12
54+00				21.52	8.81
53+50				18.05 / 18.57	11.76
T.P.	0.59	219.29	1.23	218.70	
53+00				15.14 / 215.62	3.67
52+50				12.15 / 1267	6.62
52+00				209.32 / 209.72	9.57
T.P.	0.15	209.56	9.88	209.41	
51+50				06.25 / 204.77	2.79
51+00				03.3 / 3.82	5.74
50+50				200.32 / 200.87	8.69
50+00				197.4 / 197.92	11.64
T.P.			8.46	201.10	201.11

VOID A/C LATER GRADE CHANGE

*Re-Setting Blue Tops. Under Soo Br. A/C Grade Chg

T.P.	1.95	195.86		193.91	
46+74.3				89.07 / 89.59	6.27
47+00				89.1 / 89.62	6.24
47+41				89.14 / 89.61	6.20
B.M. & T.P.	6.46	200.37		193.91	
49+10				191.57 / 192.09	8.28
49+70.3				95.11 / 198.63	4.74
49+50				193.85 / 94.37	6.00

Party { Deutsche
Weber
Connelly
Franke.

8-4-23
Cool. Fair

L ℄ R

1 Sp. 16" Twin Oak R Sta. 55+75

Top stk 17' R Sta. 53+55

End. 8-4-23 } Connelly replaced by Mahoney
Start 8-6-23 } Franke transf. to new crew

Top. stk 16' R Sta. 52+08

Top stk 16' R Sta. 50+60 (Pullup to set sl. stks on Co. Rd G.)

Use these ↓ below this ↓ line (Profile Grades given me by G. Christilaw)

Start 8-9-23

End Horiz. drift bolt in pile W. pier Soo Br. See p. 16 for Elev.

Same as above

(23-02)(23-55) Resetting Blue Tops
Account Grade Change

	Cont'd fr. prev	200.37 page		196.85 52	
50+00				197.37	3.00
				199.85 52	
50+50				200.37	0.00
			8.24	201.11 ✓	201.11 ✓
T.P.	8.98	209.35	0.00	200.37	
				202.85 52	
51+00				203.37	5.98
				205.85 52	
+50				206.37	2.98
				208.85 52	
52+00				209.37	
T.P.	11.26	220.61	0.00	209.35	
52+00				209.37	
				211.85 52	
+50				212.37	8.24
				14.85 52	
53+00				15.37	5.24
				217.85 52	
+50				18.37	2.24 ✓
T.P. 53+55	11.77	230.47	1.91	218.70	218.70
				220.85 52	
54+00				21.37	9.10
				23.85 52	
+50				24.07	6.40
				25.85 52	
55+00				26.37	4.10
				27.47 52	✓
+50				27.99	2.48
					Plan Elev
B.M.			1.16	229.31	229.32
B.M.			0.12	230.35	
				229.32	✓
56+00					1.15

Party { Deutsche, Weber, Mahoney

℄

8-9-23 Cool Fair

18

L R

Top. Stk 16'R Sta. 50+60

Top. Stk 15'R Sta. 50+50

Top Stk 15'L Sta. 52+00

17'R Top Stk See page 17

Sp. Tw Oak 16'R Sta. 53+75

" 18" " 50'R " 55+60

✓On Top Concrete 12'L & R now laid

(23.02)(23.55) X-Sec. & ℄ Cut or Fill

Sta.	+5	H.I.	-5.	Profile Grade	Grade Rod.
B.M.	4.59	271.93		267.34	
247+06½				271.3	0.6
247+50				70.6	1.3
248+00				269.7	2.2
248+50				68.7	3.2
249+00				68.3	3.6
+50				67.8	4.1
250+00				67.7	4.2
+50				67.4	4.5
251+00				67.4	4.5
+57⅝				67.6	4.3
B.M.			4.59	267.34	

Party – { Deutsche, Weber, Mahoney }   ℄   Hot, fair 8-6-23

L   R

Top. Mont. Intersec. ℄s Manomin & Centerville Rds.

5.3/33 4.4/18 1.0/10.5 0.0/0 1.0/10.5 2.4/14.5 4.0/33

5.5/33 5.5/29 4.3/13 1.4/8.5 1.4/0 1.7/14 4.8/23 5.5/33

7.3/33 6.8/18.5 5.7/25 F0.1/0 2.4/25.5 5.6/35 5.9/41

8.0/33 8.0/18 F4.8/0 (inc rd. shrine) 6.9/14 6.3/18.5 3.0/25.5 2.7/36 6.6/53

7.8/33 F5.6/0 8.6/25 8.6/34 "Toe s/p old road

7.7/33 7.7/26.5 F5.5/0 9.6/37

10.4/35.5 10.8/26 F8.0/0 10.1/22.5 7.9/30.5 4.7/37

13.7/33 13.0/17 12.0/0 F6.0/0 4.4/14 4.4/34 10.9/43

14.5/33 13.4/18.5 4.4/3 0.6/0 4.5/16 10.6/28.5 11.3/33

14.4/40 14.7/32 10.7/19.5 4.8/10 F0.1/0 4.8/10.5 10.5/18.5 15.9/26 17.3/33

End 8-6-23

Top. Mont. Int. ℄s Manomin & Centerville Rds.

(23-02)(23-55) Run Curve
Sta- 247+06 ℄ – 251+51 &
Sta. Occupied | Pt Sighted At | Defl. Angle | Distance | Bearing.

P.I. = 249+95 ℄
PC = 247+06 ℄
P.T. = 251+51 &
Δ = 90°-20'
D = 20°-0' L
T = 289 ℄
L = 451 ℄

	251+51 &	45°-10' L		
	+50	44°-24' L		
	251+00	39°-24' L		
	+50	34°-24' L		
	250+00	29°-24' L		
	+50	24°-24' L		
	249+00	19°-24' L		
	+50	14°-24' L		
	248+00	9°-24' L		
247+06 ℄	247+50	4°-24' L		
	251+51 &			
		90°-20' L	289 ℄	
	247+06 ℄			
		0°-0'	289 ℄	
P.I. 249+95 ℄	Pot. 241+80 &	0°-0'		

Party { Deutsche
Weber
Mahoney-

Hot Fair 20

(23-02) (23-55')		X-Sec & Slope Stk		Profile Grade	Grade Rod.
Sta.	+S	H.I.	-S		
BM.	+2.54	259.59		257.05	
235+00				253.0	6.6
236+00	West Edge driveway R			56.5	3.1
+15	E. Edge Priv Entr R & W Edge Entr. L			57.1	2.5
+31	E " " " L			57.8	1.8
T.P. & B.M.	10.86	267.91.		257.05	
237+00				260.8	7.1
	→ a/c bumped level				
T.P. & BM	10.82	267.87		257.05	
238+00				265.1	2.8
T.P.	9.66	277.32	0.21	267.66	
239+00				269.1	8.2
	Use sec. on L same as sta. 239. for Top bank				
240+00	W. Edge borrow Pit on L (Toe Slope)			272.3	5.0
241+00				74.6	2.7
T.P.	8.58	285.04	0.86	276.46	
237+00				60.8	24.2
238+00				65.1	19.9
239+00				69.1	15.9
240				72.3	12.7
241				74.6	10.4
T.P.	10.08	277.74		267.66	
240+55	Toe slope E. side			73.5	3.8
+67	Top bk E. side.			73.8	3.5
T.P.	9.04 (9.08 or)	281.02	5.76	271.98	
242+00				75.9	5.1
243+00				76.4	4.6

Party { Deutsche. Weber Mahoney

℄

Rain all 4-noon
8-7-23 Cool. Fair PM

L R

Sp. 16" Oak R Sta. 236+25

(F9.4/29.7) 15.6/33 14.5/26.5 6.9/13.5 C0.7/0 6.7/13 13.6/25 15.1/33 (F9.4/29.7)

(DC 1.0/26) 0.6/40 0.7/34 2.0/33 4.2/28 5.3/18 3.2/12.5 C0.2/0 3.2/14.5 4.1/29 Fence line 4.3/33 (DC 1.6/26.6)

1.8/36 3.5/14.5 2.3/0 2.6/12.5 3.1/19 3.3/26.5 3.1/29.5 3.5/33

1.8/36 3.4/14.5 2.0/0

Sp. 16" Oak R Sta. 236+25

8.9/24.5 9.1/16.5 7.6/13 F0.2/0 7.7/12 9.1/15.5 8.5/20.5 4.7/24.5 4.9/33 (C2.1/29.6)

" " " " Sta. 236+25

0.7/27 4.9/20 5.0/14.5 3.6/11.5 F0.2/0 3.2/11 4.7/13.5 4.6/17.5 1.0/22

Top. Stk 12'R Sta. 238+60.

4.0/26.5 9.1/19.5 10.0/13.5 8.7/7 0.0/0 8.6/7 9.8/14 9.9/18 6.7/23

(C0.5/28) 5.4/50 4.7/33 5.0/23 6.8/19 6.8/14.5 5.6/12 C0.2/0 X-Sec not taken a/c sh. shvl has cut in

4.5/19 4.5/17 3.3/12 C0.1/0 3.2/10 " " "
" " " " " "

Top stk 26'R Sta. 238+35

(C7.3/34.8) 17.5/40 16.7/33

(C4.8/32.2) 17.5/40 15.0/31.5 9.2/32 9.1/40 (C10.8/38.3)

(C9.0/36.5) 7.6/40 5.9/33 4.0/33 4.0/40 (C11.9/39.4)

4.4/35 5.0/40 (C8.3/35.8)

(C2.0/29.5) 8.3/33 8.6/31 8.4/25.5 9.2/33 (C1.1/28.6)

End 8-7-23

Top stk 12'R Sta. 238+60

Start 8-8-23

Hd level 8.7/50 8.1/45.5 4.4/35.5 4.2/24.5 5.7/19.5 3.7/15.5 4.6/12 4.0/0 Old barrow Pit on left

+2.5/50 +2.0/38 +4.6/38 4.6/28 0.0/24.5 1.5/24 5.2/17 5.5/14.5 4.3/10 3.8/0

Sp. 16" Oak 30'R Sta. 242+20

(F2.3/19.1) 9.4/33 6.9/21 7.8/17 5.4/12.5 0.0/0 5.5/11 7.0/14.5 7.3/26 7.5/33 (DC 0.8/25.8)

F2.6/19.6 9.0/33 8.6/28 7.2/24.5 7.2/20.5 5.5/14 C0.1/0 5.0/10 4.8/13 5.6/17 8.1/26 8.1/33 (F1.1/17.5)

(23-02)(23-53) X-Sec - & Slope Stakes

Sta.	+ S	H.I.	- S	Profile Grade	Gr. Rod.
	Cont'd fr.	281.02 prev. page			
244+00				276.1	4.9
45+00				74.8	6.2
46+00				73.1	7.9
247+00				71.4	9.6
T.P.			7.86	273.16	
T.P.	8.08 ✓	287.05	2.05	278.97	
244+00				76.1	11.0
245+00				74.8	12.3
T.P. To check			8.08 ✓		
T.P.	148	274.64		273.16	
B.M.			7.35	267.29 ✓	Plan elev. 267.34

Party. { Deutsche / Weber / Mahoney-

℄

Cool. Fair
8-8-23

L R

	0.9/24.5	2.1/28	4.1/23	6.8/18.5	5.6/12.5	F 0.2/0	5.5/7.5	6.7/4	5.9/21	
		4.5/27	7.7/21	7.7/15	6.7/12	0.0/0	6.6/12.5	8.1/15	7.4/20	2.7/25
(D.C. 0.3/25.3)			10.0/33	10.0/22.5	8.2/12.5	F 0.1/0	8.5/12.5	12.3/19	13.1/33	(F 5.0/22.6)
(F 4.9/22.7)			14.3/33	13.7/18	10.1/12.5	F 0.1/0	10.3/12	12.5/18.5	13.0/33	(F 3.4/20.6)

Top stk 12'L Sta. 245+81

" " 35'L Sta. 243+75

(C 4.8/32.3)	4.6/37.5	6.0/31		4.1/28	4.2/33	(C 6.7/34.2)
(C 3.7/31.2)	8.8/33	8.6/27.5		8.6/26	8.8/33	(C 3.5/31.0)

Top stk 35'L Sta. 243+75

Top stk 12'L Sta. 245+81

Top Mont Intersec. & Manannin & Centerville Rds

(23-02) (23-55) X-Sec. & Slope Stakes

Sta.	+ S	H.I.	- S	Profile Grade	Grade Rod
B.M.	0.30	257.35		257.05	
T.P.	11.63	265.48	- 3.53	253.82	
231+00				251.9	13.6
230+00				52.4	13.1
T.P.	2.31	267.54	0.22 (S)	265.23	
230+00				52.4	15.1 ~~52.4~~
229+00				52.8	14.7
228+00				52.5	15.0
227+00				51.4	16.1
T.P.	0.21	265.44	2.31	265.23	
T.P.	1.34	255.16	11.62	253.82	
232+00				51.4	3.8
233+00				50.9	4.3
234+00				51.2	4.0

Party { Deutsch, Weber, Mahoney }

℄

L R

8-10-23 P.M. 23
Hot Fair
Rain at 4:30 ..

Sp. 16" Oak R Sta-236+25

Top Culv-pipe R - 238-

(C2.2/29.7) 10.3/33 11.4/30 14.5/19 14.9/14.5 13.7/12 C0.3/0 13.8/12 15.3/16 15.1/18.5 9.2/27 10.8/33 (C3.5/31)

14.5/18 14.1/14 13.5/11 C0.4/0 13.4/12 14.4/14 14.2/18 7.2/27 7.7/33 (C5.4/32.9)

Top stump 50'L Sta-231

(C8.0/35.5) 7.7/40 6.7/31

(C5.1/32.6) 9.4/33 10.7/29.5 12.0/27.5 15.3/19.5 15.8/13.5 15.5/12 F0.2/0 15.3/12 16.2/16 15.4/20 11.0/25.5 11.1/30 11.8/33 (C3.2/30.7)

(C11.1/38.6) 3.8/40 4.1/28 15.0/16.5 15.8/13 15.5/10.5 C0.2/0 15.2/10 15.9/14 15.1/17 2.0/31 2.1/33 2.3/40 (C12.7/40.2)

(C1.2/28.7) 15.4/33 14.2/20 17.3/15 17.0/12.5 16.0/10 F0.5/0 15.8/11 16.4/12 16.0/14.5 4.6/36 4.2/40 (C12.1/39.6)

Top stump 50'L Sta-231 to check

Top culv pipe R Sta-232

(F10.2/31.0) 13.1/30 Edge Water 12.3/27 4.5/13 0.0/0 4.8/14 11.9/26 12.7/33 (F9.5/29.9)

(F9.2/29.6) 13.6/30 Edge Water 12.6/27 11.6/23.5 5.0/13 F0.1/0 5.0/14 12.5/26 13.1/28 13.1/33 (F9.5/29.9)

(F9.2/30.0) Edge Water 12.5/[illegible] 11.7/[illegible] 4.5/12.5 C0.3/0 4.7/13.5 12.5/28 12.7/33 (F9.5/32.0)

(23-02) (23-55) Blue Tops.

Sta.	+S	H.I.	-S.	Profile Grade +0.54	Grade Rods 13 L & R
B.M.	6.15	229.52		223.37	
200+69 (L)			Not used from plan	227.60 .54 228.14 227.58 .54 28.12 27.57 .54 28.11 227.57	1.32
200+50 L					1.37
+40 (R)					1.39
200+00				28.04 27.27 .54 27.81 27.00 .54 27.54 26.57 .54 27.11 26.08 .54 26.62 25.58 .54 26.12 25.10 .54 25.64 24.84 25.34 24.5 .54 25.04 24.30 .54 24.84 24.15 .54 24.69 24.18 .54 24.72 24.20 .54 24.74 24.22 .54 24.77 24.25 .54 24.79 24.28 .54 24.82 24.30 .54 24.84	1.48
199+50					1.71
199+00					1.98
198+50					2.41
198+00					2.90
197+50					3.40
197+00					3.88
196+50					4.18
196+00					4.48
195+50					4.68
195+00	6.15 ✓				4.83
194+50					4.80
194+00					4.78
193+50					4.75
193+00					4.73
192+50					4.70
192+00					4.68
T.P.	1.99	229.46		227.47	
191+50				24.32 .54 24.86 24.35 .54 24.89 24.38 .54 24.92	4.60
191+00					4.5
190+50					4.5

Cont'd on page 25

Party { Deutsche, Weber, Mahoney, Franke }

℄

8-13-23 (14)
Rain then / Cool. windy

L R

Sp 6" poplar R Sta. 195 + 25

Note: Make elev of concrete at Sabine Xing at 10' L & R of ℄ = to. 228.20 To get good Xing.

Sabine Grade = 50 - 0.4%

Use Elev = $\left(\frac{50}{70}\right)(28.20 - 28.04) + 28.04 = 28.15$

Use elev. $\frac{40}{70} \times (228.20 - 228.04) + 28.04 = 228.13$

Not set a/c certainty of be disturbed while laying culv. etc.

Sp. Stump 40' R Sta. 191 + 25 (See p. 25 for elev.)

(23-02)(23-53) X-Sec & Slope Stakes & Blue Tops - Profile Grade +0.54 Grade Rod 13' L & R &

Sta	+ S	H.I.	- S		
	6.15 ✓	229.52	Cutd from page 24		
200+60	℄ Soo track			227.6	1.9
200+00				227.5	2.0
199				227.0	2.5
198				26.1	3.4
197				25.1	4.4
BM & TP	5.88	229.25		223.37	
196				24.5	4.8
195			5.88 ✓	24.1	5.2
BM.	5.90	229.27		223.37	
194				24.2	5.1
193 ✓				24.25	5.0
192				24.3	5.0
T.P.	1.99	229.46	1.80	227.47	
191				24.35	5.1
190				24.4 .54 24.94	5.1 4.52
189+50				24.43 .54 24.97	4.49
189+00				24.45 .54 24.99	5.0 4.47
188+50				24.48 .54 25.02	5.0 4.44
188+00				24.50 .54 25.04	5.0 4.42
187+50				24.52 .54 25.06	4.9 4.40
+30 187+00				24.55 .54 25.09	4.37
T.P.	3.37	229.56	3.27	226.19	
✓ 187+00				24.55	5.0
186+50				24.54 .54 25.12	5.0 4.44
186+00				24.6 .54 25.14	5.0 4.42
B.M.			4.25	225.31	225.32

Party { Deutsche, Weber, Mahoney, Franke

8-14-23 Cool Windy
8-15-23 Cool - still

L — ℄ — R

(C 1.9/34.4) +0.2/33 +0.4/24 1.8/21.5 2.1/18 1.4/13 1.3/0 2.0/22 2.7/29 2.9/36.5 (C 3.1/32.1)

(C 0.2/32.7) 1.8/33 1.6/31 3.9/26 4.1/21 2.4/14 2.0/10 C 0.3/0 1.3/15 2.8/19 1.3/25 0.0/26.5 +0.7/29.5 -0.3/33 (C 2.0/33)

(F 2.6/18.4) 4.8/33 4.1/28 4.2/19 2.4/11 F 0.1/0 2.8/13 6.0/18 6.3/23 5.9/27.5 4.0/31.5 4.0/33 (F 4.1/21.5)

(F 7.0/26.6) 10.0/33 10.0/31 9.7/22 3.8/13 3.9/6.5 F 0.2/0 3.8/7 8.8/20 10.0/27 9.5/30.5 7.8/33 (F 7.3/27)

(F 7.3/27.0) 11.1/33 11.1/20 4.6/13 C 0.3/0 4.6/7 4.8/13 10.9/22 10.8/33 (F 7.0/26.6)

Sp 6" poplar R Sta. 195+25

(F 4.1/21.5) 7.8/33 8.0/27.5 8.0/23 4.4/13 4.8/8 C 0.2/0 5.2/8 5.5/12 9.5/18.5 10.5/22 11.0/33 (F 6.8/26.3)

(DC 7.7/35.4) 0.8/34 (F 3.6/20.7) 1.0/33 5.6/27.5 7.1/24.5 8.6/19.5 4.8/13 5.0/7 C 0.5/0 5.0/7 4.9/13 9.6/22.5 9.7/26.5 9.0/30.5 8.5/33 (F 4.9/22.7)

Sp. 6" poplar R Sta. 195+25 Start. 8-15-23

(F 6.0/24.2) 10.8/33 10.1/22 4.9/14 5.2/7.5 C 0.2/0 5.2/8 5.1/13 11.0/22 11.6/26 11.5/33 (F 6.9/26.5)

(F 5.5/23.5) 10.0/33 10.0/22 5.1/13.5 5.0/6.5 C 0.1/0 5.0/7 4.8/13 10.1/20.5 10.6/25.5 10.5/33 (F 5.9/24.1)

(F 5.1/22.9) 8.6/33 9.3/21.5 5.1/13 4.9/5.5 C 0.3/0 4.8/7 4.0/12 8.5/21 8.5/31 7.9/33 (F 4.0/21.4)

Sp. Stump 40'R Sta. 191+25

(DC 2.5/33.5) (F 4.4/22) 6.5/33 5.2/28.5 8.9/23 8.7/17.5 5.9/11 C 0.5/0 5.0/13.5 7.9/21 7.9/26.5 6.2/31.5 4.1/33 (F 2.6/19.6)

(DC 1.7/31.7) F 3.0/20.0 6.3/33 5.7/23 7.7/22 7.9/19 5.4/10 C 0.3/0 5.6/13.5 7.3/20 7.4/25.5 6.7/28.5 5.2/33 (F 2.3/19.1) ✓

(F 7.1/26.7) 12.2/34 11.1/21 5.8/11 C 0.1/0 5.1/11 8.0/24 7.9/26 7.5/31.5 6.1/35.5 (F 3.2/20.2)

C 0.3/0 4.5/13 9.7/23 9.9/27.5 9.1/31 8.9/33 F 5.8/23.9 →

(F 6.8/26.3) 11.9/33 10.9/21 5.3/11

Top Vert. spike in growth on 8" Oak 40'R Sta. 187+30

(F 5.4/23.3) 9.2/33 9.4/20 5.7/11 C 0.1/0 5.2/11.5 9.3/21.5 9.1/27.5 8.0/30 7.8/33 (F 4.8/22.6)

(F 2.9/19.9) 0.0/37 0.0/50 +2.0/40 3.4/33 7.6/26.5 7.6/20 5.1/13 C 0.4/0 5.0/12 6.3/17 6.4/25 (See Borrow Pit X-Sec for remainder of X-Sec)

Slope stk not set 9/c Borrow Pit

(23-02)(23-55) Sta.	X Sec. Blue Top * Sl. Stakes * Note start " " only. + S	H.I.	- S	Profile Grade + 0.54	Grade Rod 13' Lt R & ℄
		Cont'd from prev page 25			
185+50		229 56		24.65 54 25.19	4.37
185+00				24.54 54 25.08	5.0 4.48
B.M.	3.60	228.92		225.32	
184+50				24.47 54 25.01	3.91
184				24.30 54 24.84	4.08
183+50				24.10 54 24.64	4.28
183+00				23.9 54 24.44	4.48
BM			3.60	225.32	
* BM	3.81	229.13		225.32	
T.P.			4.81	224.32	
182+50				23.7 54 24.24	4.89
182+00				23.5 54 24.04	5.09
181+50				23.36 54 23.90	5.23
181+00				23.33 54 23.87	5.26
180+50				23.41 54 23.95	* 5.18
T.P.	4.98	229.30			
180+50				23.41 54 23.95	5.35
180+00				23.6 54 24.14	5.16
179+50				23.82 54 24.36	4.94
179+00				23.97 54 24.51	4.79
178+50				24.07 54 24.61	4.69
178+00				24.1 54 24.64	4.66
177+50				24.64	4.66
177				24.64	4.66
176+50				24.64	4.66

Cont'd on page 28

Party { Deatsche
Weber
Mahoney
Franke L

Cool. Fair
8-15-23
8-17-23

(F 3.5/20.8) 4.5/37 5.0/33 8.3/27 8.4/21 5.3/12 C 0.3/0 5.4/13 8.7/21.5 6.4/28.5 {See borrow Pit X-Sector orig}

Sp 16" Oak L Sta. 184+65

P.M. 8-16-23

Sp. 16" Oak L Sta. 184+65 End 8-16-23

" " " " " " Start 8-17-23

Top Stk 12' L Sta. 179+90

Rt side only

Top. Stk 12' L Sta. 179+90

L Side only

(23-02) (23-55) Slope Stakes & X-Sec.

