

S.P. 27-516-01 E 62-511-01

STATE OF MINNESOTA  
DEPARTMENT OF HIGHWAYS

TRAVEL BOOK

8333

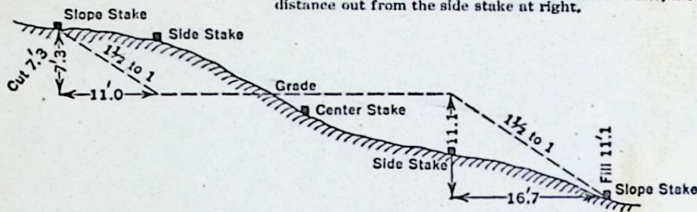
FINAL X-SECTIONS

3

## DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

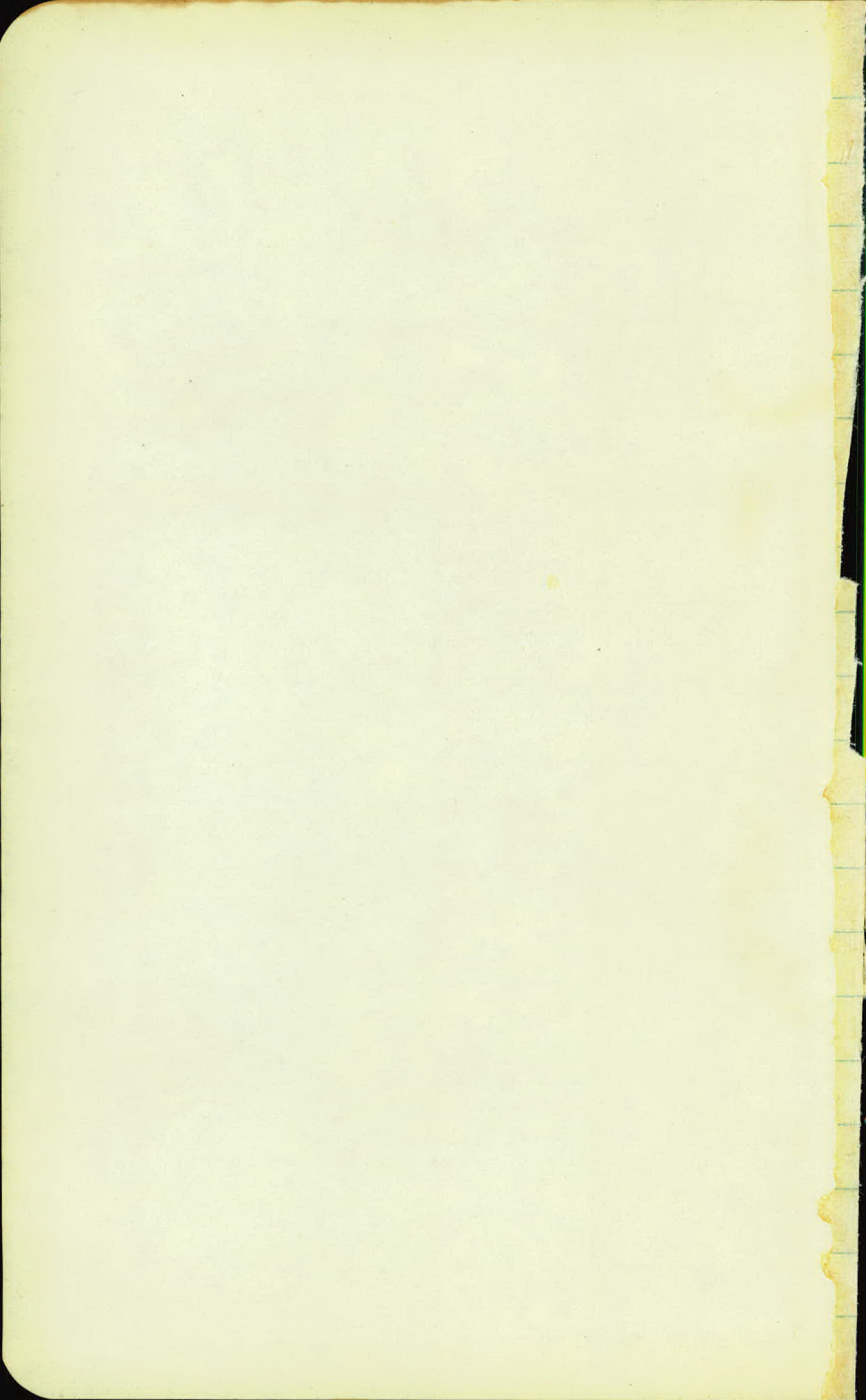
Roadway of any Width. Side Slopes  $1\frac{1}{2}$  to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

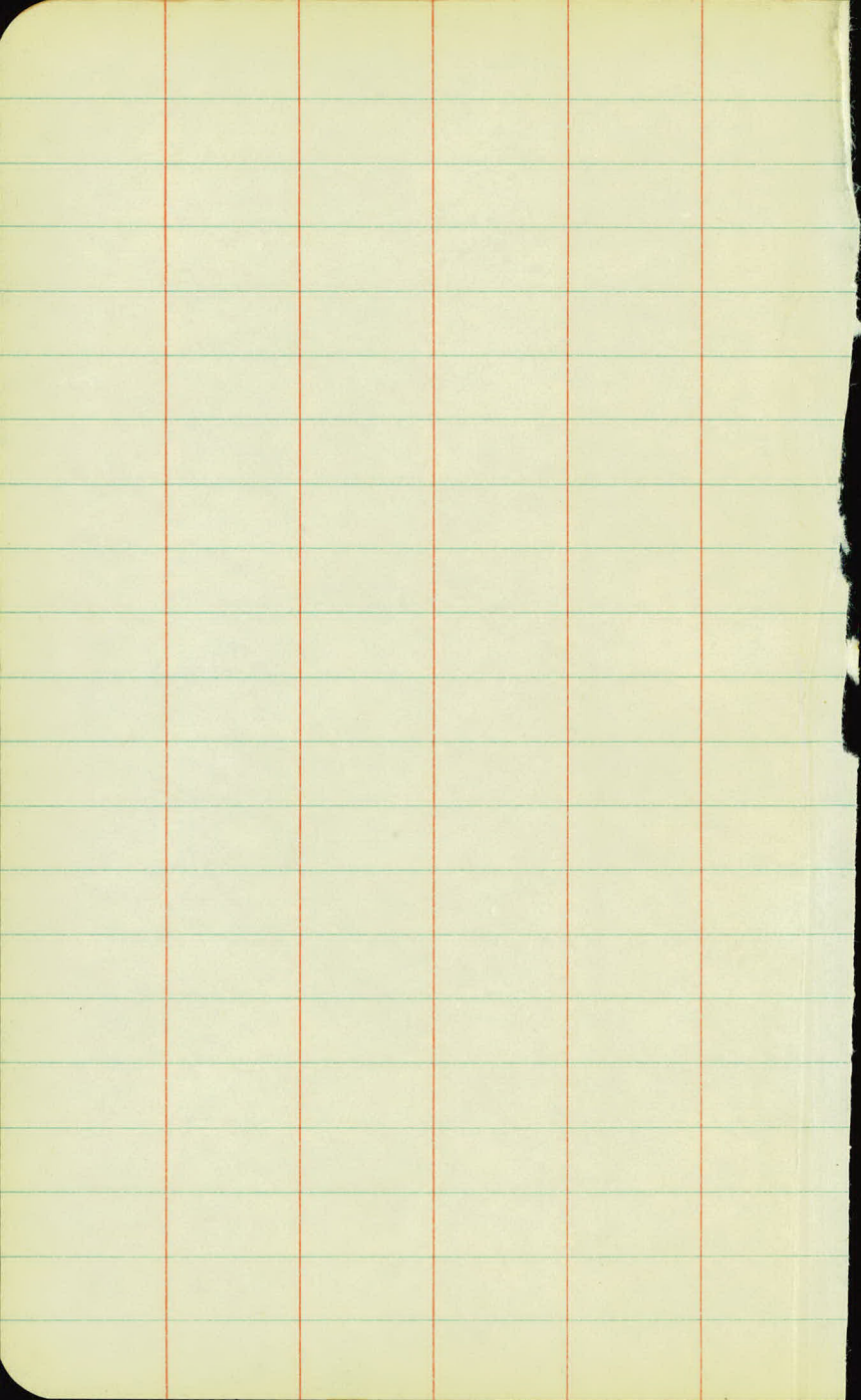
#3

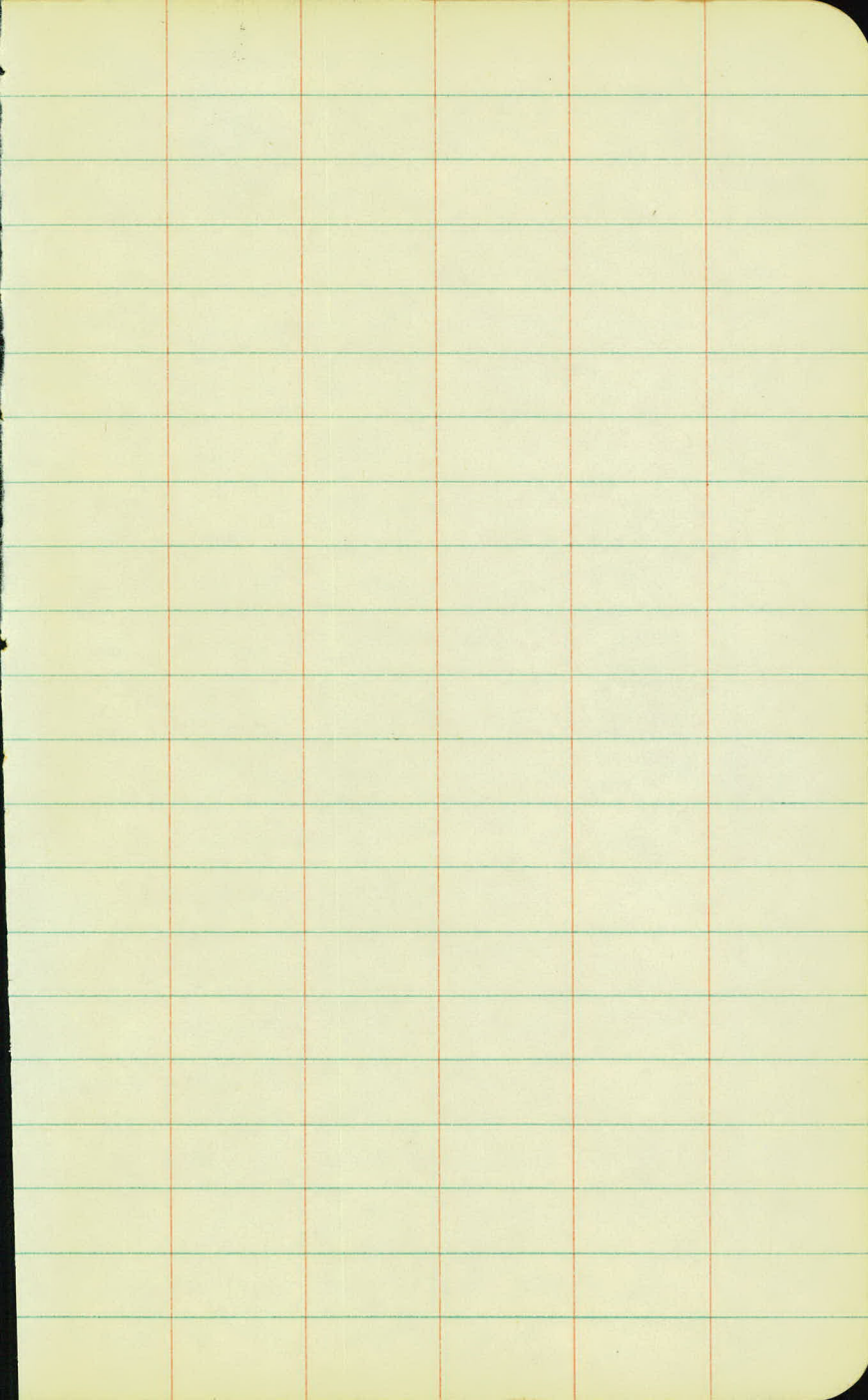


Index

Final x-sections.

Replace Fence





↓

B.M.	3.95	948.28	944.33
------	------	--------	--------

0 + 17.6

0 + 50

1

+ 15

+ 50

2



✓  
948.28

2 + 50

3

+50

4

77 84  
52 46

T.P.

3.18

✓  
943.62

784

940.44

+50

5

+50

117	98	86	59	55	519	510	520	53	54	77	94	94
39	36	31	19	15	11		11	15	19	30	41	42

113	99	86	64	62	590	584	593	61	63	70	88	101	103
37	34	28	19	15	11		11	15	18	23	30	37	40

+45 = 00 dx Lt.