Sta.	+S	H.I.	-S	Profile Grade	Grade Rod
BM.	3.58 ✓	228.90		225.32	
184+00				24.3	4.6
183				23.9	5.0
182				23.5	5.4
181				23.3	5.6
T.P.	5.05	229.30	4.65 (66-64)	224.25	
180				23.6	5.7
179				24.0	5.3
178				24.1	5.2
177				24.1	5.2
176				24.1	5.2
T.P.	5.46	229.59	5.17	224.13	
BM.			2.91	226.68	226.67 ✓
175				24.1	5.5
174				24.1	5.5
173				24.4	5.2
172				25.2	4.4
171				26.5	3.1 ✓
BM.			2.91 ✓	226.68 ✓	226.67

Note - (See BK #1 For X-Sec & Sl. Stake From 0+00 — 171+00)

Party { Deutsche, Weber, Mahoney, Franke }

℄

Hot. Fair
8-16-23

27

℄

Sp. Oak L Sta. 184+65

(F 7.3 / 26.9) 10.6/33 11.2/23 5.0/11.5 Co 0.1/0 4.8/9 10.2/22.5 Toe & Edge Slope 12.7/28 Water (F 8.6/28.7)

(F 7.3 / 26.9) 12.1/33 11.5/21.5 5.3/10.5 Co .1/0 5.4/14 9.6/27.5 9.2/26 9.7/28.5 9.0/33 (F 5.1/22.9)

(F 7.1 / 26.7) 11.8/33 11.5/21.5 5.5/11 Co .2/0 5.5/12 10.2/22 9.7/33 (F 5.5/24.5)

(F 7.1 / 26.7) 12.3/33 12.4/22 5.4/10 Co .3/0 5.7/11 12.4/22.5 12.5/27 12.8/29 12.7/33 (F 7.6/27.3)

Top. stk 12' L Sta. 180+00

(F 5.4 / 24.3) 10.6/33 10.4/20.5 5.8/11 Co .3/0 6.1/12 9.2/19 9.4/24 8.4/26 8.3/33 (F 4.3/21.8)

(F 1.8 / 18.6) 5.8/33 6.7/31.5 7.0/17 5.6/11.5 Co .4/0 5.6/12 7.1/17 7.2/20.5 2.3/30.5 1.1/33 (F 2.2/19.0) (DC 2.2/26.2)

(F 4.8 / 22.6) 10.0/33 9.6/23 4.9/11 Co .3/0 5.1/12 8.4/19 8.6/26 7.6/30 6.7/31.5 6.8/33 (F 3.7/21.1)

(F 2.4 / 19.3) 9.1/33 7.1/18.5 5.1/11 Co .4/0 5.5/12 7.6/17.5 7.6/25.5 1.8/32 1.8/34 (F 2.7/19.7)

(DC 1.5 / 26.5) (F 0.8 / 17.2) 6.8/33 6.2/15 4.8/11 Co .4/0 5.1/11.5 9.1/20 9.2/26 4.2/33 (F 4.6/22.3)

Top stk 13' R Sta. 175+00

Top-Mont. ℄ Road. Sta. 170+77.5

(C 1.0 / 28.5) (F 1.3 / 17.6) 4.2/33 4.6/23 6.0/21 6.8/16 5.7/11.5 Co .3/0 5.6/12 9.5/20 9.3/25 7.6/30 7.6/33 (F 4.1/21.6)

(F 3.8 / 21.3) 9.3/33 8.6/17 5.4/11 Co .4/0 4.9/12 8.7/20 8.7/29.5 6.5/33 (F 4.0/21.4)

(F 6.9 / 26.5) 11.7/33 10.7/20.5 5.2/11.5 Co .2/0 5.4/11.5 8.3/18.5 8.7/26.5 4.9/31.5 4.3/33 (F 3.7/21.1)

(F 5.5 / 23.5) 9.8/33 9.9/21.5 4.8/12 0.0/0 4.7/12 9.4/20.5 8.9/28.5 8.5/33 (F 5.5/23.5)

(DC 2.2 / 27.2) (F 1.1 / 17.5) 1.1/33 2.4/30 4.1/17 3.4/12 0.0/0 3.5/12 6.5/16 6.1/30 5.2/33 (F 3.4/20.5)

Top. Mont ℄ Rd. Sta. 170+77.5

Blue Tops.

Sta.	+ S	H.I.	- S	Profile Grade + 0.54	Gr. Rod. 132 R
		Contd fr. page 26			
176+00		229.30		224.64	4.66
175+50				24.64	4.66
175+00				24.64	4.66
174+50				24.64	4.66
174+00				24.64	4.66
T.P.	To check	cut off.	4.98 ✓	224.32 ✓	
T.P.	5.33	229.97		224.64	
				24.4 54	
173+50				24 94	5.03
173				24 35 54	4.88
172+50				25.09 24.81 54	4.62
172				25.35 25.26 54	4.17
171+50				25.80 54	3.63
171+00				26.34 26.53 54	2.90
170+50				27.07 27.3 54	2.13
170+00				27.84 28.1 54	1.33
B.M.			1.38	228.59 ✓	
169+50				28.9 54 29.44	0.53
B.M. & T.P.	8.80	237.39		228.59	
169+00				29.7 54 30.24	7.15
168+50				30.54 31.04	6.35
168				31.3 54 31.84	5.55
167+50				32.54 32.67	4.75
167				32.9 54 33.44	3.95
166+50				33.7 54 34.24	3.15
166				34.5 54 35.04	2.35
T.P.			10.46	226.93 ✓	226.93 ✓

VOID ACCOUNT REVISION IN GRADE BY. GB. CHRISTIAW.

Party { Deutsche, Weber, Mahoney, Frankel } & L R

8-18-23
8-20-23
Geol. Fair

Top Stk 12'L Sta. 179+90

Top. blue top. 13'L & R Sta. 174+00 Start 8-20-23

Note:-
(Rain for 2½ hrs
8-20-23 P.M.)

RR. Sp. F.P. 33'L Sta. 171+50 (Set 8-20-23 A/c B.M. (at Mark moved by Scarifier)

RR. Sp. F.P. 33'L Sta. 171+50

To check B.M above & T.P See Bk #1 Page 57. Sp. 14"Oak 60'R Sta 166+40

(23-02)(23-55) Blue Tops-

Sta.	+S	H.I.	-S	Profile Grade +0.54	Grade Rod 13'L&R
T.P.	11.50	238.43		226.93	
165+50				35.30	3.13
165				36.10	2.33
164+50				36.90	1.53
164				37.70	0.73
T.P.	6.64	244.36	0.71	237.72	
163+50				38.42 -54 = 38.96	5.40
163				38.97 -54 = 39.51	4.85
162+50				39.35 -54 = 39.89	4.47
162+00				39.57 -54 = 40.11	4.25
161+50				39.62 -54 = 40.16	4.20
161				39.51 -54 = 40.05	4.31
160+50				39.23 -54 = 39.77	4.59
160				38.73 -54 = 39.27	5.09
159+50				38.20 -54 = 38.74	5.62
159				37.67 -54 = 38.21	6.15
158+50				37.14 -54 = 37.68	6.68
158				36.61 -54 = 37.15	7.21
157+50				36.08 -54 = 36.62	7.74
157				35.55 -54 = 36.09	8.27
156+50					
156					
T.P.			4.20		

VOID ACCOUNT REVISION OF GRADE BY G.D. CHRISTIAN

Party { Deutsche, Weber, Mahoney, Franke

℄

8-21-23
Coal. Fair

29

L R

Sp. 14" Oak 60'R Sta. 166+40. To check elev seep. 57 BK #1

Top. Stk 13'R Sta. 164+00

Top Stk 13'R Sta. 161+50

(23-02)	Blue Tops		(23-53)	Profile Grade +0.54 As Revised	Grade Rod. 13L & R
Sta.	+S	H.I.	-S		
B.M.	5.70	234.29		228.59	
170+50				227.38 54 227.92	6.37 ✓
170+00				228.23 54 228.77	5.52 ✓
169+50				229.08 54 229.62	4.67 ✓
169.				229.93 54 230.47	3.82 ✓
168+50				230.78 54 231.32	2.97 ✓
168				231.63 54 232.17	2.12 ✓
167+50				232.48 54 233.02	1.27 ✓
167 T.P.	5.05	238.92	0.42 ✓	233.33 54 233.87	0.42 ✓
166+50				234.18 54 234.72	4.20 ✓
166				235.03 54 235.57	3.35 ✓
165+50				235.88 54 236.42	2.50 ✓
165				236.73 54 237.27	1.65 ✓
T.P.	11.69	238.64		226.83 237.58 53 54	0.85
164+50				238.12 59	0.52
T.P.	5.74	243.86	0.52 ✓		
164				238.29 54 238.83	5.03
163+50				238.87 54 239.41	4.45
163				239.31 54 239.85	4.01
162+50				239.63 54 240.17	3.69
162				239.80 54 240.34	3.52
161+50				239.82 54 240.36	3.50
161				239.73 54 240.27	3.59
160+50				239.79 54 240.33	3.83
160+00				239.10 54 239.64	4.22
159+50				238.60 54 239.14	4.72
159				238.07 54 238.61	5.25
T.P.	4.27	242.47	5.66	238.20	✓
BM			7.30	235.17	235.17

Party { Deutsche, Weber, Mahoney, Franke

℄

8-21-23
Cool Fair

30

L R

R R Sp. F.P. 33'L Sta. 171+50

Top. Stk 13'L Sta. 167+00

Sp. 14" Oak 60'R Sta. 166+40

Top stk 13'L. Sta. 164+50

End. 8-21-23
Start. 8-22-23

Top. Stk 13'R Sta. 159+00

Sp 14" Oak So. Sta 155+45

(23-02)	Blue Tops		(23-55)	Profile Grade +0.54 As Revised	Grade Rod 13'Lz R
Sta.	+5	H.I.	-5		
B.M.	+7.30	242.47		235.17	235.17
				37.54 / 38.08	4.39
158+50				37.01 / 37.54	4.92
158				36.48 / 37.02	5.45
157+50					
B.M.	3.21 ✓	238.38		235.17	
				35.95 / 36.49	1.89
157				35.42 / 35.96	2.42
156+50				34.89 / 35.43	2.95
156				34.36 / 34.90	3.48
155+50				33.83 / 34.37	4.01
155				33.30 / 33.84	4.54
154+50				32.62 / 33.16	5.22
154				31.67 / 32.21	6.17
153+50				30.46 / 31.00	7.38
153				29.0 / 29.54	8.84
152+50				27.28 / 27.82	10.56
152 T.P.	0.27	228.11	10.54	25.3	227.84
151+50				25.84	2.27
151				23.2 / 23.74	4.37
150+50				21.1 / 21.64	6.47
150				19.0 / 19.54	8.57
149+50 T.P.	0.98 ⓔ	218.42	10.67	16.9 / 17.44	10.67
149				14.8 / 15.34	3.08
148+50				12.7 / 13.24	5.18
148				10.6 / 11.14	7.28
147+50				208.5 / 209.04	9.38
147				206.4 / 206.94	11.48

VOID A/C GRADE CHANGE

Party { Deutsche, Weber, Mahoney, Franke

℄

Cool Fair
8-23-23

31

L R

Sp. 14" Oak So. Sta. 155+45

Sp. 14" Oak So. Sta. 155+45

Top stk 15'R Sta 152+00

Top stk 13'L Sta 149+50

(23-02) (23-535) Blue Tops

Sta.	+S	H.I.	-S	Profile Grade 0.54	Grade Rod 13'L&R.
	cont'd from 218.42 page 31.				
T.P.	0.21	207.15	11.48	206.94	
146+50				204.84	2.31
146				202.74	4.41
145+50				200.82	6.33
145				198.72	7.89
144+50				197.26	9.27
144				195.95	10.66

VOID A/C GRADE CHANGE

T.P.	3.62	221.06		217.44	
149+00				215.37	5.69
148+50				213.34	7.72
148				211.34	9.72
147+50				209.34	11.72
T.P.	1.05	210.39	11.72	208.8	
147				207.34	3.05
146+50				205.34	5.05
146				203.34	7.05
145+50				201.48	8.91
145				199.91	10.48
144+50				197.95	11.90
T.P.	1.25	199.74	11.90	198.49	
B.M.			5.69	194.05	193.99 Plan Elev.
B.M.	By REC. 5.67	199.66		193.99	
144+00				197.26	2.60
143+50				195.79	3.87
143				194.78	4.82

By christelow

VOID A/C GRADE CHANGE

Party { Deutsche, Weber, Mahoney, Franks

℄

8-23-23
Cool-Fair

32

L R

Top. Stk 13'L Sta. 147+00

Same party Cool Fair
Start 8-24-23

Top Stk 13'L Sta. 149+50

Top stk 13'L Sta. 147+50

Top stk 13'L Sta. 144+50

N.E. Cor. Top Hd. Wall. Water Calv. Sta. 144+48

" " " " " " " " "

← This is not VOID O.K. Elev. as shown 197.06

(23-02) (23-55) Blue Tops.

Sta.	+S	H.I.	-S	Profile Grade +0.54	Grade Rod 13'L2 R
~~142+50~~		199.66 Cont'd from page 32		193.65 54 ~~94.19~~ 193.95 54 ~~93.87~~	~~5.47~~
142				193.32 54 93.86	5.79
141+50				93.64 54 94.18	5.80
141				94.26 54 94.80	5.48
~~140+50~~				95.2 54 95.74	~~4.86~~
140				96.3 54 96.84 ✓	3.92
139+50				97.4 54 97.94 ✓	2.82
139				98.5 54 99.04 ✓	1.72
138+50					0.62
B.M.	4.31	198.30		193.99	
143+50				195.09 54 95.63	2.67
143				93.86 54 94.40	3.90
142+50				93.05 54 93.59	4.71
142				192.69 54 93.23	5.07
141+50				192.75 54 93.29	5.01
141				193.21 54 93.75	4.55
140+50				94.10 54 94.64	3.66
139+50	(To start 8-25-23)		1.48	196.82	
B.M.	0.23	208.74		208.51	
139+50				196.82	11.92 ✓
139+00				97.94	10.80 ✓
138+50				99.04	9.70 ✓
138+00				99.6 54 200.14	8.60
137+50				200.7 54 201.24	7.50
137				201.8 54 202.34	6.40

~~VOID A/C GRADE CHANGE~~

Party { Deutsche
Weber
Mahoney
Franke }

℄

8-24-23
Cool Fair

L R

Top-stk 13' L -

Top stk 13' L

Sp. 36" Tree L Sta. 133+45

Weber absent.

Start. 8-25-23 Hot. Fair

(23-02) (23-55) Blue Tops

Sta.	+ S	H.I.	- S	Profile Grade +0.54	Grade Rod 13'2a R
		208.74		202.84	
136+50		Contd fr. page 33.		54	
				203.38	5.36
				203.80	
136				54	
				204.34	4.40
				204.63	
135+50				54	
				205.17	3.57
				547	
135				54	
				206.01	2.73
	BM-0.23 ✓			206.3	
134+50				54	
				206.84	1.90
				207.13	
134				54	
				207.67	1.07
BM=TP	6.39	214.90		208.51 ✓	
				207.97	
133+50				54	
				208.51	6.39
				208.81	
133				54	
				209.35	5.55
				209.74	
132+50				54	
				210.28	4.62
				210 85	
132+00				54	
				211.39	3.51
BM			6.39 ✓	208.51 ✓	
BM.	10,81	219.32		208.51	
				212.0	
131+50				54	
				212.54	6.78
				213 15	
131				54	
				213.69	5.63
				214 23	
130+50				54	
				214.77	4.55
				215.14	
130				54	
				15.68	3.64
				15 85	
129+50				54	
				16 39	2.93
				16.3	
129				54	
				16 84	2.48
				16 82	
128+50				54	
				17 36	1.96
				16.99	
128				54	
				17.53	1.79
				16 93	
127+50				54	
				17.47	1.85
				16.75	
127				54	
				17.29	2.03
				16 45	
126+50				54	2.33
				16.99	
				16.15	
126				54	2.43
				16.69	

VOID A/C GRADE CHANGE

Party { Deutsche
Mahoney
Franke }

Cool Fair
8-25-23
8-27-23
Cloudy Raining

Sp. 36" Poplar - L Sta. 133+45

Sp 36" Poplar L Sta 133+45
" " " " " "

End - 8-25-23 1 PM
Add Weber to party
Start 8-27-23 AM

* Not set on Lt a/c car parked and locked

(23-02)(23-55) Blue Tops

Sta.	+S	H.I.	-S	Profile Grade +0.54	Grade Rod.
		Cont'd to prec. page 34			
125+50		219.32 ✓		15.85 54 16.39	2.93
BM				208.51	
T.P.	1.82	219.63	1.51	217.81	
125				15.55 54 16.09	3.54
124+50				15.25 54 15.79	3.84
F.P.			1.08	218.55 ✓	
BM.	11.16	219.67		208.51	
131				213.11 54 73.65	6.02
130+50				14.10 54 14.64	5.03
130				14.91 54 15.45	4.22
129+50				215.37 54 16.19	3.54
129				216.10 54 16.64	3.03
128+50				216.46 54 17.00	2.67
128+00				216.62 54 17.19	2.48
127+50				16.71 54 17.25	2.42
127 & T.P.	3.16	220.31	2.52	16.61 54 17.15	2.52
126+50				16.35 54 16.89	3.42
126+00				15.95 54 16.49	3.82
125+50				15.55 54 16.09	4.22
125+00				15.15 54 15.69	4.62
124+50				14.75 54 15.29	5.02
124+00				14.35 54 14.89	* 5.42
F.P.			1.75	218.56 ✓	

VOID

CHANGE GRADE

Party { Deutsche, Weber & Johnson, Mahoney, Frankf

8-27-23
8-28-23
Cool Fair

35.

Sp-36"poplar L Sta. 133+45

Sp. 8" Oak (White bark) 20' R Sta. 127+10

Top. F.P 28' L Sta. 124+00

Sp. 36" Poplar L Sta. 133+45 Started - 8-28-23 Johnson for Weber

Top stk 13' L - Sta. 127+00

* Note Grade rod on Right only.