95	100	99	96	92	74	71	663	653	663	68	71	89	102	103
39	36	33	30	27	19	16	11		11	15	19	28	34	37

94	100	105	109	101	95	79	76	736	730	740	76	78	99	102
39	37	34	32	30	26	19	15	11		11	14	19	30	35

42	52	60	63	62	59	54	38	35	341	335	346	37	39	60	62
45	39	36	33	31	29	26	19	15	11		11	15	18	31	35

65	70	70	68	59	44	41	399	388	397	42	44	62	75
47	39	34	31	26	19	14	11		11	15	19	27	35

+10 = 00 dx Lt.

79	64	50	46	441	430		440	46	48	55	78	86	90
35	28	19	14	11			11	15	19	24	34	36	41

943.62

5757

4 24" x 66' S.C.C.  
(New)

{ Sod 11.7' x 9' = 7 sq yds ✓  
" 11.7' x 9' = 7 " " ✓

6+00

+50

7

+50

8

T.P.

6.73

945.97 ✓

4.38

939.24

+50

8.90 Flow Lines → 9.14  
34 32

35

81 81 76 63 52 5.0 467 457 464 48 5.0 60 83 90  
43 40 36 27 19 15 11 11 15 19 26 35 38

+25 = 00 rx Lt.

65 69 72 76 74 70 5.2 5.0 473 467 473 5.0 5.2 66 82 91  
42 40 38 35 34 31 19 15 11 11 15 19 27 35 40

60 67 72 74 67 5.2 4.9 463 456 465 4.9 5.0 68 82 93  
43 39 36 33 30 20 15 11 11 14 18 29 35 37

58 64 71 66 62 48 4.7 446 439 4.46 4.7 5.1 5.7 85 94  
45 37 33 30 28 19 15 11 11 15 20 25 35 38

+70 = 00 rx Lt.

76 66 65 6.1 45 43 408 400 4.11 4.3 4.6 5.7 78 90  
40 35 32 29 19 15 11 11 15 19 26 36 39

6.0

103 90 83 78 65 61 593 583 594 61 64 101 107  
40 36 31 26 19 14 11 11 15 19 35 37

945.97 ✓

9

+50

10

+50

11

T.P.

881

953.63 ✓

1.15

944.82

+50

91	84	78	71	61	5.6	5.20	5.14	5.23	5.5	5.8	7.9	9.1	97
36	30	27	23	18	14	11		11	15	19	29	36	41

+40=00 IX Lt

72	73	74	70	54	48	447	438	4.47	4.8	5.1		73	80	82
39	36	31	27	19	15	11		11	15	19		31	39	41

+65=00 IX Rt.

5.1	5.4	5.8	6.3	6.5	6.4	5.8	4.4	4.0	3.66	3.55	3.66	4.0	4.3	5.3	5.9	6.1	6.0	5.7	5.1	5.4
42	40	37	34	31	29	26	19	15	11		11	15	18	24	28	31	35	38	42	46

28	31	37	43	51	5.6	5.6	5.4	3.4	3.1	2.90	2.70	2.84	3.0	3.2	4.8	5.1	5.1	5.1	4.6	4.1	2.6	1.9
49	47	43	40	37	34	31	28	19	15	11		11	15	19	27	29	32	36	39	42	50	59

37	41	45	47	48	48	44	26	22	20.5	2.01	2.10	2.3	2.5	4.2	4.4	4.5	4.5	4.2	3.5	0.0	+1.0
45	40	38	35	32	29	28	19	15	11		11	15	19	26	28	30	33	36	39	53	57

+1.4  
63

55

109	111	115	118	118	113	96	91	88.5	88.0	89.2	91	95	10.7	11.1	11.3	11.3	11.0	10.3	6.8	5.9	5.5
42	38	35	31	29	25	19	15	11		11	15	19	25	27	30	33	36	39	51	56	60

5.3  
65

953.63 ✓

12

+50

+83.67 = 0+00 End S.P. 27516-01 b+9 62511-01

0+50

1

+50

+53

Ent Lt

12' x 26' CMP old Mt. ✓  
30'

27' x 26' x 1' = 26 Cu yd. Emb. ✓

Sod. 8' x 6' = }  
Both Ends 8' x 6' = } 11 sq. yd. ✓

5.6

4.6  
6.5

88 98 104 109 109 105 87 82 813 807 816 84 86 99 103 103 103 96 86 62 53 49  
46 40 36 32 29 26 19 15 11 11 15 19 27 30 33 36 40 43 51 55 58

2.6 3.1  
67 62

66 67 75 81 94 100 103 102 97 79 76 732 725 735 76 78 91 95 97 97 93 85 54 43 3.6  
54 50 45 43 38 35 32 29 26 19 15 11 11 15 19 25 28 32 35 38 41 50 54 58

42 53 61 73 85 92 96 96 95 81 72 70 675 667 679 70 73 86 9.2 93 94 89 49 40 31 1.8  
57 51 47 42 39 37 34 32 28 25 19 15 11 11 15 19 25 29 33 37 40 51 54 59 68

54 56 59 68 75 85 88 88 82 64 62 604 592 600 62 64 78 81 84 81 75 38 32 2.6 22  
54 49 48 43 40 37 33 29 26 19 15 11 11 15 19 27 30 33 37 40 53 56 60 64

3.1 2.7  
59 62

49 54 62 71 80 83 80 74 60 57 545 535 543 57 59 72 76 76 73 65 5.6 46 42 3.7  
51 47 43 39 36 32 29 26 19 15 11 11 15 19 29 32 36 39 43 47 51 53 55

60 59 64 61 5.6 5.1 486 478 489 51 53 68 74 75 70 55 46 38  
49 44 35 26 19 15 11 11 15 19 29 34 37 40 47 50 55

953.63 ✓

2

+50

T.P. 5.15 954.76 ✓ 4.02 949.61

B.M. 3.73 954.74 ✓ 3.73 951.03 951.01

+61

3

+25

+50

+63 Ent. H 15" x 20' C.M.P. old Mt. ✓

✓ 32

18' x 29' x 2' 39 Coy. Emb.

Sod 7' x 5' = 4.0 Sq. yd. ✓

" 7' x 5' = 4.0 " " ✓

5.4 5.7 6.9 7.5 7.6 7.6 6.5 5.1 4.7 4.1 4.3 4.4 4.7 5.0 6.5 7.1 7.3 7.3 6.2  
 4.8 4.4 3.8 3.4 3.0 2.7 2.3 1.9 1.5 1.1 1.1 1.5 1.9 2.7 3.2 3.6 3.9 4.7

+45 = 00 rx RT.

4.7 5.4 6.2 7.0 7.1 7.0 4.7 4.3 4.0 3.9 6.4 0.5 4.3 4.6 6.0 6.8  
 4.7 4.2 3.9 3.5 3.1 2.7 1.9 1.5 1.1 1.1 1.5 1.9 2.6 3.1

Top Rock S.E. Cor. Porch of House 102' Lt 3+45

5.8 7.7 7.9 8.2 8.1 7.1 5.6 5.4 5.1 5.5 5.1 5.4 5.6 7.2 8.4 8.9  
 4.6 3.6 3.5 3.1 2.7 2.4 1.9 1.5 1.1 1.1 1.5 1.9 2.7 3.4 3.8

6.6 7.5 7.9 7.9 5.7 5.3 4.8 4.8 4.8 4.8 5.2 5.4 6.9 8.6 9.4  
 4.4 3.5 3.1 2.8 1.9 1.5 1.1 1.1 1.5 1.9 2.7 3.6 3.8

7.3 7.6 7.8 7.2 5.5 5.3 4.7 4.7 4.7 4.7 5.2 5.5 7.0 8.0 8.1  
 3.9 3.5 3.0 2.6 1.9 1.5 1.1 1.1 1.5 1.9 2.7 3.7 3.8

+37 = 00 rx RT.

7.0 7.4 7.8 7.6 6.5 4.9 4.8 4.7 4.6 4.6 5.0 5.4 6.4 7.3 7.7 7.3  
 3.7 3.6 3.2 2.8 2.5 1.9 1.5 1.1 1.1 1.5 1.9 2.5 3.1 3.6 4.1

954.74 ✓

4

+ 39 Ent. Rt

18' x 21' x 1.5 = 21 Cu Yd. Emb. ✓  
No col. vt.

+50

5

+50

6

T.P. 5.86 953.31 7.29 947.45 ✓

+48 Ent Lt.

{ 12' x 20' C.M.P. Sod 7' x 5' = 4.0 Sq. Yd. ✓  
32' " 7' x 5' = 4.0 Sq. Yd. ✓  
15' x 18' x 1.5 = 15 Cu Yd. Emb. ✓

+50

5.6 60 68 76 76 69 53 49 466 461 463 49 52 64 71 75 72 63 63  
49 46 41 35 30 26 19 15 11 11 15 19 25 31 33 36 42 43

63 76 76 72 53 49 459 453 466 47 50 70 75 63  
48 36 29 26 19 15 11 11 15 19 29 35 42

5.8 62 73 75 73 53 50 471 460 470 50 54 69 73 73 69  
49 44 39 34 27 19 15 11 11 15 19 27 33 39 42

42 53 68 73 77 75 55 52 484 479 484 51 54 70 77 78 77 71 65 30  
52 46 40 36 31 27 19 15 11 11 15 19 26 29 32 36 40 44 60

49 58 73 79 80 73 55 52 511 505 507 54 58 74 83 84 78 59 46  
51 44 38 33 30 26 19 15 11 11 15 19 26 29 32 39 51 59

West End of CMB Lt. 6+48

68 25 72 65 46 42 396 389 391 41 44 64 73 94 98  
44 40 31 28 19 15 11 11 15 19 27 32 40 47

+55=00 rx Lt

+50=00 rx Rt

95331 ✓

7

32

Relay

50' old ✓

+09 & 24" X 84' S.C.C. { Ext. 12' Lt. } 34' New ✓  
 " 22' Rt }  
 +50 Rt } Sod 7' X 9' = 7 Sq yd ✓  
 Lt. } " 7' X 9' = 7 " " ✓

8

18' X 24' X 2.5' = 40 Co. yd Emb ✓

+24 Ent. Lt. 15' X 28' (S.C.C. New Pipe) ✓  
 Sod } 9' X 6' = 6 Sq yd ✓  
 " } 9' X 6' = 6 " " ✓

+16

+30

+34

99 69 48 46 4.27 416 4.23 45 4.8 67 129 13.2  
42 30 19 15 11 11 15 19 30 50 54

FLine

10.18

37.5

FLine

1254

46.5

91 89 4.8 46 438 432 4.40 4.6 4.9 75 12.8  
42 38 19 15 11 11 15 19 32 52

+65=001x 2t

51 56 62 73 73 7.0 4.9 4.7 4.50 4.45 4.47 4.8 5.0 7.6 10.4  
49 43 40 35 33 31 19 15 11 11 15 19 32 41

41 47 71 72 6.0 4.8 4.7 4.50 4.44 4.45 4.7 5.0 7.4 9.2  
65 41 36 31 26 19 15 11 11 15 19 30 37

41 42 65 69 6.0 4.4 4.5 4.5 4.45 4.45 4.7 5.0 7.1 8.5  
65 61 38 33 28 19 15 11 11 15 19 28 38

46 47 47 69 6.0 4.4 4.5 4.50 4.43 4.43 4.7 5.0 7.6 8.4  
65 61 50 33 28 19 15 11 11 15 19 32 39

953.31

8 + 41

+50

9

+50

T.P.

7.44

956.30

4.45

948.86

10

+50

14 26 38 63 69 60 46 45 447 439 4.41 4.7 49 72 8.2  
61 54 47 39 33 28 19 15 11 11 15 19 29 38

13 19 32 5.4 65 67 66 48 46 402 434 437 4.6 49 69 8.0  
61 56 49 42 38 34 32 19 15 11 11 15 19 28 38

29 37 49 61 67 64 45 44 428 421 4.29 4.6 48 69 8.5  
57 49 42 38 34 29 19 15 11 11 15 19 28 39

54 60 67 68 65 46 44 403 394 4.03 4.2 45 76 9.9  
56 43 37 33 30 19 15 11 11 15 19 33 44

+75 = 00 12 17

103 98 71 68 66 65 6.4 6.9 72 133 14.6  
34 32 19 15 11 11 15 19 46 48

103 64 63 6.09 5.99 6.12 6.4 6.6 90 14.4  
35 19 15 11 11 15 19 30 49

956.30

11

+50

12

+50

13

B.M

4.82

951.48

951.48

T.P.

6.00

960.01

2.29

954.01

+50

+95=001x Lt.