Top. F.P. 28' L Sta. 124+00 ✓

(23-02)(23-53) Blue Tops

Sta.	+ S	H.I.	- S	Final Elev Inside Rt.	Outside Left
B.M.	5.35 Level	216.63		211.28	
124+00				214.89	214.95
123+75				214.69	14.80
+50				14.45	14.69
+25				14.18	14.56
123				13.87	14.47
122+75				13.52	14.37
122+57 6/9 = 122+60				13.38	14.34
122+35 9				12.94	14.18
122+10 9				12.63	14.10
121+85 9				12.46	13.95
+60 9				12.33	13.84
+36 8				12.20	13.73
+11 8				12.09	13.64
120+86 8				11.99	13.54
+61 8				11.88	13.45
+36 8				11.76	13.35
+12 7				11.66	13.27
119+82 7				11.52	13.15
+62 7				11.43	13.08
+37 7				11.31	12.98
B.M.	4.43	215.71		211.28	
+12 2				11.20	12.89
118+82 7				11.07	12.78
+62 7				10.98	12.69
+37 7				11.04	12.49

8-29-23
Hot Fair

Party { Deutsche, Johnson, Mahoney, Franke
Rods

Inside		Outside	
			Sp. 10" Oak W. Side Hill Gate.
1.74		1.68	
1.94		1.83	
2.18		1.94	
2.45		2.07	
2.76		2.16	
3.11		2.26	
3.25		2.29	
3.69		2.45	
4.00		2.53	
4.17		2.68	
4.30	*	2.79	* Note not set ofc in road - 8-29-23
4.43		2.90	
4.54		2.99	
4.64		3.09	
4.75		3.18	
4.87		3.28	
4.97		3.36	
5.11		3.48	
5.20		3.55	
5.32		3.65	Sp. 10" Oak W. Side Hill Gate
4.51		2.82	
4.64		2.93	
473		3.02	
4.67		3.22	

Blue Tops

	+S	H.I.	-S	Final Elev Inside	Outside
		215.71			
		Cont'd fr. p. 36			
118+12 I				11.13	12.27
118+00				11.15	12.17
117+75				11.20	11.92
117+62 I				11.19	11.81
117+50				11.13	11.67
B.M.			4.42	211.29	Plan Elev. 211.28

Same party page 36.
8-29-23

Grade Rod Inside	Outside
4.58	3.44
4.56	3.54
4.51	3.79
4.52	3.90
(4.58)	(4.04)
Ref (4.38)	(3.79) Ref. ↑ To old blue Tops

Sp. 10" Oak W.S. Hill Gate

(23-02)(23-53) X-Sec & Slope Stakes

Sta.	+S	H.I.	-S	Profile grade	Grade Cut
B.M.	7.54	230.91		223.37	
T.P.	8.71	237.98	1.64	229.27	
201+00				27.8	10.2
202+00				27.5	10.5
T.P.	3.52	230.35	11.15	226.83	3.5
203				26.9	3.3
204				26.2	4.2
205				25.3	5.1
206				25.1	5.3
207				26.0	4.4
208				27.9	2.5
T.P.	7.92	238.19	0.08	230.27	
209				30.3	7.9
210				32.7	5.5
211				35.1	3.1
B.M.	7.83	238.10		230.27	
212				37.5	0.6
T.P.	9.65	246.91	0.84	237.26	
209				30.3	16.6
210				32.7	14.2
211				35.1	11.8
212				37.5	9.4
213				39.9	7.0
214				42.3	4.6
215				44.2	2.7
T.P.	8.35	252.59	2.67	244.24	

Cont'd on page 40

Party { Deutsche, C E Johnson, Mahoney, Franke }

Cool - Fair
8-30-23

L ℄ R

Reading at S before = 7.52 after 7.54
(B.M. Nail bent down 0.02 to reset)

Sp. 6" poplar Rt. 195+25

Sp. (RR) Xing Sign 16' L Sta. 201+10

Hotsot ℄ a/c 1/2' 18 South → 9.3/37 10.2/41 10.5/27 10.9/17 10.0/12 C0.6/0 9.8/12 10.7/15.5 10.8/28 9.6/34.5 (C 0.6/35.1)

in RR trk. (F 3.2/20.3) 50 - 9.1/43.5 11.1/41 13.2/34 13.2/17.5 10.8/12 C0.3/0 10.8/11.5 12.5/15.5 12.4/21 10.6/24 9.5/29.5 9.7/33 x Fence Line (C 0.6/33.1)

Top stk 10' R Sta. 203+40

(DC 2.0/31.7) (F 2.7/19.7) 4.0/33 4.0/32 3.8/25 5.6/21 5.7/15.5 4.0/11 C0.2/0 4.0/11.5 5.0/14 5.3/20.5 5.6/28.5 6.2/32 6.2/34 (F 2.0/18.7) (DC 0.2/25.2)

(DC 4.2/33.7) F2.5/19.4 2.2/34 2.7/31 3.7/26 5.5/23 6.4/17.5 4.7/11 0.0/0 4.8/11.5 8.4/19 9.3/28 9.5/31 10.1/33.5 (F 5.3/23.2)

(F 6.1/25.4) 10.8/33 10.4/21.5 5.1/10.5 C0.5/0 5.3/11 11.0/20.5 11.3/27 11.2/32 12.5/34 (F 6.8/26.3)

(F 4.9/22.7) 9.8/34 9.8/21 5.4/10 C0.4/0 5.4/10.5 9.2/19 9.7/26 8.0/31 7.2/33 (F 4.7/22.4) (DC 0.7/28.1)

(F 6.8/26.3) 11.1/33 10.4/20 5.0/11.5 0.0/0 4.7/10 9.5/18 10.7/22 10.8/26 10.8/33 (F 7.0/26.6)

(F 4.5/22.1) 7.5/33 6.7/20 3.4/12.9 F0.4/0 3.4/11.5 5.6/17.5 5.4/23 5.4/33 (F 2.7/19.7)

{ End 8-30-23
{ Start 8-31-23 } Same party

Top stk 22' L Sta. 208+60

(C 2.2/29.7) 5.9/33 5.9/24 6.9/22.5 10.2/17 10.0/15.5 8.8/13 F0.4/0 8.8/9 9.9/12 10.0/14 7.0/18

(DC 1.7/26.7) 7.6/33 6.5/24.5 6.0/22 7.8/19 7.7/15.5 6.7/13 F0.3/0 6.2/10.5 7.4/12.5 7.5/15

(C 0.7/28.2) 2.6/33 2.0/22.5 5.3/17 5.2/14.5 4.2/12 F0.2/0 3.9/12 5.1/14 5.0/16.5

(DC 1.5/26.5) 1.7/26 1.7/33 2.0/20.5 2.9/18 2.7/14 1.5/11 F0.3/0 1.2/12 2.9/15 2.9/18

Top stk 10' L Sta. 212+00

10.0/26 8.5/33 8.2/40.5 (C 8.2/35.7)

5.3/27.5 5.2/33 5.4/40 (C 8.8/36.3)

7.5/23.5 7.3/33 (C 4.6/32.1)

10.3/21 8.7/25.5 8.7/31 8.9/33 (C 0.9/28.4)

(C 2.6/30.1) 4.1/33 4.9/21.5 8.6/15.5 8.7/13 7.7/10.5 F0.2/0 7.8/12 9.5/15 9.6/18 8.8/20 9.4/33 (F 2.2/19.3) (DC 0.2/24.5)

(DC 1.5/26.5) 6.3/33 5.0/19.5 5.7/17 6.5/14.5 6.4/12.5 5.5/10.5 F0.3/0 5.5/13 6.5/15 6.6/25 9.1/30.5 4.5/33 (DC 0.2/25.2)

(F 3.9/21.4) 7.4/33 6.9/22.5 6.0/19 3.7/10 F0.3/0 3.4/13 4.4/15

Top stk 12 R - Sta. 215

(23-02) Slope Stakes (23-55)

on Curve 247+06½ – 251+57.8

Sta.	+S	H.I.	–S.	Inside Elev. From Profile Less Est Super.	Outside Elev. From Profile Plus Super Elev.
P.C. = 247+06½					
B.M.	5.11	272.45		267.34	
93.9 248+00				268.9	270.3
100' 249+00				67.5	68.9
100' 250				66.9	68.3
45 250+45				66.6	68.0
33 250+78				66.6	68.0
22 251+00				66.6	68.0
57.8 P.T. 251+57.8				67.1	68.0
B.M.			5.11 ✓	267.34	

Super = –0.8 ; –0.5
Super = +0.6 ; +0.4

$\Delta = 90°20'$

$D = 20° L$

$T = 289.6'$

$L = 451.7'$

Width pavement 248+00 to 251

" " 248+00 to

Party { Deutsche, Johnson, Mahoney, Franks

Grade Rod Inside	Grade Rod Outside	Shldr Dist Inside	Shldr Dist Outside	Defl. Angle from P.C.	L	℄	R	
		~	~	247+06±	Top Most Inters. ℄s Centerville & Manomin Rds			
3.6	2.2	20	15	9°-24'	F 4.0 / 25.5	F 0.4 / 0	DC 1.7 / 26.7	
5.0	3.6	21	17	19°-24'	F 3.7 / 26.1	C 0.5 / 0	F 6.0 / 25.2	
5.6	4.2	21	17	29-24'	F 5.4 / 28.3	C 0.3 / 0	F 6.1 / 25.4	DC 1.2 / 30.6
5.9	4.5	21	15	33°-54'	F 8.8 / 33	C 1.2 / 0	DC 2.2 / 27.2	
5.9	4.5	22	15	37°-12'	F 9.6 / 35.0	C 0.1 / 0	DC 1.8 / 26.8	
5.9	4.5	19	17	39°-24'	F 10.6 / 33.4	C 0.1 / 0	F 0.7 / 18.1	
5.4	4.5	19	17	45°-10'	F 10.6 / 33.4 ✓	C 0.4 / 0	F 14.1 / 29.8	

Same as above ✓

As shown on plans but not practical as it will be putting ditch thru & across Centerville Rd

incl = 13.72' - Sta. 251+57.8 = 11.84' Inside - ℄

251+57.8 incl = 10' Outside ℄.

X-Sec & St. Stakes

Sta	+S	H.I.	−S	Profile Grade	Grade Rod
		Cont'd from p. 38			
215		252.59		44.2	8.4
216				45.1	7.5
217				45.1	7.5
218				44.95	7.6
B.M.			6.47	246.12	Plan Elev 246.34 Ges E 246..
B.M.	6.48	252.82		246.34	
219				44.8	8.0
220				44.7	8.1
T.P.	2.05	249.36	5.51	247.31	
221				44.5	4.9
222				44.55	4.81
223				45.4	4.0
224				46.9	2.5
T.P.	7.19	255.06	1.49	47.87	
225				48.4	6.7
226				49.9	5.2

Same party p. 38   ℄   8-31-23   40

Cool Fair to 10:30
Rain 10:30 to 1:00
Fair Cool. 1:00 End.

L   R

← See p. 38 →   9.9/24   2.9/27   7.1/33   (C 0.6/28.1)

(C 4.5/32.0) 3.0/33 2.2/26 9.3/16.5 9.3/13 8.9/11.5 F0.7/0 8.3/12.5 9.1/14 8.9/18 4.5/24 5.5/33 (C 2.4/29.9)

(C 4.3/31.8) 3.2/33 3.2/31.5 4.1/26.5 9.2/18 9.7/15 8.5/12.5 F0.3/0 8.2/12 8.9/14 9.2/17 8.8/19.5 6.1/23.5 6.9/33 (C 1.1/28.6)

(C 5.8/33.3) 1.9/33 2.4/29.5 3.9/25.5 9.3/18.5 9.3/13.5 8.4/12 F0.3/0 8.4/12 9.1/13.5 8.9/18 3.9/23.5 4.7/33 (C 3.0/30.5)

Sp 18" Oak R Sta. 216+27

(DC 2.2/27.5) 7.6/33 8.9/22.5 10.2/18 10.2/15.5 8.3/12.5 C0.2/0 8.8/12 9.8/13 10.1/19 8.2/24.5 2.3/32.5 (C 5.7/33.2)

(F 6.3/24.5) 12.8/33 14.0/30 13.6/21.5 8.6/12 0.0/0 8.9/13 15.5/23 16.1/33 (F 8.5/28.6)

Top. unplaced culv pipe R Sta. 220+15

(F 8.0/27.9) 11.8/33 12.1/24.5 5.9/13 C0.2/0 5.7/13 15.5/28 15.7/33 (F 11.7/33)

(DC 5.0/33.0) (F 6.7/26.1) 5.9/33 11.1/25 11.0/20.5 5.1/12 C0.1/0 5.3/13 14.7/27 16.1/33 16.1/34 (F 12.4/34.0)

(DC 5.7/30.6) F2.8/19.9 0.8/33 1.0/30.5 6.1/22 6.6/17 4.2/12 C0.5/0 4.4/13 8.7/19 9.0/27 7.5/30 7.2/33 (F 5.6/23.6) (DC 1.7/30.3)

(DC 0.2/24.3) (F 2.2/19.1) 5.2/33 5.2/28 4.7/21 4.6/15 2.5/12 C0.4/0 2.9/12 5.2/16 5.5/23.5 2.7/29.5 3.1/33 (F 3.3/20.5) (DC 1.2/26.7)

Inv. culv pipe not in place 224+80

(F 8.8/29.0) 14.7/33 14.7/26 (Swamp) 6.7/12 C0.2/0 6.9/12 13.8/22.5 13.8/33 (F 7.7/27.5)

(F 10.2/31.0) 14.5/33 Edge Swamp 13.9/26.5 5.1/12 C0.8/0 4.9/12 7.8/19.5 7.9/23.5 6.3/33 (F 2.7/19.7)

(23-02)(23-53) CHECK LEVELS

Sta	+S	H.I.	-S.	Elev.	Plan Elev.
B.M.	8.69	232.06		223.37	223.37
T.P.	1.57	230.83	2.80	229.26 ✓	229.27 Sup
T.P.	8.09	238.52	0.40	230.43 ✓	
T.P.	10.92	249.19	0 0.25	238.27	
B.M.			2.90	246.29	246.34
T.P.	3.92	249.35	3.76	245.43	
T.P.	8.71	256.53	1.52	247.82	
B.M.	4.04	256.44	4.13	252.40	
T.P.	1.25	255.30	2.39	254.05	
T.P.	11.44	265.40	1.34	253.96	
B.M.			8.43	256.97	
T.P.	12.08	277.19	0.29	265.11	
B.M.			5.28	271.91	
T.P.	3.18	279.41	0.96	276.23	
B.M.			10.74	268.67	
B.M.			12.23	267.18	

Prev. Party Check Levels { Deutsche, Mahoney, Johnson, Franke }

9-7-23 PM. Cool Windy

Sp. 6" Poplar. R Sta. 195+25

38 R.R. Sp. R.R. Xing Sign L Sta. 201.

Top stk. 22' L Sta 208+60 Here's the diff

Stone in road.

246.26 Sp. 18" Oak R Sta. 216+27

Hub cap on grader.

Sp. in 18" Oak 70' Lt. Sta. 226+98

Sp. in 16" Oak 35' Rt. Sta. 236+25.

Sp. 14" Oak 27' Rt Sta. 242+22

Sp in 14" Oak. SE Cor. inters. Co. Rd. G. & Centerville

Top. Mont. Co. Rd. G + Centerville Rd.

℄ Elev. So RR East. 9/8/23
9/11/23.

BM.	2.60	231.86		229.26
Pavt.			3.72	228.14
"			3.62	228.24
			3.68 West Rail	228.18
Rail			3.65	228.21
			3.60 West Rail	228.26
"			3.58	228.28
201			3.5	228.4
+50			3.7	228.2
202			4.1	227.8
+50			4.7	227.2
203			5.1	226.8
+50			5.5	226.4
204			5.7	226.2
+50			5.8	226.1
205			6.0	225.9
+50			6.1	225.8
206			6.1	225.8
207			5.9	226.0
208			4.3	227.6
209			1.9	230.0

RR. Sp. RR. Xing Sign 4, Sta 201.
Past. SW ℄ RR. Xing
" NW. ℄ "
East Rail SE. of ℄ of Xing.
" " NE

Blue Tops. 9/8/23 9 m e.

	+	HI.	−	Profile Gr. +54	Grade Rod 13' Rt + Lt.
B.M.	2.60	231.86		229.26	
Track N.				228.24	3.62
" S.				228.14	3.72
201				227.76 54	
				228.30	3.56
+50				227.62 54	
				228.16	3.70
202				227.38 54	
				227.92	3.94
+50				227.78 54	
				227.82	4.04
203				226.69 54	
				227.47	4.42
+50				226.58 54	
				227.12	4.74
204				226.74 54	
				226.74	5.12
+50				225.68 54	
				226.22	5.64
205				225.84 54	
				225.84	6.02
+50				225.59 54	
				225.59	6.27
206				225.64 54	6.22
T.P.	0.92	231.35		230.43	
206+50				225.45 54	
				25.99	5.36
207				26.54 54	
				26.54	4.81
+50				26.83 54	
				27.37	3.98
208				27.9 54	
				28.44	2.91
+50				29.1 54	
				29.64	1.71
209				30.3 54	
				30.84	0.51
T.P.	6.35	36.78		30.43	
209+50				31.5 54	
				32.04	4.74
210				32.7 54	
				33.24	3.54

Sp. RR. Xing Sign Lt. Sta. 201.
NE. Of Track. NW Cor. Pavt.
SE. " " SW. " "

Top stk 22'L Sta 208+60 { Start 9-10-23 Rain-Cool. Deutsche Johnson Maloney Franks

Top stk 22'L Sta 208+60

(23-02)(23-55)		Blue Tops		Profile Grade	Grade Rod
Sta.	+ S	H.I. 36.78	- S		
210+50		Cont'd fr. p. 43		33.9 .54 34.44	2.34
211				35.1 .54 35.64	1.14
T.P.	8.12	243.76	1.14	35.64	
211+50				36.3 .54 36.84	6.92
212				37.5 .54 38.04	5.72
+50				38.7 .54 39.24	4.52
213				39.9 .54 40.44	3.32
+50				41.1 .54 41.64	2.12
214				42.3 .54 42.84	.92
T.P.	6.88	249.71	0.93	43.03	
214+50				43.38 .54 43.92	5.79
215				44.2 .54 44.75	4.96
+50				44.8 .54 45.34	4.37
216				45.13 .54 45.67	4.04
B.M.			3.42	45.24 .54 45.78	246.29 3.93
B.M.	3.47	249.76		246.29	
217				45.1 .54 45.64	4.12
+50				45.03 .54 45.57	4.19
218				44.95 .54 45.49	4.27
+50				44.88 .54 45.42	4.34
219				44.80 .54 45.34	4.42
+50				44.72 .54 45.26	4.50
220				44.65 .54 45.19	4.57
T.P.	4.56 Room	249.75	4.57	45.19	
220+50				44.58 .54 45.12	4.63
221				44.5 .54 45.04	4.71

VOID A/C GRADE CHANGE 45 for Re
See Page

Party { Deutsche, Johnson, Franke, Mahoney }

Rod. H.I. = 8

Elev. 244.75

9-10-23 Cool. Windy -

9-11-23 Cool. Still

Top stk 13' R Sta. 211

7.6

Top. stk. 13' L Sta. 214

6.7

5.8

5.5

5.2

Sp. 18" Oak R Sta. 216+27 See Ch. Levels p. 44

4.9

Sp. 18" Oak R Sta. 216+27 4 4 4 4 4 Start 9-11-23

4.7

4.9

4.9

4.7

4.7

5.0

5.1

Top stk 13' R Sta. 220

5.4

5.1

(23-02) (23-55) Blue Tops

Sta.	+5	H.I. 249.75	-5	Profile Grade +0.54	Grade Rod 13'L & R
221+50		Cont'd. p. 44		44.45 54 44.99	4.76
222				44.56 54 45.10	4.65
+50				44.88 54 45.42	4.33
223				45.40 54 45.94	3.81
+50				46.11 54 46.65	3.10
224				46.9 54 47.44	2.31

Cont'd fr. p. 44.

		249.75		241.08 54 41.62	
213+50				42.14 54 42.68	8.13
214				43.03 54 43.57	7.07
+50				42.76 54 43.30	6.18
215				44.33 54 44.87	5.45
+50				44.76 54 45.30	4.88
216				45.05 54 45.59	4.45
+50				45.08 54 45.62	4.16
217+00				47.65 54 48.19	4.13
224 +50				48.44 54 48.98	1.56
T.P. 225+00	7.79	256.73	0.81	49.15 54 49.69	0.81
225+50				49.90 54 50.44	7.04
226+00				50.45 54 51.19	6.29
+50				51.4 54 51.94	5.54
227				52.05 54 52.59	4.79
+50				52.50 54 53.04	4.14
228 T.P.	8.62	257.56	7.79 but	48.94 52.75 54 53.29	3.69
+50				52.8 54 53.34	4.27
229				52.65 54 53.19	4.22
+50					4.37

Party { Deutsche, Johnson, Mahoney, Franke

Rod & Elev
H.I. = 249.75

9-11-23
Cool. Cloudy
Some Rain
9-12-23
Cold. Windy -

5.2
5.1
4.7
4.0
3.3
2.6

8.9
H.I. = 256.73
Top stk 13'L Sta. 225 8.2
7.3
6.2
5.4
4.8
4.3
4.0 End 9-11-23
Top stk 13'L Sta. 225 H.I. 257.56 Start 9-12-23 2:P.M.
5.3
4.9

51

Sta.	+S	H.I. 257.56	-S	Profile Grade +0.54	Grade Rod. 2'L 2R
230		Cont'd fr p. 45		52.4 54 52.94	4.62
+50				52.15 54 52.69	4.87
231				51.90 54 52.44	5.12
T.P.	2.65	255.34	4.87	52.69	
231+50				51.65 54 52.19	3.15
232				51.40 54 51.94	3.40
+50				51.15 54 51.69	3.65
233				50.90 54 51.44	3.90
T.P.	6.47	258.87	2.94	252.40	
B.M.			1.91	256.96	256.97
B.M.	2.80	259.77		256.97	
233+50				250.85 54 251.39	8.38
234				251.2 54 51.64	8.13
+50				51.95 54 52.49	7.28
235				53.1 54 53.64	6.13
+50				54.65 54 55.19	4.58
236+00				56.5 54 57.04	2.73
+50				58.65 54 59.19	0.58
T.P. 237+00	11.74	270.90	0.58	259.16 260.8 54 261.34	9.56
+50				262.95 54 263.49	7.41
238+00				265.1 54 65.64	5.26
+50				67.21 54 67.75	3.15
239+				69.1 54 69.64	1.26
T.P.	8.18	277.82	1.26	270.64 70.83 54 71.37	6.45
+50				72.3 54 72.84	4.98
240					

VOID A/C GRADE CHANGE

Party { Deutsche, Johnson, Mahoney, Franks

Rod Elev

9-12-23 Cool Windy

9-17-23 Rain Cool.

4.9

5.3

5.5

Top Stk 13'R Sta. 230+50

5534

3.8

4.0

4.4

4.6

Oak Spigot Sta. 234+50

See Check Levels Page 41

Sp. 16 "Oak 35'R Sta. 236+25"

Sp. 16 "Oak 35'R " " " " Start 9-17-23

9.1

8.4

7.5

6.1

4.7

3.0

1.0

Top stk 13'L Sta. 236+50

10.2

8.3

6.1

3.8

1.8

Top Stk 13'R Sta 239

7.1

5.4

Sta.	+ S	Blue Tops H.I.	− S	Profile Grade +0.54	Grade Rod 13' L & R
		277.82			
240+50		Cont'd fr. prec. page 16		73.52 54 74.06	3.76
241				74.60 54 75.14	2.68
+50				75.42 54 75.96	1.86
242				75.9 54 76.44	1.38
+50				76.25 54 ✓ 76.79	1.03
T.P. & B.M.	9.08	280.97	9.93	271.89	(271.91 Ch. Levels)
243				76.4 54 76.94	4.03
+50				76.34 54 76.88	4.09
244				76.1 54 76.64	4.33
+50				75.54 54 76.08	4.89
245				74.8 54 75.34	5.63
+50				73.95 54 74.49	6.48
B.M.			9.08		
Prev. sheets.					

VOID A/C GRADE CHANGE

Sta.	+ S	H.I.	− S	Profile Grade	Grade Rod
B.M.	9.45	266.42		256.97	
236+00				56.6 54 57.14	9.28
+50				58.75 54 59.29	7.13
237+00				260.9 54 61.44	4.98
+50				63.05 54 63.59	2.83
238+00				65.21 54 65.75	0.67
T.P.	9.27	275.02	0.67	265.75	
238+50				67.30 54 67.84	7.18
239				69.18 54 69.72	5.30
+50				70.83 54 71.37	3.65
240				72.27 54 72.81	2.21
+50				73.47 54 74.01	1.01
241				74.47 54 75.01	0.01

Party - Deutsche, Johnson, Franke, Mahoney

Rod.