6.3°

93	96	94	58	5.6	5.43	5.36	5.46	5.8	6.1	12.5
51	42	35	19	15	11		11	15	19	47

+45=001x Rt

6.3°

55	61	68	76	78	74	54	51	48	47	4.81	5.2	5.5	9.0	9.5	9.3	8.9
58	49	45	38	35	30	19	15	11		11	15	19	38	43	47	51

6.3°

47	52	68	70	66	45	43	411	4.00	4.09	4.4	4.7	6.9	7.2	7.0	5.6	5.1
57	51	39	34	30	19	15	11		11	15	19	31	36	41	48	59

6.3°

48	56	65	64	63	5.7	38	35	333	3.28	3.39	3.6	3.8	5.9	6.3	6.0	5.5	3.9	3.0
54	48	41	36	32	29	19	15	11		11	15	19	31	35	37	40	48	56

6.3°

42	55	5.8	5.2	32	29	2.63	2.56	2.67	2.9	3.1	4.5	5.5	5.1	1.7	0.4
47	39	36	32	19	15	11		11	15	19	29	33	38	52	61

+15=00 1x Lt.

30° 00K 103 Lt 13 + 26

92	91	80	62	60	5.69	5.60	5.66	5.9	6.2	7.6	8.3	8.5	7.8	5.5	2.6
34	32	27	19	15	11		11	15	19	26	30	33	38	48	60

✓  
960.01

14

+50

T. P

7.27

✓  
957.82

7.46

952.55

15

+50

16

+50

+91 & Ent. Rt

15' x 28' s.c.c. NoW - 20' x 23' x 2.5 = 426.0 yd. ✓  
EMI

31

Sod 9' x 6' = 6 Sa. yd ✓

9' x 6' = 6 " " ✓

+90=001x Lt.

76 81 80 79 72 58 54 506 498 509 54 57 71 78 77 74 63 44 37  
37 36 32 30 26 19 15 11 11 15 19 26 30 32 35 42 53 58

60 78 81 78 74 66 53 50 475 465 470 49 51 64 73 70 49 31  
43 38 36 33 30 26 19 15 11 11 15 19 26 30 37 46 58

Devo  
Harrison  
Merry

W. End 75" S.C.C. 30 RT. 16 + 75

May 18- 1942

32 53 63 74 74 69 52 47 441 430 436 46 18 69 72 66 34  
48 40 40 36 33 28 19 15 11 11 15 19 28 34 38 47

31 47 62 70 73 71 49 46 439 430 441 47 49 72 73 71 60  
48 43 39 36 33 29 19 15 11 11 15 19 28 32 36 42

502

46 58 65 76 76 71 51 49 470 461 474 50 53 74 76 73 66 52 51  
44 40 37 35 33 29 19 15 11 11 15 19 28 31 35 38 46 51

68 71 81 80 80 72 57 54 517 512 526 55 58 74 82 81 47 37  
42 39 38 35 33 28 19 15 11 11 15 19 27 31 36 49 56

✓  
959.82

17

+50

T. P.

2.19

✓  
953.79

8.22

951.60

18

+50

19

+50

86 90 88 91 89 83 66 62 592 584 592 61 63 71 91 92 89 76 67 52  
41 40 37 36 32 29 19 15 11 11 15 19 23 29 33 37 42 52 56

101 100 102 102 101 96 75 72 68 675 685 71 76 95 96 96 85 76  
45 42 37 36 33 29 19 15 11 11 15 19 29 33 38 43 51

46 51 52 53 51 45 25 22 186 179 184 21 24 42 44 43 35 32 32  
42 41 37 36 34 31 19 15 11 11 15 19 28 33 37 43 49 56

+30=00 rx Lt.

76 71 67 65 63 59 35 32 294 286 291 32 35 55 56 55 53 51 48  
41 42 37 36 34 31 19 15 11 11 15 19 28 31 36 37 45 54

+80=00 rx Lt.

55 73 76 76 74 70 45 43 398 390 398 43 46 66 69 68 64 60 49  
42 40 37 36 33 30 19 15 11 11 15 19 28 32 35 37 44 55

66 76 84 82 76 57 54 504 495 502 53 56 78 81 75 68 64  
40 37 36 31 28 19 15 11 11 15 19 29 34 36 47 56

✓  
953.79

20

+50

21

+50

22

+50

157 Ent. Rt. 15'x40' S.C.C. New. 14'x40'x2.5'=52 Cu. yd. ✓ Emb.

32

Sod 9'x6' = 6 Sa. yd.  
" 9'x6' = 6 " "

77 82 89 82 90 83 66 63 603 596 607 63 65 87 88 86 79 72 71  
42 39 37 36 32 28 19 15 11 11 15 19 28 32 37 39 51 59

72 81 89 99 102 98 93 77 74 716 702 712 73 76 96 97 98 90 72 60 52 51  
45 43 40 37 36 32 28 19 15 11 11 15 19 30 33 36 38 45 49 53 55

72 86 100 114 108 109 108 101 87 85 820 810 815 83 86 98 108 107 85 62 53 51  
48 44 41 37 36 34 32 27 19 15 11 11 15 19 26 30 34 42 52 54 59

72 86 96 110 122 117 119 119 112 97 95 925 918 926 94 98 121 118 115 98 77 63 60 53  
50 47 44 41 37 36 35 32 28 19 15 11 11 15 19 28 33 36 42 48 53 56 61

54  
25

77 88 102 118 126 129 129 124 108 105 1028 1017 1028 106 111 130 132 128 123 112 106  
54 50 45 41 37 36 33 29 19 15 11 11 15 19 26 30 35 37 40 46

68 89 107 131 132 134 137 130 119 117 115 1143 115 116 117 134 138 136 119 108  
52 47 43 37 36 34 31 27 19 15 11 11 15 19 27 31 35 41 43

953.79 ✓

23

T.P.

2.23

943.09 ✓

12.93

940.86

+50

24

+24

+56

+74

Ent. Rt. 15' x 40' S.C.C Newl  
28'

21' x 35' x 3' = 82 Co. W. Emb ✓

Sed 6' x 9' = 6 SQ Yd. |

" 7' x 9' = 7 " " |

25

88 64 89 110 120 126 144 148 145 135 132 1285 12.78 12.84 13.1 13.4 15.0 15.0 13.5 12.3 11.4  
2.48 44 41 37 35 32 29 25 19 15 11 11 15 19 28 32 36 41 46

E. End 15' x 40' S.C.C 32' RT 22 + 77

13 34 46 58 60 61 50 41 38 356 347 358 3.8 41 53 60 6.0 57 40 2.0  
45 42 41 37 36 31 25 19 15 11 11 15 19 26 30 32 34 39 48

+60=00 DC Lt.