9-17-23 Rain Cold.
9-18-23 Cool. Fair

4.1
3.2
2.55
2.0
1.6

p. 41) Sp. 14" Oak 27'R Sta. 242+22 (27189 Ch. Levels BR#1 A5)

4.7
4.5
5.1
5.7
6.2
7.1

Sp. 14" Oak 27'R Sta. 242+22 End. 9-17-23

Start 9-18-23

Sp. 16" Oak 35'R Sta. 236+25

Top Stk 13'L Sta. 238+00

(23-02)(23-53) Blue Tops

Sta.	+ S	H.I. 275.02	− S	Profile Grade (Revised) + 0.54 * Exception to incl. 0.62 for super	Grade Rod 13' L & R
T.P.	5.61	280.62	0.01	275.01	
241+50				75.31 54 75.85	4.77
242				75.80 54 76.34	4.28
+50				76.17 54 ✓ 76.71	3.91
B.M.			8.71	271.91	271.91 ✓
243				76.30 54 76.84	3.78 ✓
+50				76.23 54 76.77	3.85 ✓
244				75.92 54 76.46	4.16 ✓
+50				75.40 54 75.94	4.68 ✓
245				74.65 54 75.19	5.43 ✓
+50				73.83 54 74.37	6.25 ✓
Super elev { 246+00				* Ins. 73.54 * Outs. 73.67	7.08 6.95
is made up +0.62 ℄ pvm. +50				* Ins. 72.56 * Outside 73.04	8.06 7.58
B.M.			8.71	271.91 ✓	Cheverly (271.91)
B.M.	7.21	274.39		267.18	
247+06±				I 271.35 O 72.31	3.04 2.08
+31±				I 70.75 O 71.99	3.64 2.40
+56±				I 70.20 O 71.67	4.19 2.72
+81±				I 69.78 O 71.25	4.61 3.14
248+06±				I 69.37 O 70.84	5.02 3.55
B.M.			7.21	267.18 ✓	
B.M.			5.73	268.66 or 67	
B.M.	6.53	273.71		267.18	
248+31±				I 68.97 O 70.44	4.74 3.27
+56±				I 68.60 O 70.07	5.11 3.64
+81±				I 68.27 O 69.74	5.44 3.97
249+06±				I 67.99 O 69.35	5.72 4.36

Party - Deutsche, Johnson, Mahoney (on leave this pm.), Franks

9-18-23
Cool fair
P.M.

℄

L R

Top stk 13'R Sta. 241

(See ℄ Levels p. 41.) Sp 14" Oak 27'R Sta. 242+22

p. 41

Sp. 14" Oak 27'R Sta. 242+22 End. 9-18-23

Top Mont Insec. ℄ Co. Rd. G. & Centerville Rd. (See ℄ Levels P. 41)

Top Mont. Ins ℄ Centerville & Co Rd G.
Sp. Tree 14" Oak S.E. Cor. Ins. " " " " ✓ See 41 page.

Top Mont as above

(23-02) (23-55) Blue Tops

Sta.	+ S.	H.I.	- S	Profile Grade Top of Pavement as Corrected	Grade Rod.
℄ curve & ℄ 249+31.95		Cont'd fr. prec page 273.71		I 67.74	5.97 ✓
				O 68.98	4.73 ✓
+57.8				I 67.53	6.18 ✓
				O 68.62	5.09 ✓
+82.8				I 67.38	6.33 ✓
				O 68.27	5.44 ✓
250+07.8				I 67.26	6.45 ✓
				O 67.93	5.78 ✓
+32.8				I 67.20	6.51 ✓
				O 67.60	6.11 ✓
Note... +57.8	6.53 ✓			I 67.20	6.51 ✓
				O 67.28	6.43 ✓
+82.8				I 67.37 67.47 6.24 ✓	6.34 ✓
				O 67.54	6.17 ✓
251+07.8				I 67.62	6.09 ✓
				O 67.71	6.00 ✓
+32.8				I 67.87	5.84 ✓
				O 67.88	5.83 ✓
+57.8				I 268.12	5.59 ✓
				O 268.12	5.59 ✓
252+07.8	6.53 ✓			I 268.63	✓ 5.08
				O 268.63	✓ 5.08
B.M.			6.53	267.18 ✓	

Note - See Centerville Project Note Book (First Pages)

EQUATION IN LEVELS

B.M. Sp. Tel.P. Rt. Sta. 258+87 (Centerville Sta'g)

Party { Deutsche, Johnson, Mahoney, Franke

℄ L R

Warm Fair
9-27-23

℄ - Elev Curve & W. Edge Proposed Centerville Rd/G = 267.47 Rod = 6.24

→ " Outside edge Reverse Curve & W Edge Centerville = 267.28 Rod =

Top. Mont. Inters. Co Rd G & Centerville

267.37 Co Rd G. Project & 267.46 Centerville Project

12/11/23 Clear & Mild

23-02

	+S	H.I.	-S	E/V.	Sub-grade Elev.
B.M.	5.20	239.44			234.24
0-5			5.7	33.7	33.1
00+06			5.8	33.6	33.0
1+00			5.6	33.8	33.2
2			5.3	34.1	33.5
3			5.2	34.2	33.6
+22			5.15	34.3	
4			5.0	34.4	33.8
5			5.5	33.9	33.3
6			6.6	32.8	32.2
T.P.	1.30	233.02	7.72	231.72	
7			1.2	31.8	31.2
8			2.4	30.6	30.0
9			3.5	29.5	28.9
B.M.			2.78	230 24	230.29

Lt ℄ Rt.

{Jorgenson
{Persons
{Briggs
{Eck

Spk 1? 30" Cottonwood Rt. Sta 1+62

Lt						℄	Rt						
		6.5/30	8.1/26	7.6/22	6.1/19	5.8/12	5.7/12	6.2/19	7.4/33				(5.6)
		6.1/27	7.8/24	7.8/21	6.0/17	5.9/12	5.8/12	6.1/19	8.1/34				(5.7)
6.3/30	6.4/28	7.9/24	7.9/21	5.8/17	5.7/12		5.6/12	5.6/18	7.1/21	7.3/25	6.2/26	6.4/29	(5.7)
5.8/30	5.5/27	7.0/23	7.3/20	5.3/17	5.4/12		5.7/17	5.3/12	7.3/21	7.6/25	6.4/28	6.5/3?	(5.4)
			5.6/31	5.1/22	5.2/12		5.2/12	5.5/18	6.6/21	6.7/25	6.3/27	6.6/32	(5.3)
	6.5/33	6.6/26	6.9/21	5.0/17	5.2/12		5.2/12	5.4/18	6.6/21	6.7/27			(5.4)
5.5/31	5.7/27	6.8/25	6.8/21	5.2/17	5.1/12		5.1/12	5.4/18	7.3/21	7.4/27			(5.7)
6.7/33	6.5/28	8.0/27	8.0/22	5.7/17	5.5/12		5.6/12	6.0/18	7.6/20	7.5/28			(6.1)
	7.5/31	7.6/25	8.5/21	6.8/18	6.7/12		6.7/12	6.9/18	8.5/21	8.5/24	8.1/26	8.3/29	(7.2)
2.5/29	2.2/27	3.4/25	3.4/21	1.4/17	1.3/12		1.3/12	1.5/17	3.0/22	3.0/30			(1.8)
2.9/31	2.5/27	4.2/25	4.0/21	2.5/17	2.5/12		2.5/12	2.7/18	4.5/21	4.5/24	4.0/28		(2.7)
3.7/31	3.4/27	5.5/24	5.1/20	3.6/17	3.5/12		3.6/12	3.8/18	5.1/22	5.6/28			(3.8)

Spk 20" Oak Lt. Sta. 9+70

	+S	H.I	-S		Sub-grade Elev.
		233.02			
10			4.6	28.4	27.8
11			5.7	27.3	26.7
12			6.9	26.1	25.5
13			8.1	24.9	24.3
14			9.5	23.5	22.9
T.P.	0.70	223.10	10.62	222.40	
15			1.1	22.0	21.4
16			2.5	20.6	20.0
17			4.3	18.8	18.2
18			7.1	16.0	15.4
			10.8		
19			10.8	12.3	11.7
T.P.	0.90	212.34	11.66	211.44	
20			4.20	08.1	07.5
21			8.4	03.9	203.3
~~21~~					
B.M.					205.61

Lt ℄ Rt.

4.2	4.4	6.1	6.0	4.7	4.7	5.0	4.7	5.0	6.8	7.2
30	27	25	21	17	12		12	17	22	28
5.2	6.3	7.3	7.3	5.7	5.7	6.3	5.8	6.0	8.6	8.8
33	28	27	22	17	12		12	17	23	28
5.8	6.9	6.5	8.5	6.8	7.0	7.3	7.0	7.1	8.9	9.7
31	28	25	21	17	12		12	18	21	28
6.7	6.7	9.1	9.3	8.2	8.2	8.3	8.2	8.2	9.7	10.2
32	28	24	19	17	12		12	18	21	27
7.5	7.7	10.9	10.8	9.5	9.2	9.6	9.6	9.6	11.9	12.5
33	28	24	19	17	12		12	18	23	28
0.0	0.0	2.4	2.5	1.1	1.2	1.2	1.3	1.4	4.1	4.8
30	28	24	20	17	12		12	17	23	27
6.6	6.6	4.0	3.7	2.5	2.5	2.6	2.6	2.6	6.1	6.7
33	31	25	20	17	12		12	18	23	27
2.4	2.3	5.0	5.4	4.3	4.4	4.3	4.4	5.0	10.0	11.0
31	28	24	21	19	12		12	20	28	33
7.7	7.9	8.5	7.0	7.1	7.4	7.4	7.2	7.5	12.5	13.5
32	27	23	19	12			12	21	28	32
10.6	10.8	11.9	12.0	10.6	10.8	10.7	11.0	11.1	11.5	17.5	18.0
34	28	25	21	18	12		12	17	21	30	32
3.9	3.7	4	5.4	5.5	4.1	4.2	4.1	4.3	4.5	10.8	11.6
32	28		25	22	19	12		12	21	29	34
7.9	8.4	9.9	10.1	8.3	8.4	8.4	8.5	8.5	13.8	14.9
33	28	25	22	18	12		12	21	30	33

Mail T.R. 27+50 25' Lt.

	+S	H.I	-S		Sub-grade Elev.
		212.34			
T.P.	0.70	201.36 ✓	11.68	200.66 ✓	
22			1.3	200.1	199.4
23			4.6	96.7	96.1
24			7.2	94.1	93.5
T.P.	2.43	194.84 ✓	8.95	192.41 ✓	
25			2.8	192.0	91.4
26			4.3	90.5	89.9
27			5.0	89.8	89.2
28			5.2	89.6	89.0
+42	Culv.				
B.M.					19.40
29			4.9	89.9	89.3
30			4.7	90.1	89.5
31			4.4	89.8	89.8
32			4.2	90.6	90.0
T.P.	6.40	197.24 ✓	4.00	190.84 ✓	

Lt & Rt.

0.8	1.1	2.7	2.8	1.1	1.4	1.4	1.7	7.2	7.6
30	28	25	22	18	12	12	21	31	33

1.6

5.6	5.9	6.5	6.7	4.8	4.7	4.6	4.5	4.9	10.1	10.7
32	28	25	22	17	12	12	19	24	32	33

5.1

8.8	8.5	7.3	7.3	7.3	7.4	8.3	15.3		
29	23	19	12	12	20	29	39		

7.7

6.8	7.0	3.0	2.9	2.9	3.1	3.5	9.5	9.7	
31	28	22	12	12	20	27	35	39	

3.6

7.2	7.6	4.2	4.4	4.4	4.5	5.0	9.4	9.9	
31	29	24	12	12	20	26	34	36	

4.6

7.5	7.9	5.1	5.1	5.1	5.1	5.8	9.5	9.5	
34	30	26	12	12	19	26	33	36	

4.8

8.2	8.3	5.2	5.0	5.2	5.3	5.3	6.0	9.4	9.4
34	32	27	18	12	12	19	26	33	36
		9.0			9.66				
		1 MK.			1 MK.				

4.9

N. T. P. 27+ 50 4T.

8.7	8.8	5.0	5.0	5.0	5.1	6.0	9.5	9.7	
37	33	26	12	12	19	26	32	37	

5.0

8.2	7.8	5.0	4.8	4.8	4.9	5.3	9.6	9.6	
33	30	25	12	12	19	27	34	40	

5.0

6.3	7.1	4.4	4.5	4.5	4.5	4.8	9.5	9.4	
33	30	24	12	12	20	27	34	37	

4.9

7.5	8.0	4.5	4.3	4.3	4.2	4.7	9.5	9.6	
32	29	23	12	12	20	26	36	40	

4.9

	+ S	H.I 197.24	- S		Sub-grade Elev.
B.M.			2.52	194.72	194.70
33			6.2	91.0	190.4
4			5.4	91.8	91.2
5			4.2	93.0	92.4
6			3.1	94.1	93.5
7			2.7	94.5	93.9
8			2.8	94.4	93.8
T.P.	2.76	197.16 ✓	2.84	194.40 ✓	
9			3.5	93.7	93.0
B.M.			1.95	195.21	195.2
+70			4.2	93.0	92.3
40			4.6	92.6	91.9 ✓
B.M.	Culv.		5.13	192.03 ✓	192.04
1			5.7	91.5	90.8
2			6.9	90.3	89.6

Lt & Rt.

N. Trace Lt. 32+95

7.8 / 28	7.8 / 24	6.3 / 22	6.3 / 12	7.0	6.3 / 12	6.4 / 20	6.7 / 26	12.0 / 35	12.0 / 39
5.6 / 28	7.2 / 25	7.9 / 21	5.7 / 18	5.6	5.5 / 12	5.8 / 19	6.5 / 26	11.4 / 35	11.3 / 38
0.0 / 36	1.9 / 28	6.1 / 24	6.3 / 20	4.5 / 17	4.3 / 12	4.7	4.3 / 12	4.2 / 21	4.8 / 26	8.9 / 34	9.3 / 38
+5.5 / 31	0.0 / 28	4.9 / 22	4.5 / 19	3.3 / 17	3.4 / 12	3.4	3.2 / 12	3.4 / 20	3.9 / 27	7.5 / 33	8.3 / 37
+2.0 / 30	0.0 / 28	4.0 / 24	4.2 / 19	2.7 / 16	2.7 / 12	2.2	2.8 / 12	2.9 / 20	3.2 / 27	6.7 / 32	7.9 / 37
0.7 / 28	4.0 / 23	4.0 / 20	2.8 / 17	2.8 / 12	2.8	2.8 / 12	2.9 / 23	4.1 / 26	4.3 / 32	6.4 / 39
3.2 / 36	3.1 / 31	3.0 / 28	5.3 / 24	5.5 / 19	3.8 / 17	3.6 / 12	3.9	3.6 / 12	3.5 / 19	4.7 / 23	4.7 / 28	3.9 / 34	6.8 / 39

N. Oak Rt Sta 37+26

3.0 / 33	3.5 / 31	3.1 / 28	5.4 / 24	5.4 / 20	4.9 / 17	4.3 / 12	4.5	4.4 / 12	4.2 / 18	7.3 / 23	8.4 / 30
3.0 / 36	4.6 / 35	4.8 / 31	4.3 / 28	5.2 / 24	5.9 / 21	4.6 / 18	4.7 / 12	4.8	4.7 / 12	4.7 / 18	5.2 / 25	8.3 / 28
6.8 / 33	5.8 / 31	5.6 / 28	7.1 / 24	7.0 / 20	5.8 / 17	5.8 / 12	10.7 Inv. 5.9	5.8 / 12	11.5 Inv. 5.5 / 24	10.6 / 31	10.6 / 33
9.0 / 23	8.6 / 24	7.0 / 17	6.9 / 12	7.4	7.0 / 12	7.7 / 21	7.8 / 27	11.9 / 33	

	+S	H.I. 197.16	-S		Sub-grade Elev.
43			7.6	89.6	188.9
T.P.	5.15	194.57	7.74	189.42	
4			5.2	89.4	88.7
5			5.1	89.5	88.8
B.M.			2.02	192.55	192.57
6			4.9	89.7	89.0
7			4.9	89.7	89.0
+30			4.8	89.8	
+39	end pavement				
+96			4.1	90.5	89.9
T.P.	10.35	204.65	0.27	194.30	
49			12.6	92.0	92.0
+69	end Pavement				
50			7.1	97.5	196.9
T.P.	11.38	215.18	0.85	203.80	
1			11.6	203.6	203.0
2			5.7	209.5	208.9
T.P	10.83	226.01	0.0	215.18	
3			10.5	215.5	214.9

Lt ℄ Rt

9.4/32 7.5/30 7.1/27 9.3/25 9.2/30 7.8/17 7.7/12 **7.7** 7.7/12 7.6/26 11.8/33

43+53 start Cut.

5.3/31 4.6/30 4.1/28 6.3/24 6.4/19 5.3/17 5.3/12 **5.0** 5.3/12 5.4/18 7.1/21 7.1/25 3.5/29 4.7/33

6.9/34 3.2/30 3.6/28 6.4/24 6.1/19 5.2/17 5.2/12 **4.1** 5.2/12 5.1/19 7.2/23 7.0/26 3.6/31 5.8/34 6.6/36 -1.0

Spk tree Rt 45+03

4.7/33 2.3/30 2.6/27 6.0/24 6.2/21 5.1/18 5.0/12 **3.2** 5.0/12 5.2/18 7.0/22 6.7/26 2.9/31 2.9/33 6.6/37

(5.5)

+5.8/31 0.0/27 2.0/25 5.3/21 5.0/17 5.0/12 **3.1** 5.0/12 4.8/18 6.4/22 6.3/25 2.0/30 0.0/31 +1.5/32 -1.0

+8.1/34 0.0/26 5.3/21 5.0/19 4.9/12.8 **3.3** 4.9/12.8 5.1/16 5.8/18 5.8/20 0.7/25

+3.9/18 1.3/15 3.1/10 **0.6** 4.2/12 4.3/18 5.0/20 4.6/22 0.0/29 +8.5/36

48+55 start cut.

+15.5/56 +3.0/47 0.0/43 11.1/28 14.0/21 13.3/18 12.6/12 **13.0** 12.8/12 5.1/21 4.4/26

+18.8/50 +8.7/48 0.0/36 7.2/23 7.8/21 7.2/18 6.8/12 7.1/12 **7.5** 7.2/12 6.9/12 7.3/17 7.9/21 0.0/35 +6.0/39

(12.2)

+12.2/48 0.0/39 13.0/21 11.5/16 11.4/12 11.8/12 **12.0** 11.7/12 11.4/12 11.4/16 12.3/21 3.5/37 0.0/38

(6.3)

+10.9/43 0.0/34 6.1/25 6.0/23 6.9/21 5.6/17 5.4/12 5.8/12 **6.0** 5.8/12 5.0/12 5.3/17 6.6/22 0.0/33 +9.0/41

(11.1)

+3.0/37 0.0/36 11.2/26 10.7/23 11.4/21 10.5/17 10.2/12 10.6/12 **10.6** 10.6/12 10.7/12 10.3/16 11.1/22 10.0/25 4.7/33 +1.2/36

(0.1)

	+S	H.I.	-S		Sub-grade Elev.
		226.01			
54			4.5	21.5	220.9
T.P.	8.87	234.88	0.0	226.01	
55			8.4	226.5	25.9
B.M. +60			4.50	230.38	230.42
56			5.4	229.5	28.9
57			4.9		29.4
58			5.2		29.1
59			5.4		28.9
60			5.7		28.6
T.P.	4.00	233.03	5.85	229.03	
61			4.2		28.2
62			4.6		27.8
63			4.9		27.5
F.P.	7.04	233.83	6.24	226.79	
64			5.9		27.3
65			5.9		27.3
+35	Culv.				

Lt ℄ Rt.

+2.7/32 0.9/30 5.4/21 4.3/16 4.7/12 4.5/12 [4.5 (5.1)] 4.6/12 4.2/12 4.3/16 4.7/19 5.4/22 4.7/25 0.0/30 +2.4/32 (00)

4.4/31 6.2/27 8.7/23 9.4/21 8.5/17 8.1/16 8.5/12 [7.5 (9.0)] 8.5/12 8.1/12 8.4/16 9.2/21 8.5/24 5.8/28 6.2/33 (-0.1)

4.6/31 7.4/26 7.5/21 5.6/17 5.5/12 | 5.5/12 5.7/18 7.0/21 7.1/25 5.3/28 6.0/34

2.7/34 7.8/27 7.5/21 5.3/17 5.0/12 [5.8] 5.0/12 5.4/17 7.1/21 6.9/25 4.7/29 4.7/31

1.7/38 1.9/34 7.3/28 7.1/21 5.1/17 5.3/12 [5.3] 5.3/1.2 5.5/18 6.5/20 6.6/25 5.1/28 4.8/31

2.2/38 2.1/36 7.7/28 7.6/23 5.8/19 5.6/12 [5.6] 5.5/12 5.6/18 6.6/20 6.7/25 4.6/28 4.2/29

4.1/30 7.5/24 7.1/20 5.8/17 5.8/12 [5.9] 5.8/12 5.8/18 7.2/21 7.0/25 4.9/28 4.2/29

2.1/31 2.5/29 6.0/23 5.8/19 4.5/17 4.3/12 [4.4] 4.3/12 4.3/18 5.5/20 5.1/25 2.4/29 1.7/31

4.1/27 6.4/23 6.3/21 4.7/17 4.6/12 [4.8] 4.7/12 4.8/18 5.5/20 5.2/25 3.4/28 2.8/31

7.2/25 7.6/23 6.8/20 5.3/17 5.0/12 [5.5] 5.0/12 5.2/18 6.6/21 6.6/25 5.8/26 5.6/28

63 + 00 end cut. 63+75 end cut

12.9/32 6.1/22 6.0/12 [6.9] 6.0/12 6.2/18 6.1/24 10.9/31 10.9/33

19.4/45 17.3/39 12.0/31 6.0/23 6.0/12 [6.0] 6.0/12 6.0/18 6.3/24 15.4/37 16.5/46

18.8/Inv 17.2/Inv.

12/12/23 Cloudy, Cold & Windy

	+S	H.I	-S		Sub-grade Elev.
66			5.0		228.2
67			3.6		29.6
68			2.0		31.2
+55			1.2		
+57			1.1		
+71			1.0		
+85			0.9		
+90			0.8		
69			0.7		32.5
T.P.	6.65	239.83 ✓	0.65	233.18 ✓	
70			5.9		33.3
71			5.4		33.8
72			5.1		34.1

Lt ℄ Rt -

Jorgenson
Briggs
Persons
Eck.

Lt						℄	Rt					
		16.8/41	12.0/32	5.6/23	5.1/12	5.3	5.1/12	5.1/24	13.5/36	14.3/43		
		7.4/29	6.5/25	3.7/20	3.7/12	3.5	3.7/12	3.6/20	5.5/24	5.7/31		

Cut shorts 6, 7 & 16 Rt & Lt.

Lt						℄	Rt					
[illegible]/29	2.5/26	4.1/24	4.2/20	1.9/17	2.1/12	1.9	2.1/12	2.0/20	3.6/23	3.6/25	1.2/27	1.2/29
			2.2/35	1.7/23	1.3/12	1.7	1.2/12	1.6/25	0.9/29	0.7/33		
			2.6/36	1.7/25	1.3/12	1.6	1.2/12	1.4/26	2.6/30	2.6/33		
			2.0/40	1.2/23	1.1/12	1.7	1.0/12	1.2/25	1.4/33			
			2.4/36	1.4/24	1.0/12	1.6	0.9/12	1.0/22	1.4/31			
1.4/36	1.4/29	3.1/26	3.2/22	0.9/19	0.9/12	1.6	0.8/12	1.1/22	2.3/25	2.7/31		
1.0/36	1.1/27	3.2/25	3.0/22	0.7/18	0.8/12	1.5	0.8/12	0.9/23	1.0/28			
6.9/32	7.0/29	8.8/26	8.8/21	6.3/17	6.0/12	6.7	6.0/12	6.2/16	8.3/20	8.5/24	7.5/26	6.1/30
6.5/30	6.4/27	7.9/25	7.9/21	5.8/17	5.5/12	5.9	5.5/12	5.5/17	7.6/21	7.5/24	6.4/27	6.5/31
6.9/30	6.7/26	7.6/25	7.4/20	5.3/17	5.2/12	5.5	5.2/12	5.5/18	6.6/20	6.8/25	6.3/28	6.6/33

	+ S	H I	- S	Elv.	Sub-grade Elev.
		239.93			
73			4.8		234.4
74			4.4		34.8
75			4.1		35.1
76			3.9		35.3
T.P.	4.55	240.54	3.84	235.99	
77			4.3		35.6
78			4.0		35.9
B.M.					239.44
79			4.3		35.6
80			5.7		34.2
81			8.3		31.6
+78			10.8		
82			11.4		28.5
83					
T.P.	0.86	229.28	12.12	228.42	

L4 & RT

5.7 5.5 6.8 6.6 4.8 4.9 5.1 4.8 4.7 6.3 6.3 4.6 4.8
32 28 24 21 17 12 12 18 20 23 26 31

5.9 5.4 6.7 6.7 4.8 4.5 4.8 4.5 4.7 5.9 5.9 5.1 5.6
29 25 24 21 17 12 12 17 19 23 28 37

5.4 5.4 6.2 6.2 4.5 4.7 4.6 4.2 4.1 5.9 6.0 5.6 5.6
32 27 25 20 17 12 12 17 20 25 26 33

3.1 3.6 5.0 5.2 3.8 4.0 4.2 4.0 4.2 6.0 5.8 4.3 4.5
31 27 25 20 17 12 12 17 20 24 27 33

5.0 5.0 5.7 5.6 4.9 4.6 4.5 4.4 4.4 5.8 5.4 4.8 5.0
30 25 24 20 18 12 12 18 21 25 27 31

2.1 2.4 5.8 5.9 4.7 4.1 4.5 4.0 4.5 5.7 5.5 3.7 4.0
34 30 24 20 17 12 12 17 20 25 29 35

79+42 Free L. 79 + 42
1.4 1.7 6.3 6.4 4.9 4.9 4.3 4.9 5.8 6.0 2.8 2.8
33 31 25 21 17 12 12 17 19 24 30 34

1.7 1.8 7.9 7.7 5.7 6.1 6.0 5.8 5.9 8.1 8.3 2.3 2.3
33 32 25 21 17 12 12 17 21 26 32 34

3.3 3.3 10.5 10.5 8.6 8.4 9.2 8.4 8.3 10.3 10.0 2.8 3.0
34 33 25 21 17 12 12 17 21 24 33 35

5.7 6.1 11.5 10.8 10.9 11.6 10.8 11.0 12.6 13.0 2.4
37 34 28 19 12 12 18 21 25 37

4.9 13.9 13.7 11.9 11.5 11.5 17.2 11.6 13.4 13.3 2.3
33 25 22 17 12 12 18 22 25 38

6.5
35

15.6

3.8
40

	+S	H.I	-S	Elv.	Sub-grade Elev.
		229.28			
83			3.5		225.2
84			6.7		22.0
85			9.9		18.8
T.P.	1.74	219.60	11.42	217 86	
6			3.0		16.0
7			4.5		14.5
8			5.0		14.0
9			5.0		14.0
90			4.9		14.1
1			4.7		14.8
108 T.P	Culv. 9.76	225.61	3.75	216.85	
92			9.0		16.0
3			7.8	18.0	17.2
B.M.			5.84	219.77	219.79
94			6.6		18.4

Lt & Rt.

4.4

5.8	5.6	3.8	3.6	3.6	3.7	4.7	6.6
25	21	17	12	12	18	22	27

7.4

4.9	4.0	8.8	8.8	7.0	6.8	6.8	7.1	10.0	10.0	3.5
32	30	24	20	17	12	12	18	23	29	37

8.4 + 4.3 end cut Rt 8.6 Lt.

15.7	10.0	10.0	8.0	8.0	10.3	10.4	12.0	16.6
28	21	12	12	12	18	23	27	34

12.9

18.8	12.0	3.2	3.1	3.1	3.5	3.8	12.0	18.2
46	35	21	12	12	17	24	36	44

R L

5.0

18.1	4.7	4.6	4.6	4.9	5.0	13.5	
39	22	12	12	17	22	36	

5.2

6.5	6.6	3.1	5.1	5.0	5.4	8.4	8.8
26	22	18	12	12	20	25	29

5.2

6.7	6.6	4.9	5.1	5.1	6.1	8.5	8.9
26	22	18	12	12	20	25	29

5.2

11.3	11.0	5.2	5.0	5.0	5.2	12.5
34	29	19	12	12	20	31

4.8

12.3	9.6	4.4	4.3	4.3	4.8	10.5	13.3
38	28	19	12	12	20	28	38

12.6 IMV 12.9 IMV

9.6

17.7	12.0	9.3	9.1	9.1	9.7	13.2	14.5
32	23	19	12	12	20	25	32

8.4

14.3	7.8	7.9	7.9	8.2	9.8	9.9	
31	20	12	12	20	23	28	

9.3 + 7.8 L.P. Rt.

6.8

10.1	9.5	7.8	6.8	6.7	6.7	6.6	8.6	8.3	6.5	6.2
30	27	23	18	12	12	18	22	25	28	34

	+S	H.I.	-S	Elv.	Sub-grade Elev.
		225.61			
95			5.5		219.5
6			4.2		220.8
7			3.1		221.9
8			1.8		223.2
T.P.	4.98	228.73	1.86	223.75	
9			3.8		24.3
100			3.3		24.8
1			4.1		24.0
2			6.3		21.8
3			9.2		18.9
4			12.1		16.0
T.P.	0.47	217.60	11.60	217.13	
5			3.9		13.1
6			6.8		10.2

27 & 1pt.

7.1 7.1 8.4 7.8 5.4 5.5 5.9 5.6 5.9 7.5 7.5 5.2 5.2
31 28 25 21 17 12 12 12 18 21 29 28 32

1.3 1.3 6.3 6.1 4.3 4.3 4.9 4.3 4.8 8.4 8.0 3.1 3.3
34 32 26 20 17 12 12 19 23 26 31 34

+9.5 5.9 5.8 3.3 3.1 3.9 3.1 3.2 4.8 5.2
31 25 21 17 12 12 18 21 24

+1.2 4.5 4.3 2.1 1.9 2.5 1.9 2.0 4.1 5.1
31 25 21 17 12 12 18 22 25

0.4 6.2 6.1 3.9 3.8 4.4 3.8 3.9 6.1 6.2 4.0 4.9
32 25 22 18 12 12 18 21 24 28 31

+6.9 0.0 6.1 6.1 3.6 3.4 4.1 3.4 3.4 5.8 5.8 0.0 +2.7
37 32 25 22 18 12 12 17 21 25 32 34

+9.0 0.0 6.9 6.9 4.4 4.2 4.6 4.1 4.3 6.2 6.5 0.0 +5.5
41 34 25 23 17 12 12 18 22 26 34 38

+8.4 0.0 9.4 9.4 7.3 6.7 6.4 6.8 6.4 6.8 9.0 8.8 0.8
42 36 25 23 20 17 12 12 18 22 25 34

+6.0 0.0 11.7 11.9 9.6 9.3 9.2 9.3 9.6 11.9 11.9 5.4
42 38 26 23 19 12 12 18 21 24 31

+6.2 0.0* 14.5 14.4 12.3 12.2 12.6 12.2 12.4 14.7 15.3 8.3 5.7
45 41 24 22 19 12 12 18 22 25 35 36

+12.0 0.0 6.5 6.3 4.3 4.0 4.5 4.0 4.2 6.3 6.3 0.0 +3.2
45 33 24 22 19 12 12 18 22 25 32 34

105 + 90 and cut

5.6 6.1 9.8 9.7 7.0 6.1 7.1 6.9 6.9 12.0 16.5
33 29 25 22 17 12 12 20 29 35

106 + 15 and cut. 1

	+S	H.I	−S	Elv.	Sub-grade Elev.
		217.60			
107			9.7		207.3
T.P.	1.38	208.83	10.15	207.45	
8	+08		3.9		204.3
	+50	Culv.	5.1		
B.M.			10.51	198.32	198.31
9			6.0		02.2
110			6.8		01.4
T.P.	5.38	207.30	6.91	201.92	
111			5.4		01.3
112			5.5		01.2
113			4.4		02.3
114			2.1		04.6
T.P.	11.20	213.85	4.65	202.65	
115			6.3		06.9
116			4.2		09.0
17			2.9		10.3

2+ ℄ Rt.

20.5 12.0 10.0 9.9 10.3 9.9 10.4 12.0 22.0
33 22 19 12 12 20 25 38

13.8 13.3 5.8 4.2 4.0 4.4 4.3 4.4 6.5 14.5 15.4
inv. 35 24 19 12 12 20 26 37 inv. Culv
13.9 7.2 5.5 5.2 5.5 6.2 14.4
31 22 17 12 12 21 32

Tree Rt 10 ft 35° R. R. Spk.
13.7 6.3 6.6 6.3 6.3 13.9
31 18 12 12 20 31

13.6 7.3 6.9 7.1 6.9 7.0 13.9
30 20 12 12 20 29

11.2 5.8 5.5 5.5 5.5 6.0 12.3
29 20 12 12 21 31

11.4 11.0 5.5 5.5 5.6 5.9 12.5
33 30 21 12 12 20 28

R L
11.3 5.7 4.3 4.5 4.6 4.5 4.9 12.2
31 22 19 12 12 21 31

9.8 7.6 2.1 2.2 2.3 2.2 2.0 10.3
32 27 18 12 12 21 33

N. Trea Rt 114+60 L.
9.1 7.6 9.6 9.4 6.7 6.4 6.7 6.4 6.2 14.9
32 32 28 23 17 12 12 22 33
and CH+ 116+00

+1.1 0.0 7.1 7.1 4.6 4.9 5.0 4.3 4.4 6.8 6.7 2.7 3.2
33 32 25 22 17 12 12 17 21 24 30 33

4 5.3 5.0 5.8 5.6 3.1 3.0 3.8 3.0 3.0 4.8 4.6 0.0 +4.8
36 33 25 22 17 12 12 17 21 24 30 33

12/13/23	+S	H.I	-S	Clear & Cold	
23-02		213.85		E/V.	Sub-grade Elev.
118			2.2		211.0
19			1.8	212.1	11.4
T.P.	5.56	218.48	0.93	212.92	
+50			6.2		
120			6.0		11.9
+18			6.0		
+25			6.0		
B.M.			7.21	211.27	211.28
+50			5.8		
+75			5.8		
21			5.7		12.2
+50			5.4		
+75			5.4		
122			5.3		12.6

Jorgensen
Persons
Briggs
Eck.

Lt ℄ Rt.

2.7

+8.2/38 10.0/31 4.1/25 4.0/22 2.0/18 1.8/12 | 2.7/12 2.4/12 2.7/17 5.0/22 4.7/24 0.0/30 +6.5/35

(1.8)

1.0/35 2.0/34 2.2/30 0.8/27 0.8/20 1.0/12 | 2.6/14 2.3/14 2.3/20 4.3/23 4.3/29 +6.7/40

0.9

7.0/61 8.1/56 7.4/53 6.8/46 6.0/29 5.1/21 5.4/12 | 7.0/14 6.7/14 6.8/20 8.3/25 8.3/28 0.2/38

5.2

9.0/42 8.1/35 7.5/25 5.0/19 6.3/12 | 6.9/14 6.5/14 6.6/20 8.1/25 8.3/28 4.2/33

6.8

11.2/40 11.1/35 9.0/26 5.3/20 5.3/12 | 6.8/13.5 6.5/13.5 6.4/21 5.6/27 8.4/29 6.7/31 6.6/33

10.0

11.8/35 10.4/29 5.0/20 5.3/12 | 6.8/13.5 6.5/14 6.5/21 8.9/27 8.9/30 7.4/32 7.4/34

spk in Oak Hill farm gate

12.2

13.4/32 5.2/21 5.2/12 | 6.7/14 6.4/14 6.7/21 10.7/27 10.6/31

14.5

13.7/33 4.9/20 5.1/12 | 6.5/13 6.3/13 6.7/21 12.2/30

11.8

6.9/53 7.2/38 8.4/34 8.7/29 5.0/21 5.0/12 | 6.4/12 6.1/12 6.3/20 11.0/28

8.9

10.0/54 4.4/36 4.4/24 4.7/12 | 5.2/12 5.9/12 5.8/20 10.9/28 10.7/34

7.1

13.7/40 3.9/28 4.0/21 4.6/12 | 6.1/12 5.8/12 6.0/20 9.1/26 8.7/33

5.9

12.3/35 3.8/23 4.5/12 | 5.9/12 5.6/12 5.4/19 7.3/23 7.5/30

	+S	H.I	-S	Elv.	Sub-grade Elev.
122+60.9 = 122+57.6		218.48			
			4.6		213.3
T.P.	8.19	221.87	4.80	213.68	
123			7.8		13.4
24			6.9		14.3
25			6.1		15.1
26			5.3		15.9
27			4.7		16.5
28			4.6		16.6
29			5.2		16.0
30			6.4		14.8
31			8.1		13.1
32			10.5		10.7
T.P.	0.26	210.63	11.50	210.37	
33			1.1		08.9
B.M.					208.51

Lt & Rt.

8.9	4.3	4.2	5.3	5.1	4.8	5.2	8.3	6.9	5.7	
24	17	11		11	11	17	22	24	27	
11.9	7.2	7.4	8.3	8.0	7.7	8.0	11.2	11.5		
24	16	10		10	10	16	22	24		
10.0	6.9	6.9	7.1	7.0	7.3	10.1				
24	17	10		10	15	20				
7.9	7.5	7.5	6.1	6.7	6.5	10.0	10.0			
24	23	21		10	15	21	23			
6.6	7.0	5.2	5.4	5.3	5.3	7.7	8.4			
23	21	16	10		16	20	26			
4.9	5.5	5.5	4.6	4.7	4.7	4.8	4.8	6.9	5.4	5.4
23	21	19	16	10	10	16	20	22	26	
5.1	5.4	6.0	6.0	4.6	4.6	5.0	4.7	4.7	4.8	6.8	4.7	4.3
27	22	21	19	16	10		10	16	20	23	25	27
6.2	6.4	7.2	7.4	5.5	5.2	5.8	5.3	5.4	8.1	7.4	7.0	
25	23	22	20	16	10		10	16	21	22	24	
7.4	7.1	7.7	7.7	6.3	6.5	6.7	6.5	6.4	8.6	8.6	7.6	7.7
26	22	21	19	16	10		10	16	20	22	23	25
11.5	7.1	8.1	8.3	8.2	8.3	7.7	11.7			
24	22	16	10		10	16	22	24		
15.6	10.6	10.6	10.9	10.6	10.4	15.9				
24	16	10		10	16	26				
6.5	5.0	1.2	1.2	1.4	1.2	1.2	5.8	6.9		
24	23	16	10		10	16	23	25		

Twin Cotton Wood 36" Lt 133 + 45

	+S	H.I. 210.63	−S	Elv	Sub-grade Elev.
134			2.8		207.2
35			4.5		05.5
36			6.2		03.8
37			8.1		201.9
38			10.5		199.5
T.P.	0.18	199.36	11.45	199.18	
39			1.4		97.3
40			3.6		95.1
41			6.6		92.7
42			6.5		92.2
+10	Culv.				
43			5.1		93.6
44			2.3		96.4
B.M.	11.86	205.79	5.43	193.93	193.99
+22			8.1		
+40			7.6		

Lt ℄ Rt-

3.2

6.5/25 4.8/22 2.8/17 2.9/10 2.9/10 2.9/16 6.8/22 6.7/25

4.8

7.4/26 6.0/22 4.3/16 4.5/10 4.5/10 4.3/16 7.1/22 7.0/24

6.9

8.5/24 8.1/21 6.3/17 6.3/10 6.3/10 6.3/16 8.2/21 8.9/24 8.1/25 8.6/28

8.9

8.5/25 9.8/23 9.4/18 8.2/16 8.2/10 8.2/10 8.2/16 10.9/22 10.7/25

11.0

15.1/23 10.6/16 10.5/10 10.6/10 10.4/17 12.0/20 10.6/27

2.1

6.7/27 1.5/17 1.5/10 1.5/10 1.5/16 5.6/24 5.4/27

4.1

8.4/24 7.9/22 3.8/17 3.6/10 3.7/10 3.9/16 8.2/25 8.3/28

6.4

10.6/27 10.7/25 6.2/18 6.1/10 6.1/10 6.6/16 10.6/23 10.5/25

7.10

10.7/28 10.7/25 6.5/17 6.6/10 6.6/10 6.7/17 10.6/23 10.5/25

11.0 11.4

5.11

10.0/25 9.4/23 4.7/17 5.1/10 5.2/10 5.3/16 10.0/23 9.8/26

3.3

9.3/27 8.2/24 2.5/16 2.3/10 2.4/10 2.6/16 9.1/25 9.0/28

N.E. Cor top head wall 144+48 Rt.

13.6/32 13.9/25 8.3/17 8.2/10 8.1/10 8.2/16 8.6/16 14.5/25

8.7

12.1/32 11.6/25 7.6/17 7.1/10 7.7/10 7.9/15 11.7/24 12.1/31

	+S	H.I.	-S	Elv.	Sub-grade Elev.
		205.79			
+55			7.2		
145			6.0		199.2
46			2.5		202.7
T.P.	11.79	217.14	0.44	205.35	
47			9.8		206.7
48			5.8		10.7
49			1.8		14.7
T.P.	11.51	228.07	0.58	216.56	
50			8.5		18.9
51			4.3		23.1
Hay Wire +22					
52			0.2		27.2
T.P.	11.20	238.95	0.32	227.75	
53			7.9		30.4
54			5.7		32.6

Lt & Rt.

8.3
15.5/30 7.1/17 7.3/10 7.3/10 7.4/16 14.1/25

6.6
14.1/28 5.9/17 6.1/10 6.1/10 6.5/16 13.1/26

3.2
12.7/30 2.5/17 2.6/10 2.6/10 2.7/16 10.6/27

10.3
20.0/33 12.0/23 9.8/18 9.8/10 9.9/10 10.0/16 12.0/20 20.0/30

6.1
11.6/28 6.8/18 5.9/10 5.8/10 5.9/18 10.8/28 11.9/30 12.2/35

48 + 10 end cut.

1.9
+9.6/40 0.0/31 4.9/23 4.3/20 1.7/15 1.9/10 1.9/10 2.0/15 3.8/19 4.4/24 0.0/30 +2.6/35 +10.2/46 +13.9/48

8.7
+6.8/42 0.0/41 10.8/25 10.5/19 8.7/16 8.6/10 8.6/10 8.5/16 9.8/21 10.7/24 0.0/40 +7.5/51 +11.7/52

4.5
+7.5/40 +2.3/37 0.0/33 7.1/23 6.9/19 4.6/15 4.4/10 4.4/10 4.9/16 6.1/24 4.5/27 0.0/34 +1.8/37 +6.3/39.5

0.3
+10.1/40 0.0/28 3.7/23 2.8/19 0.5/15 0.3/10 0.3/10 0.4/16 1.6/20 2.0/23 0.0/26 +0.6/29 +4.6/35 +10.6/39

8.0
1.5/34 6.2/31 10.8/24 10.4/19 8.2/15 8.0/10 8.0/10 8.0/15 8.4/19 9.8/24 4.8/32 +0.8/36

4.2
+2.5/39 0.0/37 2.6/35 4.1/30 8.5/23 8.5/19 5.9/15 6.8/10 5.8/10 5.8/15 7.6/21 8.1/25 0.2/34

	+S	H.I.	-S	Elv.	Sub-grade Elev.
		238.95			
155			4.6		233.7
B.M.			3.79	235.16	235.17
+50			4.0		34.3
56			3.5		34.8
57			2.4		35.9
58			1.4		36.9
T.P.	7.44	245.34	1.05	237.90	
+40			7.3		
59			6.7		38.0
60			5.6		39.1
1			5.0		39.7
2			5.0		39.7
3			5.5		39.2
+50			5.9		

Lt ℄ Rt.

[illegible] [illegible] 4.6/33 6.4/26 5.8/18 4.6/15 4.6/10 **5.7** 4.6/10 4.7/14 6.2/17 6.8/24 2.0/30

Sta. 4" Oak R 155 + 45

7.9/33 7.8/27 7.6/23 4.0/17 4.1/10 **4.6** 4.1/10 4.3/16 5.9/20 6.2/24 5.5/25 6.4/30

155 + 55 and Cut.

9.3/30 9.6/27 3.6/18 3.6/10 **4.1** 3.6/10 3.7/18 11.0/29

21.1/45 12.0/34 2.4/18 2.5/10 **3.0** 2.5/10 2.6/19 12.0/33 25.4/54

15.2/38 1.3/18 1.4/10 **2.0** 1.4/10 1.7/18 11.5/32

158 + 40 and Cut.