102 97 91 87 70 54 52 499 493 5.02 5.2 5.4 6.7 7.6 7.4 5.7 3.9  
41 37 36 34 27 19 15 11 11 15 19 26 31 33 41 50

108 105 97 89 73 60 58 557 552 5.60 5.8 6.2 7.7 8.7 8.1 6.0 4.6  
42 38 36 33 25 19 15 11 11 15 19 27 32 35 43 51

+45 = 00 DC RT.

113 110 98 84 66 63 617 608 6.16 6.3 6.4 7.7 8.9 8.7 7.0 5.4  
37 36 33 27 19 15 11 11 15 19 25 31 33 37 43

116 112 113 112 86 73 706 695 6.83 6.93 7.0 7.1 9.1 9.7 10.0  
46 37 36 35 28 23 18 11 11 15 19 30 35 41

943.09 ✓

25+24

+60

26

+16

+28

+43

566

12.6 11.5 11.5 9.6 7.7 7.45 7.33 7.18 7.12 7.07 7.10 7.3 7.4 9.1 10.2 11.0 10.7  
 86 73 63 59 51 40 29 19 11 11 15 19 27 32 37 40

7.9 7.45 7.42 7.35 7.33 7.4 7.5 9.7 11.4 12.5  
 28 20 11 11 15 19 29 35 41

11.9 9.7 8.0 7.9 7.6 7.55 7.65 7.9 7.9 9.8 12.0 13.0 12.5  
 36 28 17 15 11 11 18 19 28 35 38 40

12.4 11.6 9.4 8.0 7.9 7.64 7.62 7.67 7.8 7.9 9.5 11.4 12.5  
 38 34 27 19 15 11 11 15 19 28 34 37

10.0 8.7 8.0 7.8 7.70 7.67 7.67 7.8 7.8 8.1 8.1 8.4  
 33 26 19 15 11 11 15 19 27 39 72

8.5 8.0 7.8 7.80 7.73 7.75 7.9 8.2 8.2 10.1 11.6  
 24 19 15 11 11 15 17 19 30 35

✓  
943.09

26 + 68

T.P.

3.12

✓  
938.02

8.19

934.90

+83

+90

27

+20

Ent. Lt.

✓  
 $20' \times 18' \times 1.5' = 20$   
NO COIN

Co. yd. Emb.

+50

28

15.0 145 126 95 81 80 288 784 794 8.1 84 9.6 117 14.6 15.9  
59 47 37 25 19 15 11 11 15 19 25 35 47 52

10.0 94 74 51 33 31 287 279 292 32 3.6 5.0 7.9 87  
51 45 36 26 19 15 11 11 15 19 26 37 38

8.0

5.7 64 52 34 32 292 281 295 32 3.5 5.2 7.6 8.4  
35 33 27 19 15 11 11 15 19 26 36 39

5.7 62 49 3.6 37 3.02 286 3.00 33 3.5 5.0 6.9 7.9  
33 32 25 19 15 11 11 15 19 25 33 38

92 69 5.6 43 39 3.62 3.48 3.66 3.9 4.2 6.1 8.3 85  
42 34 26 19 15 11 11 15 19 28 38 40

+00=00 rx Rt.

8.1 65 47 45 42.6 417 4.29 4.6 4.9 6.9 7.7 7.4  
34 27 19 15 11 11 15 19 28 35 37

938.02 ✓

28 +50

29

Sod 9'x6' = 6 SQ. yd ✓  
" 9'x6' = 6 " ✓

+50

+92 Ent. Rt. 12"x28' C.M.P. old Pipe 16'x26'x25' = 39 Cuyd. Emb. ✓

+98 Ent. Lt 12"x20' C.M.P. old Pipe 10'x19'x22' = 14 Cuyd. Ent. ✓  
32'  
30' Sod 7.5x5 = 4 SQ. yd ✓  
" 7.5x5 = 4 " " ✓

30

B.M. 0.90 933.07 ✓ 5.82 932.20 932.17

+50

31

7.1 7.3 6.8 5.5 5.2 5.0 4.93 5.04 5.3 5.7 6.6 7.5 7.6 7.2 6.7 5.6 4.6  
 32 31 26 19 15 11 11 15 19 24 29 32 35 37 41 43

+00=000

8.3 8.1 7.7 6.5 5.9 5.7 5.65 5.79 5.9 6.2 7.3 7.8 8.3 8.0 7.1 5.8 5.6  
 29 27 24 19 15 11 11 15 19 24 27 31 34 39 44 45

7.7 8.1 8.7 9.0 8.6 7.2 6.7 6.40 6.51 6.46 6.8 7.1 8.4 9.4 9.2 8.4 7.0 5.8 6.0  
 33 31 29 27 25 19 15 11 11 15 19 25 30 33 38 42 46 48

8.8 9.9 9.7 7.4 7.2 7.12 7.11 7.22 7.4 7.4 8.2 9.2 10.5 10.0 9.1 8.8 7.9  
 35 31 28 19 15 11 11 15 19 23 27 32 37 43 48 49

SPK. in 18" E/107 52' Rt. 29 + 75

5.1 5.5 5.3 3.5 3.2 2.99 2.94 3.02 3.3 3.5 5.5 5.9 6.1 5.7 5.1  
 36 29 27 19 15 11 11 15 19 28 30 35 37 41

+00=000

6.3 5.8 4.2 4.1 3.67 3.61 3.71 4.0 4.2 6.1 6.5 6.2 6.1 5.3 5.2  
 29 25 19 15 11 11 15 19 28 31 34 38 43 46

✓  
933.07

31 + 50

+55 Ent. Lt. 15" x 20' C.M.P. old Pipe 11' x 19' x 2' = 150 yd Emb  
29' Sod 6' x 8' = } 11 sq. yd. ✓  
" 6' x 8' = }

32

+50

+81 Ent. Lt. 18" x 28' S.C.C. New ✓ 10' x 28' x 2' = 26 Co. yd ✓ Emb  
30' Sod 8' x 7' = } 13 sq yds. ✓  
" 8' x 7' = }

33

+50

34

T.P.