11.0/32 10.5/26 9.8/22 7.7/17 7.4/10 **7.9** 7.4/10 7.4/18 9.2/23 9.4/26 8.8/27 8.5/32

3.0/37 7.7/29 8.6/25 8.2/20 6.8/16 6.8/10 **7.2** 6.8/10 6.8/16 8.0/18 8.3/22 0.0/33 +7.8/43

+1.8/37 0.0/35 8.2/26 8.2/21 5.8/16 5.7/10 **6.2** 5.7/10 5.7/15 7.8/21 8.0/26 +0.5/36

+3.6/38 0.0/35 7.9/25 7.4/19 5.2/15 5.1/10 **5.4** 5.1/10 5.6/15 7.5/19 7.9/24 0.0/33 +1.1/33

+0.3/34 6.9/26 7.1/21 5.1/16 5.1/10 **5.4** 5.1/10 5.3/16 8.2/21 8.1/26 7.0/27 5.6/29

4.9/34 5.5/30 7.2/27 7.2/21 5.5/16 5.6/10 **5.9** 5.5/10 5.6/16 8.5/21 9.1/25

5.2/31 5.5/28 7.5/25 7.5/21 6.0/16 6.0/10 **6.4** 6.0/10 6.2/17 7.4/22 7.7/25 6.5/27 6.1/29

	+S	H.I.	-S	Elv.	Sub-grade Elev.
		245.34			
164			6.5		238.2
5			8.1		36.6
T.P.	2.93	236.92	11.35	233.99	
6			1.4		34.9
7			3.0		33.3
8			4.7		31.6
9			6.4		29.9
B.M.			6.40	230.52	230.54
170			8.0		28.3
B.M.	2.52	233.06		230.54	
1			6.1		26.3
2 T.P. Culv.	4.80 +35	230.01	7.3 7.85 4.9	225.21	25.1
3			4.9		24.5
4			5.1		24.3
5			5.1		24.3

Lt ℄ Rt.

10.1 1.3 8.1 7.7 4.3 6.5 7.2 6.6 6.4 8.0 8.1 0.6 +5.2
36 35 25 21 17 10 10 16 21 24 36 42

+7.6 0.0 8.7 7.8 9.6 8.1 8.1 8.8 8.2 8.0 9.5 9.8 0.0 +6.8
44 43 29 25 21 16 10 10 16 21 25 40 43

+2.2 0.1 1.6 2.7 2.9 1.1 1.4 2.0 1.4 1.5 4.6 5.3
33 31 26 24 22 16 10 10 14 27 33

166 + 25 end out

11.7 10.9 3.0 3.1 3.6 3.1 3.2 12.0 25.3
32 29 17 10 10 14 33 51

12.5 4.8 4.8 5.2 4.8 5.0 12.0 19.8
29 16 10 10 18 29 39

11.5 6.4 6.5 6.8 6.5 6.5 13.0
25 17 10 10 17 29

13.3 7.9 8.1 8.4 8.1 8.4 12.2 12.3
24 16 10 10 16 22 25

7.9 6.8 6.1 6.1 6.6 6.1 6.7 9.5 10.2
28 20 16 10 10 17 21 27

12.7 7.6 7.4 7.9 7.4 7.5 13.0 12.2
23 16 10 10 16 24 29

11.9 10.5
17V 17V

11.8 11.9 5.7 5.0 5.6 5.0 5.2 9.3 9.3
30 26 16 10 10 16 23 26

9.6 9.3 5.7 5.2 5.9 5.7 6.3 9.5 9.4
27 22 16 10 10 15 22 27

5.0 6.5 5.2 5.2 5.9 5.7 5.3 9.6 9.3
23 20 16 10 10 15 23 27

12/14/23 +5		H.I. 230.01	- S	E/V.	Sub-grade Elev.
176			5.1		224.3
+50			5.1		
7			5.1		24.3
8			5.1		24.3
9			5.3		24.1
T.P.	4.54	229.20	5.35	224.66	
180			4.8		23.8
1			5.3		23.3
+30	Colv.				
2			5.2		23.4
3			4.8		23.8
4			4.4		24.2
B.M.			3.90	225.30	225.32
185			4.1		24.5
6			4.0		24.6

Jorganson
Parsons
Briggs
Eck.

Lt ℄ R.

59

6.9/26 6.7/24 7.2/23 7.0/20 5.1/15 5.2/10 | 5.2/10 5.3/15 10.2/22 10.1/25

176+85 end cut
2.9/29 7.3/24 7.1/20 5.3/15 5.2/10 | 5.2/10 5.2/15 8.4/20 8.8/25

59
8.6/25 8.0/20 5.1/15 5.2/10 | 5.2/10 5.2/15 8.3/21 8.4/25

59
10.5/27 9.8/22 5.1/15 5.2/10 | 5.2/10 5.4/15 9.2/22 9.3/26

178+17 end cut Rt & Lt

5.5
7.6/28 6.7/21 5.4/16 5.4/10 | 5.4/10 5.3/16 7.9/22 7.9/25 4.4/28 0.8/33

179+61 end cut Rt & Lt.

5.6
10.3/31 10.2/24 5.1/16 4.9/10 | 4.9/10 5.0/16 9.4/23 8.3/25

5.4
13.4/27 5.5/16 5.3/10 | 5.4/10 5.5/16 13.1/28

13.6/IMV 12.55/IMV

5.7
12.4/32 11.9/27 5.3/16 5.3/10 | 5.3/10 5.1/16 10.4/24 10.5/28

(5.2)
12.3/31 12.1/27 5.0/16 4.9/10 | 4.9/10 4.6/17 9.1/25 10.0/29

ice
(4.7)
11.2/31 11.5/27 4.7/16 4.5/10 | 4.5/10 4.4/16 11.2/26

Spk Oak L. Sta 184+65

(4.1)
7.9/27 8.1/24 4.2/16 4.1/10 | 4.2/10 4.3/16 6.6/20 6.7/26 5.7/30

(4.1)
7.5/26 7.5/22 4.1/16 4.1/10 | 4.1/10 4.3/16 6.0/19 6.2/22 5.5/29

	+S	H.I.	-S		Sub-grade Elev.
		229.26			
187			4.0		224.6
T.P.	4.80	229.89 ✓	4.11	225.09 ✓	
88			4.8		24.5
89			4.8		24.5
90			4.9		24.4
+40			4.9		
1			5.0		24.3
2			5.0		24.3
3			5.0		24.3
+32	Cul/v.				
4			5.1		24.2
+84			5.1		
5			5.1		24.2 ✓
B.M.			6.53	223.36 ✓	223.37
6			4.7		24.6
+38	Cul/v.				
7			4.0		25.3
B.M.	8.09	231.45 ✓		223.36 ✓	
8			4.7		26.1

Lt ℄ Rt.

9.2/27 9.4/24 4.1/16 4.1/10 4.6 4.1/10 4.2/16 8.8/23 8.6/28

12.1/30 11.5/27 4.9/16 4.9/10 4.9 4.8/10 4.9/16 10.4/23 10.4/27

12.0/31 11.7/27 5.0/16 4.9/10 4.9 4.9/10 5.0/17 8.4/23 8.2/27

89+85 and Cut.

6.8/33 6.9/29 7.5/27 7.4/21 4.9/17 4.9/10 5.0 4.9/10 5.0/16 7.8/21 7.6/27

4.3/33 3.8/31 8.1/28 7.9/23 4.9/17 4.9/10 4.9/10 4.7/16 7.1/21 7.1/26

6.9/33 8.6/27 8.2/22 5.1/16 5.0/10 5.5 5.0/10 4.9/16 8.3/22 8.3/26

191+33 and cut.

9.9/27 10.1/24 5.1/16 5.0/10 5.6 5.0/10 5.0/16 8.8/21 9.5/27

10.5/27 10.4/24 5.2/16 5.1/10 5.6 5.1/10 5.3/16 10.9/25 11.0/30

11.65/INV 11.65/INV

94+59 and cut.

11.0/28 11.0/22 5.2/16 5.1/10 5.7 5.2/10 5.2/16 12.0/26 12.1/31

0.8/35 8.0/26 7.4/20 5.2/16 5.1/10 5.2/10 5.1/16 10.1/25 10.0/28

1.6/34 8.1/27 8.1/20 5.2/15 5.2/10 5.8 5.2/10 5.3/16 10.4/25 9.7/28

95+50 and cut

Sb 6" Poplar - Rt. 195+25

8.3/31 8.4/23 4.9/16 4.8/10 5.4 4.8/10 4.9/17 11.5/26 11.5/30

11.0/INV 11.3/INV

11.5/33 11.2/27 4.2/16 4.1/10 4.8 4.1/10 4.5/16 11.1/27 11.2/31

12.0/31 11.5/26 5.0/16 4.8/10 5.4 4.8/10 5.0/16 11.9/27 11.8/30

	+S	H.I.	-S	Elv.	Sub-grade Elev.
		231.45			
199			3.8		227.0
200			3.3		27.5
+60 ℄ RR			3.2		
201			3.1		27.7
2			3.3		27.5
T.P.	3.03	230.99	3.49	227.96	
3			3.5		26.9
4			4.3		26.1
5			5.2		25.2
6			5.4		25.0
7			4.4		26.0
8			2.5		27.9
T.P.	11.44	241.13	1.30	229.69	
+68			11.1	230.0	29.4

Lt ℄ Rt.

198+75 end Cut

6.6/32 4.1/27 7.3/26 6.9/22 4.1/16 3.9/10 **4.5** 3.9/10 4.1/16 8.1/27 7.9/27

99+54 end. Cut

3.9/26 6.0/22 3.6/16 3.4/10 **4.0** 3.4/10 3.5/17 4.9/22 5.2/25 1.4/30

200+10 end cut

2.4/27 3.1/18 3.2/10 **3.9** 3.2/10 3.0/17 2.8/30 0.9/33

4.2/25 3.9/20 3.1/17 3.1/10 **3.7** 3.1/10 3.4/16 4.7/21 4.8/25 4.3/26 4.0/29

6.1/38 6.8/26 6.2/20 3.6/15 3.4/10 **4.0** 3.4/10 3.6/16 5.2/19 5.3/24 2.9/28

4.7/31 6.2/27 5.3/19 3.6/15 3.6/10 **4.1** 3.6/10 3.7/16 5.4/19 6.7/25 6.4/26

3.7/31 6.8/27 6.6/24 4.4/15 4.3/10 **4.8** 4.4/10 4.5/15 9.3/21 9.6/24

204+71 end cut.

11.0/28 11.0/24 5.4/15 5.3/10 **5.7** 5.3/10 5.3/16 10.9/24 11.7/28

10.6/29 10.5/24 5.6/15 5.5/10 **5.9** 5.5/10 5.5/16 10.2/24 9.9/27

5.0

11.3/30 10.8/24 4.5/15 4.5/10 4.5/10 4.7/16 11.2/26 11.3/30

208+10 end cut

7.2/25 6.5/22 2.7/15 2.6/10 **3.1** 2.6/10 2.7/16 5.7/22 6.4/28

10.3/32 11.3/30 14.0/26 14.1/24 11.4/15 11.2/10 **(11.1)** 11.2/10 11.5/15 13.9/20 14.1/23 ~~0.0~~ 0.3/36

	+S	H.I. 241.13	−S	Elv.	
					Sub-grade 230.2 Elev.
209			10.3		
+50			9.2		
210			8.1		32.4
+51			6.9		
11			5.8		34.7
12			3.4		37.1
13			0.9		39.6
T.P.	9.58	250.31 ✓	0.4	240.73 ✓	
14			7.8		41.9
15			6.1		43.6
16			5.1		44.6
17			4.8		44.9
18			4.9	✓	44.8 Plan 2
B.M.			4.09	246.22	246.34
19			5.0		44.7
T.P.	5.00	250.14 ✓	5.17	245.14 ✓	
20			5.0		44.5
21			5.2		44.3

Lt & Pf.

8.8 10.5 13.0 12.7 10.6 10.4 10.8
32 30 26 23 16 10

10.4 10.6 13.1 13.3 2.6
10 15 21 24 35

10.3 10.8 12.1 17.9 9.5 9.3 9.3 9.3 11.5 11.4 0.0 +2.2
31 28 26 23 16 10 10 15 22 25 35 37

5.7 10.8 10.9 8.5 8.2 8.4 8.1 8.3 10.2 10.7 +0.5
28 25 22 16 10 10 15 20 24 36

5.8 9.3 9.9 9.5 7.3 7.0 7.0 7.1 9.6 9.5 8.6 7.5
27 26 24 21 15 10 10 15 22 24 25 30

5.3 7.5 7.8 6.9 5.9 6.0 5.9 5.9 8.1 8.0 1.1
27 23 21 15 10 10 15 21 23 31

4.5 4.5 5.7 6.7 3.4 3.4 3.6 3.5 3.4 5.8 5.8 2.4 2.6
31 27 25 22 15 10 10 15 19 23 27 30

212+78 end cut.
212+50 start cut

+2.3 0.0 2.9 3.0 1.1 1.0 1.2 1.0 0.9 3.5 3.9 3.0
33 31 27 20 15 15 10 16 23 26 28

213+55 end cut.
213+80 start cut. 8.0
9.0 8.7 9.9 10.0 7.9 7.8 7.9 8.0 10.4 10.5 9.1 7.3
27 29 32 20 15 10 10 15 21 26 27 30

10.4 9.8 6.1 6.1 6.4 6.2 6.2 8.5 8.1 4.9
25 21 15 10 10 15 20 27 32

0.8 7.1 7.2 5.3 5.2 5.2 5.2 7.5 7.7 3.0
33 25 20 15 10 10 15 20 27 33

1.0 7.2 7.2 5.0 4.8 5.2 4.8 5.1 7.5 7.7 4.5 5.0
33 25 19 15 10 10 15 21 26 31 34

✓ check Elv. +0.6 7.0 7.3 5.1 5.5 5.4 5.0 5.1 7.4 7.5 2.3
246.262 3A 26 20 15 10 10 15 19 25 32

5.3 5.8 7.0 7.0 5.7 5.1 5.5 5.1 5.2 7.7 7.4 5.1 0.7
30 25 24 19 15 10 10 14 20 24 26 31

219+60 end cut.

10.8 5.2 5.1 5.4 5.2 6.1 13.1
25 16 10 10 16 27

13.7 5.4 5.3 5.6 5.3 5.3 12.0 16.5
27 15 10 10 16 25 33

	+S	H.I.	−S	Elv.	Subgrade Elev.
		250.14			
+52	Culv				
22			5.2		244.3
23			4.2		45.3
+47			3.5		
24			2.7		46.8
+52	Culv.				
25			1.2		48.3
T.P.	8.69	258.16	0.67	249.47	
26			7.6		49.9
27			6.1		51.4
28			5.1		52.4
29			4.8		52.7
30			5.2		52.3
31			5.7		51.8
T.P.	3.94	256.24	5.86	252.30	
32			4.3		51.3
+12	Culv.				
33			4.9		50.7

Lt & Rt.

12.9 INV. 17.2 INV.

11.7 5.3 5.2 5.5 5.3 5.4 12.0 17.0
27 16 10 10 16 26 32

227+90 Start cut

2.0 7.3 7.3 4.3 4.3 4.3 4.9 10.1 10.1
30 23 21 16 10 10 16 24 27

+1.5 0.0 5.8 5.8 3.5 3.6 3.6 3.6 7.7 7.1
30 28 22 20 17 10 10 16 23 26

5.9 5.8 6.0 5.0 2.7 2.8 2.8 2.9 6.6 6.1
31 28 26 20 15 10 10 16 22 25

9.2 INV. 9.5 INV.

10.4 1.6 1.3 1.7 1.3 1.4 8.9 9.0
27 16 10 10 16 27 30

18.0 12.0 7.8 7.7 8.3 7.6 7.6 10.6 11.2
28 21 16 10 10 16 21 25

226+05 Start cut.

5.7 5.3 8.4 8.3 6.3 6.2 6.8 6.2 6.3 8.6 8.6 2.9 0.0 +5.3
31 27 24 20 16 10 10 15 22 26 34 36 39

+5.8 0.0 4.4 4.2 6.7 6.7 5.1 5.2 5.7 5.1 5.2 7.7 7.6 0.0 +7.1
52 47 41 27 22 19 15 10 10 16 23 26 34 40

+1.8 0.0 4.7 4.4 6.6 6.5 4.9 4.9 5.4 4.9 5.0 7.8 7.7 2.4 2.4
51 48 41 25 22 19 15 10 10 15 21 24 31 34

+1.0 0.0 4.7 4.5 6.6 6.4 5.1 5.3 5.8 5.3 5.6 7.6 7.7 0.3
51 50 42 26 22 19 15 10 10 15 20 23 33

+8.8 0.0 5.0 5.2 6.9 6.9 5.7 5.8 6.3 5.8 5.9 8.0 8.4 3.4 3.7
60 52 44 27 22 20 16 10 10 15 20 25 31 34

end cut Rt & Lt. 231+51

13.5 4.4 4.4 4.8 4.4 4.3 14.0
30 17 10 10 16 30

13.55 INV. 14.35 INV.

14.3 5.0 4.9 5.3 5.0 4.9 13.9
32 16 10 10 16 29

12/15/23	+S	H.I. 256.24	−S	Elv. Mild & Clear	Sub-grade Elev.
234			4.6		251.0
35			2.6		253.0
T.P.	9.70	265.37	0.57	255.67	
36			8.2		56.5
+15			7.6		
B.M.			8.45	256.92	256.95
+31			6.9		
37			3.9		60.8
+80			0.5	264.9	
T.P.	10.96	273.62	2.71	262.66	
38			7.8		65.2
39			3.9		69.1
+79			1.4		
40			0.8		72.2
T.P.	8.40	281.46	0.56	273.06	
+55			7.3		
+64			7.1		
A1			6.4		74.4

Jorgenson
Parsons
13-199
Eck.

Lt & Rt.

14.0 4.9 4.7 5.0 4.7 4.7 14.4
30 16 10 10 16 31

11.0 2.5 2.6 3.8 2.6 2.5 11.0
28 16 10 10 16 30

I 35 + 44 start cut.
6.7 9.3 10.5 10.7 5.2 8.3 8.9 8.3 8.2 9.7 10.0
34 30 26 19 15 10 10 16 23 27

7.8 7.7 7.7 7.7 9.3 7.7 7.9 10.3 10.0 9.2 9.2
40 29 17 10 10 15 20 24 27 29

16' Oak Rt. 236 + 25
6.7 6.9 8.2 8.8 7.0 7.0 7.5 7.0 7.0 10.1 9.9 7.8 8.0
34 27 27 20 16 10 10 15 21 24 26 29

+2.6 0.0 6.3 6.2 4.0 4.0 4.6 3.9 3.8 6.8 6.9 7.1 2.0
32 30 24 19 15 10 10 15 21 24 29 32

+4.7 0.0 2.7 3.2 0.6 0.6 0.5 0.6 0.5 2.6 2.9 0.0 +11.9
32 27 25 20 15 10 10 16 22 28 31 39

State Rt. 37+80
3.9 10.6 10.8 8.1 8.2 8.5 7.9 7.8 8.6 10.2 0.0 +2.5
32 29 20 15 10 10 15 20 29 37 39

+4.3 0.0 6.1 6.0 4.0 4.0 4.5 4.0 4.1 6.1 6.2 0.0 +6.8
36 32 26 21 15 10 10 15 24 27 34 39

+9.3 0.0 3.7 3.6 1.7 1.4 1.5 1.3 3.7 3.7 0.0 +6.8
38 30 25 21 15 10 10 15 22 25 29 35

0.6 3.4 3.0 0.9 0.9 1.3 0.9 0.7 3.3 3.4 0.0 +6.8
30 27 20 15 10 10 15 20 25 29 35

8.8 8.7 10.0 9.5 7.6 7.4 8.0 7.4 7.2 10.1 10.1 0.0 +0.6
33 28 25 20 16 10 10 15 21 26 37 37

0.2 9.6 9.2 7.4 7.2 7.7 7.2 7.2 7.2 9.4 9.7 0.1
32 26 20 15 10 10 15 21 24 32

4.5 9.3 9.1 6.6 6.5 6.9 6.5 6.5 8.8 9.1 5.7
31 25 21 15 10 10 15 20 27 31

	+S	H.I.	−S	Elv.	Sub-grade Elev.
		281.46			
42			5.1		275.7
			9.58	271.88	271.9
43			4.6		76.2
44			4.9		75.9
+43			5.4		
45			6.2		74.6
T.P.	1.40	276.55	6.31	275.15	
46			2.9		73.0
47			4.5		Plan 71.4
B.M.			9.34	267.21	267.34
+06			4.7		267.18
+50			5.3		
48			6.2		69.7
+50			7.0		
T.P.	5.27	272.48	9.34	267.21	
49			3.6		68.3
+50			4.2		

Lt ℄ Rt.

9.2/29 8.3/26 9.1/25 8.7/22 5.2/15 5.2/10 **5.6** 5.2/10 5.2/15 8.1/20 8.1/26 7.4/27 7.7/31

47+10 end cut.

Spk tree rt. 242+22

9.2/29 8.8/27 8.1/22 4.6/16 4.7/10 **5.1** 4.7/10 4.6/16 7.7/22 8.6/27

start cut 243+02

9.7/32 7.6/24 7.6/21 4.8/15 5.0/10 **5.4** 5.0/10 4.8/15 7.8/21 7.7/24 0.0/33 +1.2/34

+1.0/34 0.0/33 7.6/23 7.2/19 5.4/15 5.5/10 5.4/10 5.2/15 7.8/21 7.8/24 0.0/33 +1.2/35

3.0/31 8.5/24 8.3/20 6.1/15 6.3/10 **6.7** 6.3/10 6.2/15 8.7/21 8.7/24 3.0/31

5.4/28 5.5/25 5.8/23 6.0/22 2.5/15 2.7/10 3.0/10 **3.5** 2.9/10 2.8/15 8.0/23

46+10 end cut.

9.7/29 9.5/25 4.6/18 4.7/11 5.0/11 **5.2** 4.1/10 4.0/16 8.3/23

Top monument

check levels Page #1

9.8/26 4.7/18 4.8/11 5.2/11 **5.2** 4.2/10 4.1/15 8.4/22

10.2/29 10.1/26 5.7/19 5.9/13 6.2/13 **6.0** 4.8/10 4.3/18 9.9/26

11.7/33 11.7/29 6.5/20 6.7/14 7.1/14 **6.9** 5.6/10 5.3/19 5.5/29 9.5/39

12.6/35 11.9/29 7.3/20 7.4/14 7.7/14 **7.9** 6.4/10 6.3/15 8.0/20 8.1/24 7.3/28 7.1/34

8.7/31 7.6/26 3.9/18 4.0/13 4.4/13 **4.2** 3.0/10 3.1/15 7.6/23 9.2/30

7.7/32 6.8/25 4.4/20 4.5/14 4.8/14 **4.7** 3.7/10 3.5/16 9.1/26 10.2/34

	+S	H.I.	-S	E/V.	Sub-grade Elev.
		272.48			
50			4.7		267.2
+50			5.1		
51			4.8		67.1
+57.8			4.4		267.5
B.M.			5.27	267.21	267.34

Lt. & Rt.

10.2 9.2 4.8 4.8 5.1 4.8 4.4 4.3 9.5
32 28 20 14 14 10 18 27

13.7 13.0 5.2 5.0 5.4 5.1 5.0 4.8 5.1
38 33 20 14 14 10 20 31

15.1 4.8 4.7 5.0 5.1 4.9 5.0
34 19 13 13 9 19

14.7 5.4 4.2 4.5 4.9 4.6 no shoulders
33 16 10 10 12

Top monument Centerville & Memorial

12/15/23 Borrow Pit Rt.
Final X Sec.
Base Line edge pavement

			edge Pavement		
B.M.	9.21	234.53		225.32	
184+70			9.5	225.0	(9.9)
+75					
185			9.4	25.1	(9.5)
+25			9.4	25.1	(9.5)
+50			9.3	25.2	(9.4)
+75			9.4	25.1	(9.6)
186			9.3	25.2	(9.5)
+25			9.4	25.1	(9.5)
+50			9.3	25.2	(9.6)
+65			9.4	25.1	
+75			9.4	25.1	(9.6)

Jorgenson
Persons
Briggs
Eck

Mild - Clear

original base line & pavement.

Lt. 19. 184+65 Oak.

9.5/6 11.7/12 12.4/17 11.8/21 12.1/25 11.6/50 11.6/58 6.9/68 6.7/75

9.6/5 12.0/10 12.3/14 11.0/19 11.1/25 11.0/41 11.7/50 11.7/70 9.8/75 8.7/78 0.1/82

9.4/16 (6) 11.9/12 12.1/13 11.4/14 11.1/25 10.7/45 11.4/50 11.3/75 7.3/81 0.0/84 +2.8/84

9.3/6 11.5/10 11.6/12 11.0/14 11.1/25 10.1/37 10.9/50 11.5/75 11.5/83 0.0/86 +3.3/86

9.4/6 11.6/10 11.6/12 10.6/14 11.3/25 9.7/37 11.3/50 11.2/75 11.5/98 10.5/100 7.4/107 0.2/110

9.4/16 (6) 11.5/09 11.7/12 10.7/13 10.8/25 10.0/36 11.2/50 10.4/64 11.4/75 12.1/100 11.6/105 1.8/112 8.5/109

9.4/6 11.5/10 11.3/14 11.0/25 11.2/50 10.7/63 11.4/75 11.9/101 11.5/103 8.1/108 2.1/112

9.6/5 11.6/9 12.3/13 11.4/16 11.1/25 10.4/34 11.4/50 11.5/75 11.1/99 10.7/100 8.3/104 2.7/108

9.6/4 11.1/25 11.4/50 11.5/75 11.2/89 7.0/98 1.9/100

9.8/4 10.9/25 8.5/40 6.2/50 3.1/75 2.1/89 1.9/99

(23-56) Drain Tile Grade

Sta.	+ S	H.I.	- S		
BM.	2.19	242.24		240.05	
85+91			Elev outlet 233.9 " intake 234.0		8.34 8.24
86+00				233.9	8.34 - 4.9
				1.7	
87+00				34.07	8.17 - 5.2
				1.7	
88+00				34.24	8.00 - 4.0
				1.7	
89+00				34.41	7.83 - 4.9
				1.7	
90+00				34.58	7.66 - 3.9
				1.7	
91+00				34.75	7.49 - 4.9
				1.7	
92+00				34.92	7.32 - 4.3
				1.7	
93+00				35.09	See below
T.P. BM.	4.17	244.22	2.19	240.05	
	2.417			240.50	
New BM.			1.97	242.25	
93+00				35.09	9.13 - 5.9
				1.7	
94+00				35.26	8.96 - 5.0
				1.7	
95+00				35.43	8.79 - 4.9
95+50	℄ Culvert in place			235.6 235.5	8.62 - 4.9 8.72 - 2.9
B.M.			2.417 ✓		

This should be 2.417
Didn't hear the 2 when rodman called it to me. All subsequent sta. are incorrect.

This is correct

Note:- 2.417 is correct BS on BM not 4.17 :- sta. 93, 94, 95+50 etc are not set correct and should be reset

These notes transfered to note book for project 23-56 by R.E.D. 8-27-23

Party – Deutsche, Weber, Mahoney, Franke

8-17-23
Cool - Fair

℄ Rd. ℄ Ditch Rt

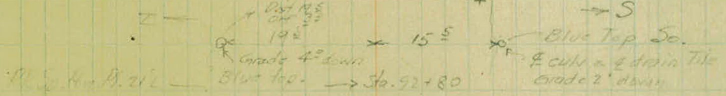
R.R. Sp. Power Pole 21'L Sta. 92 + 80

17.4'
17.0' – 6'
15.5 – 6'
15.3 – 5'
15.5 – 2'
15.4 – 3'
15.2 – 4'
15.2 – 4'

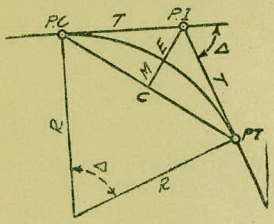
R.R. Sp. Power Pole 21'L Sta. 92 + 80 (This B.M. will be moved)

Sp. 18" Oak 70'L Sta. 94 + 25 Set 8-17-23

15.2 – 4'
15.0 – 4
15.0 – 4'



DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES



CURVE FORMULAS

Radius=R=$\frac{50}{\text{sin. } D/2}$ (1) Degree of Curve=D and sin. $\frac{D}{2}=\frac{50}{R}$ (2)

Tangent=T=R tan $\frac{\Delta}{2}$ (3) Length of Curve=L=$100\frac{\Delta}{D}$ (4)

Middle ordinate=M= R(1—cos. $\frac{\Delta}{2}$) (5) =R vers $\frac{\Delta}{2}$ (6)

External=E=T tan $\frac{\Delta}{4}$ (7) =R ÷ cos. $\frac{\Delta}{2}$ —R (8)=R x exsec $\frac{\Delta}{2}$ (9)

Long Chord=C=2 R sin. $\frac{\Delta}{2}$ (10) Δ=Central Angle

EXPLANATION AND USE OF TABLES

Stations.—Given P. I.=Sta. 161 +60.35 to find Sta. of P. C. and P. T. Δ=62° 10′ D=8° 20′. From Table IV for 1° curve T=3454.1 and ÷8⅓=414.49 ft. From Table V correction=.36 or T=414.85 ft. P. C.=Sta. P.I.—T=157 +45.50. Also from (4) L=746.00 and P. T.=Sta. P. C. +L=164 +91.50.

Offsets.—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft.=7.27 ft. Distance=158—Sta. P. C.=54.50, hence offset=7.27 (54.50 ÷ 100)²=2.16 ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus (54.50)² ÷ (2 x 688.26)=2.16 ft.

Deflections.—Deflection angle=½ D for 100 ft., ¼ D for 50 ft., etc. For c ft.=(in minutes) .3 x C x D° or=defl. for 1 ft. from Table III x C. For Sta. 158 of above curve=.3 x 54.5 x 8⅓=136.2′ or 2° 16.2′, or=2.50 x 54.5=136.2′ from Table III. For Sta. 159 deflection angle=2° 16.2′ +8° 20′ ÷2=6° 26.2′, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 91.37. For from Table IV for 1° curve E=960.6 for 8° 20′=960.6 ÷ 8⅓=91.27 and from Table V correction=.10 or E=91.37 ft. Or suppose Δ=32° and E is measured and found to be 42 ft. What is D? From Table IV E=230.9 and ÷42=5.5 or D=5° 30′.

Table I.—Minutes in Decimals of a Degree.

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

Table II.—Inches in Decimals of a Foot.

1–16	3–32	1/8	3–16	1/4	5–16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Table III.—Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan Offset	Def. for 1 Foot
0° 10′	34377.5	.036	.145	0.05′	7°	819.02	1.528	6.105	2.10′
20	17188.8	.073	.291	0.10	20′	781.84	1.600	6.395	2.20
30	11459.2	.109	.436	0.15	30	764.49	1.637	6.540	2.25
40	8594.42	.145	.582	0.20	40	747.89	1.673	6.685	2.30
50	6875.55	.182	.727	0.25					
					8	716.78	1.746	6.976	2.40
1	5729.65	.218	.873	0.30	20	688.16	1.819	7.266	2.50
10	4911.15	.255	1.018	0.35	30	674.69	1.855	7.411	2.55
20	4297.28	.291	1.164	0.40	40	661.74	1.892	7.556	2.60
30	3819.83	.327	1.309	0.45					
40	3437.87	.364	1.454	0.50	9	637.28	1.965	7.846	2.70
50	3125.36	.400	1.600	0.55	20	614.56	2.037	8.136	2.80
					30	603.80	2.074	8.281	2.85
2	2864.93	.436	1.745	0.60	40	593.42	2.110	8.426	2.90
10	2644.58	.473	1.891	0.65					
20	2455.70	.509	2.036	0.70	10	573.69	2.183	8.716	3.00
30	2292.01	.545	2.181	0.75	30	546.44	2.292	9.150	3.15
40	2148.79	.582	2.327	0.80	11	521.67	2.402	9.585	3.30
50	2022.41	.618	2.472	0.85	30	499.06	2.511	10.02	3.45
					12	478.34	2.620	10.45	3.60
3	1910.08	.655	2.618	0.90	30	459.28	2.730	10.89	3.75
10	1809.57	.691	2.763	0.95	13	441.68	2.839	11.32	3.90
20	1719.12	.727	2.908	1.00	30	425.40	2.949	11.75	4.05
30	1637.28	.764	3.054	1.05	14	410.28	3.058	12.18	4.20
40	1562.88	.800	3.199	1.10	30	396.20	3.168	12.62	4.35
50	1494.95	.836	3.345	1.15					
					15	383.07	3.277	13.05	4.50
4	1432.69	.873	3.490	1.20	30	370.78	3.387	13.49	4.65
10	1375.40	.909	3.635	1.25	16	359.27	3.496	13.92	4.80
20	1322.53	.945	3.718	1.30	30	348.45	3.606	14.35	4.95
30	1273.57	.982	3.926	1.35	17	338.27	3.716	14.78	5.10
40	1228.11	1.018	4.071	1.40	18	319.62	3.935	15.64	5.40
50	1185.78	1.055	4.217	1.45	19	302.94	4.155	16.51	5.70
5	1146.28	1.091	4.362	1.50	20	287.94	4.374	17.37	6.00
10	1109.33	1.127	4.507	1.55	21	274.37	4.594	18.22	6.30
20	1074.68	1.164	4.653	1.60	22	262.04	4.814	19.08	6.60
30	1042.14	1.200	4.798	1.65	23	250.79	5.035	19.94	6.90
40	1011.51	1.237	4.943	1.70	24	240.49	5.255	20.79	7.20
50	982.64	1.273	5.088	1.75					
					25	231.01	5.476	21.64	7.50
6	955.37	1.309	5.234	1.80	26	222.27	5.697	22.50	7.80
10	929.57	1.346	5.379	1.85	27	214.18	5.918	23.35	8.10
20	905.13	1.382	5.524	1.90	28	206.68	6.139	24.19	8.40
30	881.95	1.418	5.669	1.95	29	199.70	6.360	25.04	8.70
40	859.92	1.455	5.814	2.00	30	193.18	6.583	25.88	9.00

Note. Chord Deflection=2 times tangent deflection.

TABLE IV.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central 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.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central 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	483.8	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
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.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central 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.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central 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	5808.2	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 TANGENTS AND EXTERNALS.

These corrections are to be added to the approximate values, found by dividing the tangent, or external, for a 1° curve (Table IV) by the degree of curve, in order to obtain the true tangents, or externals. Intermediate values may be obtained by interpolation.

FOR TANGENTS ADD

Central Angle	DEGREE OF 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	4.40	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
110°	.51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4.76	5.31	5.86	6.43	7.01	7.60
120°	.62	1.25	1.93	2.52	3.16	3.81	4.45	5.11	5.77	6.44	7.12	7.80	8.50	9.22

FOR EXTERNALS ADD

Central Angle.	DEGREE OF 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
110°	.268	.536	.806	1.08	1.35	1.63	1.91	2.20	2.48	2.76	3.05	3.35	3.66	3.96
120°	.360	.721	1.08	1.45	1.82	2.19	2.57	2.95	3.33	3.72	4.11	4.50	4.91	5.32

Table VI.—Corrections for Sub-Chords and Long Chords.

FOR SUB-CHORDS ADD										Excess of arc per 100 ft.	LONG CHORDS				
D	10	20	30	40	50	60	70	80	90		D	200	300	400	500
4°	.00	.00	.01	.01	.01	.01	.01	.01	.00	.02	1	199.99	299.97	399.92	499.85
6	.00	.01	.01	.02	.02	.02	.02	.01	01	.05	2	199.97	299.88	399.70	499.39
8	.01	.02	.02	.03	.03	.03	.03	.02	.01	.08	3	199.93	299.73	399.32	498.63
10	.01	.02	.03	.04	.05	.05	.05	.04	.02	.13	4	199.88	299.51	398.78	497.57
12	.02	.04	.05	.06	.07	.07	.07	.05	.03	.18	5	199.81	299.24	398.10	496.20
14	.02	.05	.07	.08	.09	.10	.09	.07	.04	.25	6	199.73	298.90	397.26	494.53
16	.03	.06	.09	.11	.12	.12	.12	.09	.05	.33	7	199.63	298.51	396.28	492.57
18	.04	.08	.11	.14	.15	.16	.15	.12	.07	.41	8	199.51	298.05	395.14	490.31
20	.05	.10	.14	.17	.19	.20	.18	.15	.09	.51	9	199.38	297.54	393.86	487.75
22	.06	.12	.17	.21	.23	.24	.22	.18	.10	.62	10	199.24	296.96	392.42	484.90
24	.07	.14	.20	.25	.28	.28	.26	.21	.12	.74	12	198.90	295.63	389.12	478.34
26	.09	.17	.24	.29	.32	.33	.31	.25	.15	.86	14	198.51	294.06	385.22	470.65
28	.10	.19	.27	.34	.37	.38	.36	.29	.17	1.00	16	198.05	292.25	380.76	461.86
30	.11	.22	.31	.39	.43	.44	.41	.33	.19	1.15	18	197.54	290.21	375.74	452.02
32	.13	.25	.36	.44	.49	.50	.47	.38	.22	1.31	20	196.96	287.94	370.17	441.15
34	.15	.28	.40	.50	.55	.57	.53	.43	.25	1.48	22	196.32	285.44	364.06	429.30
36	.17	.32	.45	.56	.62	.64	.59	.48	.28	1.66	24	195.63	282.71	357.43	416.53
38	.18	.36	.51	.62	.70	.71	.66	.53	.31	1.86	26	194.87	279.76	350.30	402.89
40	.21	.40	.56	.69	.77	.79	.73	.59	.35	2.06	28	194.06	276.59	342.69	388.43
42	.23	.44	.62	.76	.85	.87	.81	.65	.38	2.28	30	193.18	273.20	334.61	373.20
44	.25	.48	.68	.84	.94	.96	.89	.72	.42	2.50	32	192.25	269.61	326.08	357.28
46	.27	.52	.75	.92	1.02	1.05	.98	.78	.46	2.74	34	191.26	265.81	317.12	340.73
48	.30	.57	.81	1.00	1.12	1.14	1.06	.86	.50	2.99	36	190.21	261.80	307.77	323.61
50	.32	.62	.89	1.09	1.21	1.24	1.15	.93	.55	3.24	38	189.10	257.60	298.03	305.99
52	.35	.67	.96	1.18	1.31	1.35	1.25	1.01	.59	3.52	40	187.94	253.21	287.94	287.94
54	.38	.73	1.04	1.28	1.42	1.46	1.35	1.09	.64	3.80	42	186.72	248.63	277.51	269.54
56	.41	.78	1.12	1.38	1.53	1.57	1.46	1.17	.69	4.09	44	185.44	243.87	266.78	250.85
58	.44	.84	1.20	1.48	1.65	1.69	1.57	1.26	.74	4.40	46	184.10	239.93	255.78	231.95
60	.47	.91	1.29	1.59	1.76	1.81	1.68	1.35	.80	4.72	48	182.71	233.83	244.51	212.92

Note.—When a chord of less than 100 ft. is used the corrections given in the above table should be added to the nominal length of chord to get the length which should be used in order that the 100 ft. points will check with those obtained by using the standard 100 ft. chord. Thus in locating a 14° curve by 25 ft. chords measure 25'.06 for each chord. Long chords are useful in passing obstacles.

Table VII.—Middle Ordinates for Rails in Feet.

Deg. of Curve	LENGTH OF RAILS							Deg. of Curve	LENGTH OF RAILS.						
	32	30	28	26	24	22	20		32	30	28	26	24	22	20
1°	.022	.020	.016	.013	.011	.009	.008	16°	.356	.313	.273	.236	.200	.170	.139
2	.045	.038	.034	.029	.025	.021	.017	17	.378	.333	.290	.252	.213	.180	.148
3	.037	.058	.051	.044	.037	.031	.026	18	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.069	.060	.050	.042	.035	19	.423	.371	.324	.280	.238	.201	.165
5	.112	.099	.086	.074	.063	.053	.044	20	.445	.392	.341	.296	.250	.212	.174
6	.134	.117	.102	.088	.076	.064	.052	21	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.104	.088	.074	.061	22	.487	.430	.375	.325	.275	.233	.191
8	.179	.158	.137	.119	.100	.085	.070	23	.509	.450	.390	.338	.287	.243	.199
9	.201	.175	.153	.133	.112	.095	.078	24	.531	.469	.408	.354	.299	.253	.208
10	.223	.196	.171	.148	.125	.106	.087	25	.552	.486	.424	.367	.311	.263	.216
11	.245	.216	.188	.163	.139	.117	.096	26	.573	.506	.441	.382	.323	.274	.225
12	.268	.236	.206	.179	.151	.128	.105	27	.594	.524	.457	.396	.335	.284	.233
13	.290	.254	.222	.192	.163	.138	.113	28	.618	.545	.475	.411	.348	.294	.242
14	.312	.275	.239	.207	.175	.148	.122	29	.638	.564	.491	.424	.361	.303	.250
15	.334	.295	.257	.223	.188	.159	.131	30	.660	.583	.508	.438	.374	.313	.259

SLOPE REDUCTIONS.

When distances are measured on a slope they may be reduced to the equivalent horizontal distance by the following approximate rule:—subtract from the slope distance the square of the rise divided by twice the slope distance. Thus for a slope distance of 250.3 ft. and a rise of 15 ft. correction$=15^2 \div 2\times 250.3=.45$ (by slide rule) or horizontal distance$=250.3-.45=249.85$. When vertical angle=V. A. is measured horizontal distance=slope distance—slope distance (1—Cos. V. A.). Thus for slope distance of 248.7 ft. and V. A. of 4° 20′ from Table VIII Cos=.99714 and correction$=1-.99714=.00286$ per foot or total of $.286\times 2\frac{1}{2}$ (near enough)$=.57$ and horizontal distance$=248.7-.57=248.13$ ft.

TRIGONOMETRICAL FORMULAS.

See fig. (a).

sin. $A=\frac{a}{c}$

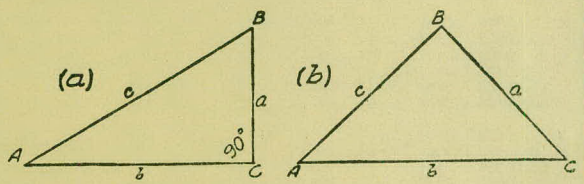
cos. $A=\frac{b}{c}$

tan. $A=\frac{a}{b}$

cot. $A=\frac{b}{a}$

sec. $A=\frac{c}{b}$

cosec. $A=\frac{c}{a}$



Formula for Solving Triangles.