2.05

926.34

878

924.29

59 69 71 66 48 46 442 435 446 47 48 61 69 73 73 65 59 57  
 32 31 28 25 19 15 11 11 15 19 25 29 33 37 41 44 47

63 73 77 78 70 57 54 512 504 515 524 57 65 76 79 78 70 62 61  
 34 31 30 27 23 19 15 11 11 15 19 23 29 33 39 42 46 49

68 74 83 85 83 75 64 72 590 582 593 62 64 75 84 86 82 74 66 61 62  
 34 33 31 29 26 23 19 15 11 11 15 19 24 28 33 37 41 44 48 50

67 62  
 43 45

31

65  
50

78 87 92 95 95 89 79 72 69 670 662 671 69 72 86 94 94 92 87 79 71 66  
 38 36 34 31 30 27 23 19 15 11 11 15 19 24 28 32 35 38 41 45 48

64 77 85 103 104 102 80 77 744 737 753 77 79 96 101 99 98 76 63  
 50 46 42 35 31 28 19 15 11 11 15 19 27 30 36 38 45 51

62 65  
53 51

91 97 105 112 115 110 101 89 86 831 823 835 85 88 96 107 110 109 109 98 88 78  
 47 44 40 36 31 27 23 19 15 11 11 15 19 23 28 32 35 38 41 43 46

✓  
926.34

34 + 50

35

+50

36

+50

+54

✓  
52' x 16' x 1.5 = 46 Cu. yd. Exc.

16' x 24' x 2.5 = 36 Cu. yd. Emb.

+58 Ent. Pt.

15' x 28' S.C.C. New ✓

32

Sod 8' x 8' = 7 Sq. yd. ✓

" 8' x 7' = 6 " " ✓

6.34

43 44 51 56 56 48 32 28 245 2.35 2.45 2.7 2.9 39 49 5.2 5.0 46 11 0.2  
45 43 37 33 29 25 19 15 11 11 15 19 24 29 32 38 40 48 52

5.2 54 61 65 55 4.0 3.6 3.75 3.26 3.36 3.6 3.9 5.1 6.1 6.2 5.8 4.5 2.6 1.6 1.2  
47 45 37 32 26 19 15 11 11 15 19 25 30 33 37 41 47 50 55

5.8 59 64 72 72 63 4.9 4.6 4.32 4.22 4.33 4.5 4.8 5.8 6.6 6.9 6.7 5.7 3.8 2.4 1.9  
49 45 40 34 29 24 19 15 11 11 15 19 24 28 31 34 38 46 51 55

6.1 63 70 78 80 80 7.0 5.8 5.6 5.23 5.15 5.25 5.4 5.6 7.7 7.7 7.1 4.8 2.8 1.8 1.5  
50 48 43 38 33 29 24 19 15 11 11 15 19 30 34 38 45 50 53 56

6.8 72 80 86 86 7.9 6.6 6.4 6.15 6.06 6.10 6.3 6.3 7.3 8.5 8.6 8.2 7.0 5.1 4.3 3.3 1.0  
51 47 42 36 32 26 19 15 11 11 15 19 25 30 32 35 39 45 51 56 65

7.0 7.4 8.1 8.7 8.7 8.1 6.7 6.4 6.20 6.13 6.20 6.3 6.4 7.3 8.5 8.6 8.2 4.8  
51 47 42 36 31 26 19 15 11 11 15 19 25 30 32 35 43

926.34

36 + 64

+ 69

37

B. M

0.13

924.93

1.55

924.79

924.80

+ 50

38

T. P.

2.67

918.86

874

916.19

+ 50

76 83 89 90 83 69 66 639 634 6.41 65 6.68 41 94 94 875.2 3.9  
50 44 38 33 26 19 15 11 11 15 19 26 31 33 37 45 65

79 80 88 91 82 69 67 647 643 653 67 6.7 8.4 94 94 86 64 5.4 2.3  
50 47 40 31 25 19 15 11 11 15 19 26 31 33 37 44 49 60

98 93 95 98 98 93 76 74 702 697 707 73 7.5 9.2 10.0 99 81 65  
45 43 36 33 30 26 19 15 11 11 15 19 26 31 33 40 45

SPK. 17 12" Bexelder 65' Rt. 36 + 69 Clear warm.  
May. 19. 1943

450=0012 Lt. 95 95 90 73 71 656 649 656 69 73 86 94 96 96 95 93 93  
31 29 26 19 15 11 11 15 19 25 30 33 35 40 43 45

105 108 107 100 82 78 745 742 752 77 77 92 101 105 105 107 100  
39 35 30 26 19 15 11 11 15 19 25 29 34 38 43 46

47 49 54 55 47 30 26 233 227 236 26 29 39 43 47 52 46 38  
41 39 34 29 25 19 15 11 11 15 19 25 28 34 38 42 46

✓

918.86

39

+50

40

+50

41

+50

53 61 63 57 36 34 305 303 320 34 37 51 58 59 67 50 43  
 42 35 30 26 19 15 11 11 15 19 26 31 32 39 43 47

54 71 72 67 45 42 385 379 391 41 43 52 65 64 61 53 46  
 42 36 33 27 19 15 11 11 15 19 26 30 34 39 43 46

59 60 74 77 71 51 48 453 449 460 48 50 63 71 72 64 52 47  
 45 42 37 32 27 19 15 11 11 15 19 27 33 36 40 45 49

70 72 79 82 76 56 54 513 507 520 54 57 71 77 75 68 61 54  
 40 38 34 30 27 19 15 11 11 15 19 27 32 37 41 45 49

86 86 88 84 61 59 562 557 568 59 61 73 80 83 80 70 65  
 38 35 33 27 19 15 11 11 15 19 25 30 35 39 44 48

1+05=001x 17.

93 91 86 68 65 611 605 615 64 67 81 89 90 82 75  
 33 30 26 19 15 11 11 15 19 25 30 35 41 45

✓  
918.86

42

T.P.

3.04

✓  
910.65

725

911.61

+5°

43

+5°

B.M.

193

912.72

912.72

44

+80

94 96 92 73 69 660 655 665 69 71 87 95 93 82 79  
 33 31 27 19 15 11 11 15 19 26 32 37 41 43

+15=00 10 Lt.

45 47 53 54 48 35 32 287 281 293 32 35 47 53 56 53 45 38 36 36  
 40 38 32 30 26 19 15 11 11 15 19 25 30 33 37 42 46 49 59

49 51 60 62 57 40 38 340 333 343 36 38 51 56 61 52 42 39 36 27  
 43 38 35 30 27 19 15 11 11 15 19 25 29 33 39 44 52 62 70

49 51 65 66 64 55 43 41 391 382 392 42 43 57 64 65 58 49 48 47 45 34  
 42 41 35 32 27 24 19 15 11 11 15 19 25 30 35 39 44 51 61 69 74

SPK. 17 20" 09K 150' Rt. 43+50

48 49 56 67 71 68 49 46 498 438 448 47 48 59 67 71 70 65 58 56 54 54  
 45 43 39 34 32 27 19 15 11 11 15 19 25 29 33 36 39 44 50 59 67

40 46 67 79 78 73 56 53 505 498 511 54 56 67 77 79 70 68 70 73 72  
 47 44 38 33 31 27 19 15 11 11 15 19 25 31 36 41 48 60 73 76

✓  
914.65

45

+50

46

T.P.