Given	Sought.	Right triangles. See fig. (a).
a, c	A, B, b	$\sin. A=\frac{a}{c}$, $\cos. B=\frac{a}{c}$, $b=\sqrt{(c+a)\,(c-a)}$
a, b	A, B, c	$\tan. A=\frac{a}{b}$, $\cot. B=\frac{a}{b}$, $c=\sqrt{a^2+b^2}$.
A, a	B, b, c	$B=90°-A$, $b=a \cot. A$, $c=\frac{a}{\sin. A}$.
A, b	B, a, c	$B=90°-A$, $a=b \tan. A$, $c=\frac{b}{\cos. A}$.
A, c	B, a, b	$B=90°-A$, $a=c \sin. A$, $b=c \cos. A$
Given	Sought.	Oblique triangles. See fig. (b).
A, B, a	b	$b=\frac{a \sin. B}{\sin. A}$
A, a, b	B	$\sin. B=\frac{b \sin. A}{a}$
a, b, C	$A-B$	$\tan. \frac{1}{2}(A-B)=\frac{(a-b) \tan. \frac{1}{2}(A+B)}{a+b}$
a, b, c	A	If $s=\frac{1}{2}(a+b+c)$, $\sin. \frac{1}{2}A=\sqrt{\frac{(s-b)\,(s-c)}{b\,c}}$, $\cos. \frac{1}{2}A=\sqrt{\frac{s\,(s-a)}{b\,c}}$, $\tan. \frac{1}{2}A=\sqrt{\frac{(s-b)\,(s-c)}{s\,(s-a)}}$, $\sin. A=\frac{2\sqrt{(s-a)\,(s-b)\,(s-c)\,s}}{b\,c}$
A, B, C, a	area	$\text{area}=\frac{a^2 \sin. B \sin. C}{2 \sin. A}$
A, b, c	area	$\text{area}=\frac{1}{2} b\,c \sin. A$
a, b, c	area	$s=\frac{1}{2}(a+b+c)$, $\text{area}=\sqrt{s\,(s-a)(s-b)(s-c)}$

Table VIII.—Natural Trigonometrical Functions.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
° ′						° ′					
0	0	0	00	1	90	8	.1392	.1405	7.115	.99027	82
10	.0029	.0029	343.8	I	50	10	.1421	.1435	6.968	.98986	50
20	.0058	.0058	171.9	.99998	40	20	.1449	.1465	6.827	.98944	40
30	.0087	.0087	114.6	.99996	30	30	.1478	.1495	6.691	.98902	30
40	.0116	.0116	85.94	.99993	20	40	.1507	.1524	6.561	.98858	20
50	.0145	.0145	68.75	.99989	10	50	.1536	.1554	6.435	.98814	10
1	.0175	.0175	57.29	.99985	89	9	.1564	.1584	6.314	.98769	81
10	.0204	.0204	49.10	.99979	50	10	.1593	.1614	6.197	.98723	50
20	.0233	.0233	42.96	.99973	40	20	.1622	.1644	6.084	.98676	40
30	.0262	.0262	38.19	.99966	30	30	.1650	.1673	5.976	.98629	30
40	.0291	.0291	34.37	.99958	20	40	.1679	.1703	5.871	.98580	20
50	.0320	.0320	31.24	.99949	10	50	.1708	.1733	5.769	.98531	10
2	.0349	.0349	28.64	.99939	88	10	.1736	.1763	5.671	.98481	80
10	.0378	.0378	26.43	.99929	50	10	.1765	.1793	5.576	.98430	50
20	.0407	.0407	24.54	.99917	40	20	.1794	.1823	5.485	.98378	40
30	.0436	.0437	22.90	.99905	30	30	.1822	.1853	5.396	.98325	30
40	.0465	.0466	21.47	.99892	20	40	.1851	.1883	5.309	.98272	20
50	.0494	.0495	20.21	.99878	10	50	.1880	.1914	5.226	.98218	10
3	.0523	.0524	19.08	.99863	87	11	.1908	.1944	5.145	.98163	79
10	.0552	.0553	18.07	.99847	50	10	.1937	.1974	5.066	.98107	50
20	.0581	.0582	17.17	.99831	40	20	.1965	.2004	4.989	.98050	40
30	.0610	.0612	16.35	.99813	30	30	.1994	.2035	4.915	.97992	30
40	.0640	.0641	15.60	.99795	20	40	.2022	.2065	4.843	.97934	20
50	.0669	.0670	14.92	.99776	10	50	.2051	.2095	4.773	.97875	10
4	.0698	.0699	14.30	.99756	86	12	.2079	.2126	4.705	.97815	78
10	.0727	.0729	13.73	.99736	50	10	.2108	.2156	4.638	.97754	50
20	.0756	.0758	13.20	.99714	40	20	.2136	.2186	4.574	.97692	40
30	.0785	.0787	12.71	.99692	30	30	.2164	.2217	4.511	.97630	30
40	.0814	.0816	12.25	.99668	20	40	.2193	.2247	4.449	.97566	20
50	.0843	.0846	11.83	.99644	10	50	.2221	.2278	4.390	.97502	10
5	.0872	.0875	11.43	.99619	85	13	.2250	.2309	4.331	.97437	77
10	.0901	.0904	11.06	.99594	50	10	.2278	.2339	4.275	.97371	50
20	.0929	.0934	10.71	.99567	40	20	.2306	.2370	4.219	.97304	40
30	.0958	.0963	10.39	.99540	30	30	.2334	.2401	4.165	.97237	30
40	.0987	.0992	10.08	.99511	20	40	.2363	.2432	4.113	.97169	20
50	.1016	.1022	9.788	.99482	10	50	.2391	.2462	4.061	.97100	10
6	.1045	.1051	9.514	.99452	84	14	.2419	.2493	4.011	.97030	76
10	.1074	.1080	9.255	.99421	50	10	.2447	.2524	3.962	.96959	50
20	.1103	.1110	9.010	.99390	40	20	.2476	.2555	3.914	.96887	40
30	.1132	.1139	8.777	.99357	30	30	.2504	.2586	3.867	.96815	30
40	.1161	.1169	8.556	.99324	20	40	.2532	.2617	3.821	.96742	20
50	.1190	.1198	8.345	.99290	10	50	.2560	.2648	3.776	.96667	10
7	.1219	.1228	8.144	.99255	83	15	.2588	.2679	3.732	.96593	75
10	.1248	.1257	7.953	.99219	50	10	.2616	.2711	3.689	.96517	50
20	.1276	.1287	7.770	.99182	40	20	.2644	.2742	3.647	.96440	40
30	.1305	.1317	7.596	.99144	30	30	.2672	.2773	3.606	.96363	30
40	.1334	.1346	7.429	.99106	20	40	.2700	.2805	3.566	.96285	20
50	.1363	.1376	7.269	.99067	10	50	.2728	.2836	3.526	.96206	10
					82						74
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
o/						o/					
16	.2756	.2867	3.487	.96126	74	24	.4067	.4452	2.246	.91355	66
10	.2784	.2899	3.450	.96046	50	10	.4094	.4487	2.229	.91236	50
20	.2812	.2931	3.412	.95964	40	20	.4120	.4522	2.211	.91116	40
30	.2840	.2962	3.376	.95882	30	30	.4147	.4557	2.194	.90996	30
40	.2868	.2994	3.340	.95799	20	40	.4173	.4592	2.177	.90875	20
50	.2896	.3026	3.305	.95715	10	50	.4200	.4628	2.161	.90753	10
17	.2924	.3057	3.271	.95615	73	25	.4226	.4663	2.145	.90631	65
10	.2952	.3089	3.237	.95545	50	10	.4253	.4699	2.128	.90507	50
20	.2979	.3121	3.204	.95459	40	20	.4279	.4734	2.112	.90383	40
30	.3007	.3153	3.172	.95372	30	30	.4305	.4770	2.097	.90259	30
40	.3035	.3185	3.140	.95284	20	40	.4331	.4806	2.081	.90133	20
50	.3062	.3217	3.108	.95195	10	50	.4358	.4841	2.066	.90007	10
18	.3090	.3249	3.078	.95106	72	26	.4384	.4877	2.050	.89879	64
10	.3118	.3281	3.048	.95015	50	10	.4410	.4913	2.035	.89752	50
20	.3145	.3314	3.018	.94924	40	20	.4436	.4950	2.020	.89623	40
30	.3173	.3346	2.989	.94832	30	30	.4462	.4986	2.006	.89493	30
40	.3201	.3378	2.960	.94740	20	40	.4488	.5022	1.991	.89363	20
50	.3228	.3411	2.932	.94646	10	50	.4514	.5059	1.977	.89232	10
19	.3256	.3443	2.904	.94552	71	27	.4540	.5095	1.963	.89101	63
10	.3283	.3476	2.877	.94457	50	10	.4566	.5132	1.949	.88968	50
20	.3311	.3508	2.850	.94361	40	20	.4592	.5169	1.935	.88835	40
30	.3338	.3541	2.824	.94264	30	30	.4617	.5206	1.921	.88701	30
40	.3365	.3574	2.798	.94167	20	40	.4643	.5243	1.907	.88566	20
50	.3393	.3607	2.773	.94068	10	50	.4669	.5280	1.894	.88431	10
20	.3420	.3640	2.747	.93969	70	28	.4695	.5317	1.881	.88295	62
10	.3448	.3673	2.723	.93869	50	10	.4720	.5354	1.868	.88158	50
20	.3475	.3706	2.669	.93769	40	20	.4746	.5392	1.855	.88020	40
30	.3502	.3739	2.675	.93667	30	30	.4772	.5430	1.842	.87882	30
40	.3529	.3772	2.651	.93565	20	40	.4797	.5467	1.829	.87743	20
50	.3557	.3805	2.628	.93462	10	50	.4823	.5505	1.816	.87603	10
21	.3584	.3839	2.605	.93358	69	29	.4848	.5543	1.804	.87462	61
10	.3611	.3872	2.583	.93253	50	10	.4874	.5581	1.792	.87321	50
20	.3638	.3906	2.560	.93148	40	20	.4899	.5619	1.780	.87178	40
30	.3665	.3939	2.539	.93042	30	30	.4924	.5658	1.767	.87036	30
40	.3692	.3973	2.517	.92935	20	40	.4950	.5696	1.756	.86892	20
50	.3719	.4006	2.496	.92827	10	50	.4975	.5735	1.744	.86748	10
22	.3746	.4040	2.475	.92718	68	30	.5000	.5774	1.732	.86603	60
10	.3773	.4074	2.455	.92609	50	10	.5025	.5812	1.720	.86457	50
20	.3800	.4108	2.434	.92499	40	20	.5050	.5851	1.709	.86310	40
30	.3827	.4142	2.414	.92388	30	30	.5075	.5890	1.698	.86163	30
40	.3854	.4176	2.394	.92276	20	40	.5100	.5930	1.686	.86015	20
50	.3881	.4210	2.375	.92164	10	50	.5125	.5969	1.675	.85866	10
23	.3907	.4245	2.356	.92050	67	31	.5150	.6009	1.664	.85717	59
10	.3934	.4279	2.337	.91936	50	10	.5175	.6048	1.653	.85567	50
20	.3961	.4314	2.318	.91822	40	20	.5200	.6088	1.643	.85416	40
30	.3987	.4348	2.300	.91706	30	30	.5225	.6128	1.632	.85264	30
40	.4014	.4383	2.282	.91590	20	40	.5250	.6168	1.621	.85112	20
50	.4041	.4417	2.264	.91472	10	50	.5275	.6208	1.611	.84959	10
					66						58
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

Table VIII.—Natural Trigonometrical Functions.

Angle	Sine.	Tan.	Cotg.	Cosin.	
° /					
32	.5299	.6249	1.600	.84805	58
10	.5324	.6289	1.590	.84650	50
20	.5348	.6330	1.580	.84495	40
30	.5373	.6371	1.570	.84339	30
40	.5398	.6412	1.560	.84182	20
50	.5422	.6453	1.550	.84025	10
33	.5446	.6494	1.540	.83867	57
10	.5471	.6536	1.530	.83708	50
20	.5495	.6577	1.520	.83549	40
30	.5519	.6619	1.511	.83389	30
40	.5544	.6661	1.501	.83228	20
50	.5568	.6703	1.492	.83066	10
34	.5592	.6745	1.483	.82904	56
10	.5616	.6787	1.473	.82741	50
20	.5640	.6830	1.464	.82577	40
30	.5664	.6873	1.455	.82413	30
40	.5688	.6916	1.446	.82248	20
50	.5712	.6959	1.437	.82082	10
35	.5736	.7002	1.428	.81915	55
10	.5760	.7046	1.419	.81748	50
20	.5783	.7089	1.411	.81580	40
30	.5807	.7133	1.402	.81412	30
40	.5831	.7177	1.393	.81242	20
50	.5854	.7221	1.385	.81072	10
36	.5878	.7265	1.376	.80902	54
10	.5901	.7310	1.368	.80730	50
20	.5925	.7355	1.360	.80558	40
30	.5948	.7400	1.351	.80386	30
40	.5972	.7445	1.343	.80212	20
50	.5995	.7490	1.335	.80038	10
37	.6018	.7536	1.327	.79864	53
10	.6041	.7581	1.319	.79688	50
20	.6065	.7627	1.311	.79512	40
30	.6088	.7673	1.303	.79335	30
40	.6111	.7720	1.295	.79158	20
50	.6134	.7766	1.288	.78980	10
38	.6157	.7813	1.280	.78801	52
10	.6180	.7860	1.272	.78622	50
20	.6202	.7907	1.265	.78442	40
30	.6225	.7954	1.257	.78261	30
40	.6248	.8002	1.250	.78079	20
50	.6271	.8050	1.242	.77897	10
39	.6293	.8098	1.235	.77715	51
10	.6316	.8146	1.228	.77531	50
20	.6338	.8195	1.220	.77347	40
30	.6361	.8243	1.213	.77162	30
40	.6383	.8292	1.206	.76977	20
50	.6406	.8342	1.199	.76791	10
40	.6428	.8391	1.192	.76604	50
10	.6450	.8441	1.185	.76417	50
20	.6472	.8491	1.178	.76229	40
30	.6494	.8541	1.171	.76041	30
40	.6517	.8591	1.164	.75851	20
50	.6539	.8642	1.157	.75661	10
41	.6561	.8693	1.150	.75471	49
10	.6583	.8744	1.144	.75280	50
20	.6604	.8796	1.137	.75088	40
30	.6626	.8847	1.130	.74896	30
40	.6648	.8899	1.124	.74703	20
50	.6670	.8952	1.117	.74509	10
42	.6691	.9004	1.111	.74314	48
10	.6713	.9057	1.104	.74120	50
20	.6734	.9110	1.098	.73924	40
30	.6756	.9163	1.091	.73728	30
40	.6777	.9217	1.085	.73531	20
50	.6799	.9271	1.079	.73333	10
43	.6820	.9325	1.072	.73135	47
10	.6841	.9380	1.066	.72937	50
20	.6862	.9435	1.060	.72737	40
30	.6884	.9490	1.054	.72537	30
40	.6905	.9545	1.048	.72337	20
50	.6926	.9601	1.042	.72136	10
44	.6947	.9657	1.036	.71934	46
10	.6967	.6713	1.030	.71732	50
20	.6988	.9770	1.024	.71529	40
30	.7009	.9827	1.018	.71325	30
40	.7030	.9884	1.012	.71121	20
50	.7050	.9942	1.006	.70916	10
	.7071	1.	1.	.70711	45
	Cosin.	Cotg.	Tan.	Sine.	Angle.
					° /

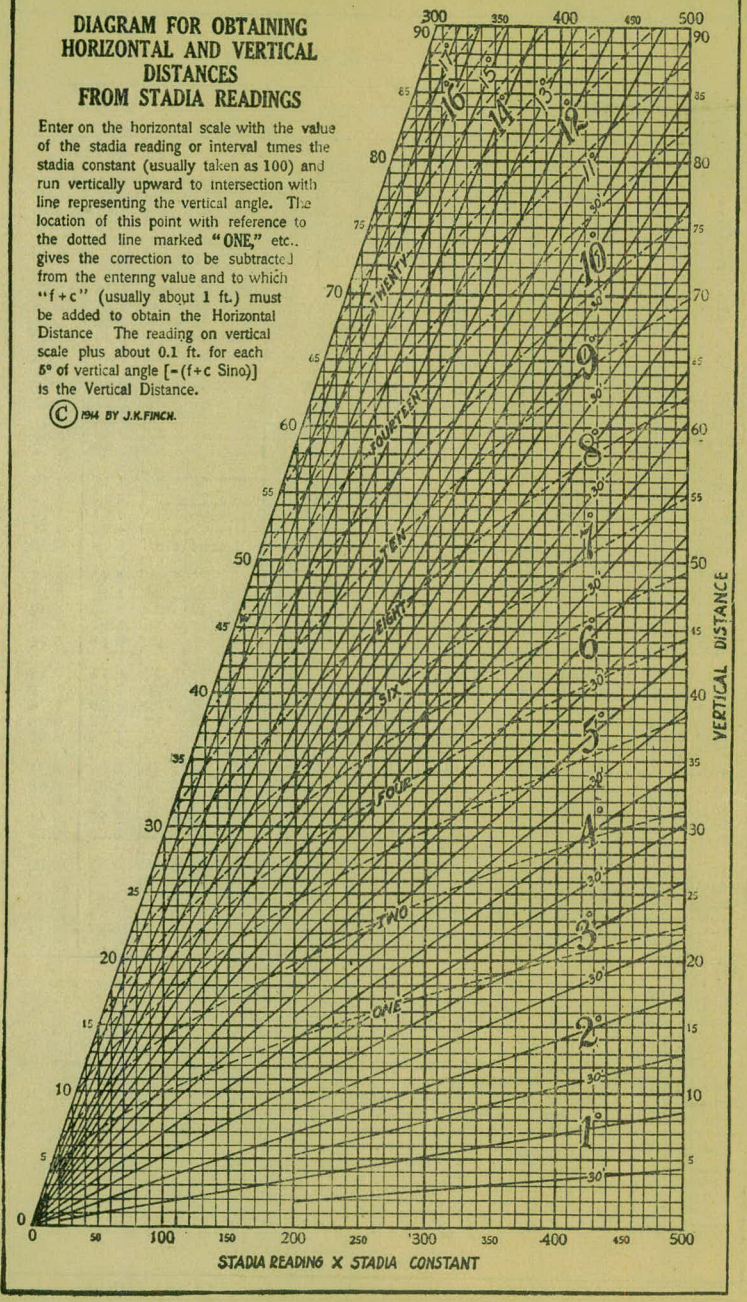
Table IX.—Calculation of Earthwork.

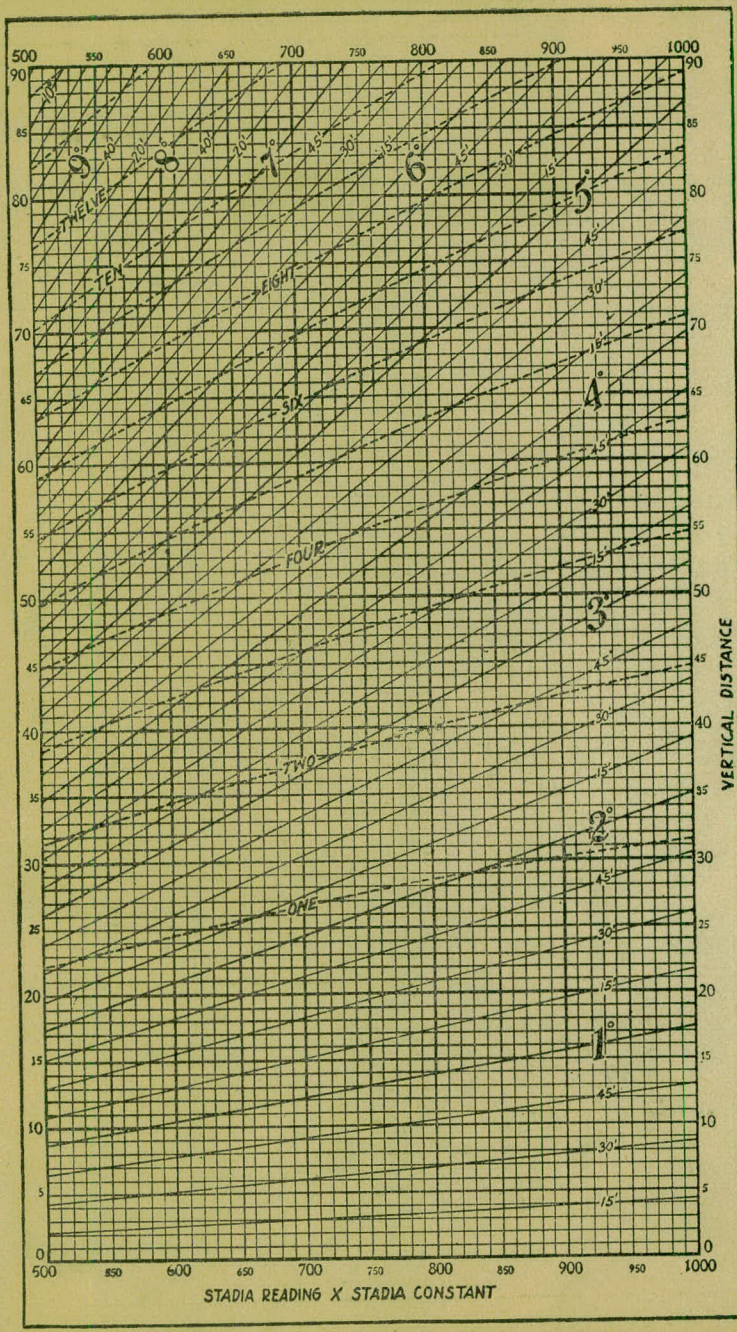
Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering the heights from 1 to 9 as tenths. Thus if w =16.2 and h =5.3, cu. yds. =1.48+.028+.089 =1.597 cu. yds. or practically 160 cu. yds. per 100 ft. If w exceeds 40 ft., use one half and multiply result by 2, if both w and h are large use one half of each and multiply result by 4. Any cross-section may be divided into triangles by the following rule. To the triangle of the sum of the outside cuts (or fills) =h, and ½ the roadbed =w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.

DIAGRAM FOR OBTAINING HORIZONTAL AND VERTICAL DISTANCES FROM STADIA READINGS

Enter on the horizontal scale with the value of the stadia reading or interval times the stadia constant (usually taken as 100) and run vertically upward to intersection with line representing the vertical angle. The location of this point with reference to the dotted line marked "ONE," etc., gives the correction to be subtracted from the entering value and to which "f+c" (usually about 1 ft.) must be added to obtain the Horizontal Distance The reading on vertical scale plus about 0.1 ft. for each 5° of vertical angle [=(f+c Sino)] is the Vertical Distance.

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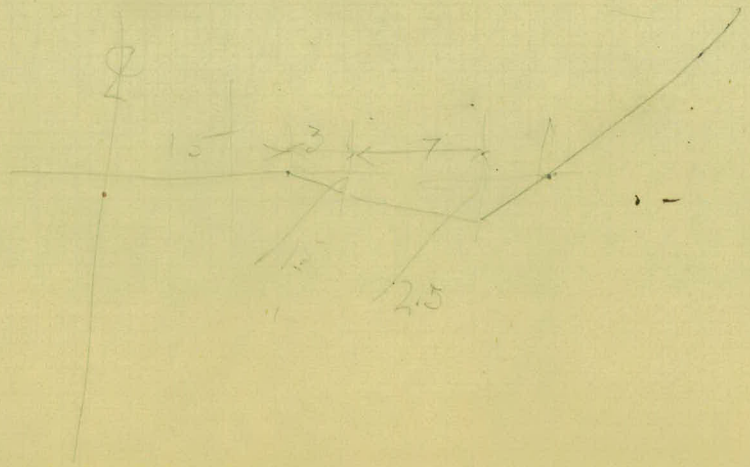
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5534
294
5240
647
5887
191
5696

Sta	+S	H.I.	-S.	
T.P.		273.71	3.51[5]	Top. Rock 30'L Sta. 253+08

Work

Start widening

Curb

End

Franke - came back

left

8-11-23

8-4-23

6718
653
7379 + 74[3]

47 + 41

49 + 04

49 + 70[2]

5697
145
6642 429
2892
6.37

5756
525
4.62

38.12
5.74
43.86

35.17
3.21
38.38

38.64
35.57
3.07

5697
3.80
59.77

5977
5759
8.38

38.64
37.27
1.37

38.64
36.42
2.22

38.64
34.72
3.92

3864
3887
4.77

20874
9682
11.92

4886
3809
5.77

61.56
3.24
58.26
2.69
55.57

9974
567
194.07
193.99
.08

9939
567
199.66

02443

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1½.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	25.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be 41.9+(20—16)÷2 or 2 ft. added to 41.9 =43.9. For slopes of 1 on 1 see inside of front cover.

Made in Germany.