4.09

✓  
911.44

7.30

907.35

+50

47

+50

+52

±

24" x 88' S.C.C

38' New Pipe ✓

50 old

Sod. Lt. End 90' x 6' = 6 SQ. yd. ✓

" Rt. " 90' x 6' = 6 SQ. yd. ✓

66 65 76 86 90 86 62 59 563 556 571 59 61 74 85 86 86 88 88  
47 44 39 35 33 28 19 15 11 11 15 19 27 34 40 48 52 61

+10=001x 12t.

99 99 100 94 70 66 629 619 632 66 68 79 91 98 100 103  
41 37 38 28 19 15 11 11 15 19 25 32 37 40 43

+60=001x Lt.

120 109 95 76 72 693 684 691 71 74 86 98 110 117  
39 34 28 19 15 11 11 15 19 26 32 37 41

105 101 96 82 74 65 47 44 420 416 428 46 48 60 72 86 99 100  
51 46 45 39 35 27 19 15 11 11 15 19 26 32 37 40 42

cont

108 98 77 66 51 48 450 445 460 48 50 63 75 94 106  
44 41 35 26 19 15 11 11 15 19 26 32 39 44

127 103 85 75 68 61 51 48 472 466 479 50 51 63 72 83 93 107 111  
47 44 40 34 29 24 19 15 11 11 15 19 25 32 37 46 42 46

13.9

47'

11.9

41

✓  
911.44

48

+50

49

+50

T.P.

7.07

✓  
915.15

3.30

908.08

50

+50

120 127  
72 74

08 101 96 84 82 70 67 55 51 471 4.67 4.85 5.1 5.1 6.4 7.1 77 9.1 104 115  
6 52 51 45 43 34 26 19 15 11 11 15 19 27 32 36 43 47 51

127 111 103 88 73 65 51 48 4.60 4.46 4.44 4.9 5.2 6.1 7.4 8.6 9.6 112  
63 57 55 47 37 27 19 15 11 11 15 19 25 33 40 45 49

126 112 106 92 70 64 45 43 4.10 4.00 4.12 4.3 4.4 5.0 7.0 8.3 9.7 10.9  
57 53 50 46 36 26 19 15 11 11 15 19 27 34 41 46 51

122 110 98 63 57 29 3.6 3.31 3.26 3.36 3.5 3.6 5.5 6.5 8.0 9.3  
60 54 49 35 26 19 15 11 11 15 19 28 34 40 45

144 130 122 109 95 90 83 69 6.6 6.18 6.09 6.22 6.6 6.8 8.1 10.1 11.5  
56 51 48 43 36 29 25 19 15 11 11 15 19 27 35 41

+45 = 0012 RT

136 130 88 79 58 5.6 5.25 5.15 5.29 5.5 5.7 6.9 8.2 8.4 7.5 6.4 6.1  
53 51 36 27 19 15 11 11 15 19 26 34 39 42 50 54

9/5/15

51

+25

+56

+73

+92 Ent. Rt 8'x12" C.M.P. 20'x15" old pipe

30

Sod 7'x8' = 6 Sq. yd.

✓ " 7'x8' = 6 Sq. yd.

12'x28'x25' = 31 Cu. yd. Emb.

117 115 108 95 68 48 46 42 422 4.35 46 47 61 67 66 5.6 44 33  
 63 59 50 41 29 19 15 11 11 15 19 26 31 34 40 46 51

8.1 80 100 105  
 63 67 71 79  
 8.6 86 77 80 83 79 72 44. 41 393 385 393 41 43 52 61 61 5.6 44 35 27 26  
 58 54 48 44 41 37 33 19 15 11 11 15 19 26 31 34 37 42 46 50 52

+30 = 00 rx Lt.

8 41 45 53 68 72 68 59 40 37 345 335 346 37 38 48 56 54 5.0 4.0 32 28  
 - 66 53 49 42 37 32 29 19 15 11 11 15 19 26 31 34 36 40 44 47

49 62 70 119  
 100 121 136 161

2.4 23 28 39 52 63 63 36 32 299 292 3.03 32 34 4.2 5.1 5.0 44 3.5 27 2.3  
 75 70 58 51 44 38 31 19 15 11 11 15 19 25 29 31 34 38 42 46

3.0 3.6 5.6 13.1  
 32 150 185 213

✓  
915.15

52

+30

B.M.

3.49

✓  
918.04

0.58

914.57

914.55

+50

1.9 2.1 2.7 5.3 5.8 4.9 3.0 2.6 2.50 2.40 2.50 2.7 3.0 4.6 4.7 4.2 3.4 2.6 2.3  
75 60 53 39 33 26 19 15 11 11 15 19 26 30 34 36 41 44

1.8 2.3 2.5 3.1 6.1 12.2  
100 127 155 200 219 244

1.5 1.0 1.4 3.2 4.8 4.3 2.5 2.2 1.95 1.88 1.99 2.3 2.5 3.5 4.3 4.2 3.6 3.0 2.7  
100 75 59 46 34 29 19 15 11 15 15 19 24 29 34 38 41 44

1.9 2.4 3.0 4.4 11.5  
150 200 243 265 286

May 20. 1943

S.P.K. 125 12" 00K 125 RT. 52 + 65

3.7 5.2 6.8 7.3 7.2 6.7 4.9 4.7 4.52 4.46 4.52 4.7 4.9 5.6 6.4 6.4 6.0 5.9  
64 53 43 37 32 28 19 15 11 11 15 19 25 30 36 43 49

3.7 4.2 4.5 4.9 5.6 6.8 12.3  
75 100 150 206 251 274 284

918.04

52+62

+75

+91.5

53+01.5 = 53+02.6

+13

53 56 63 70 72 71 65 4.7 430 430 4.22 430 4.4 4.4 50 55 5.7 5.1  
55 59 48 43 38 33 28 20 15 11 11 15 28 27 32 48 46

+66=00XRT

5.8 5.7 5.1 4.9 5.4 5.9 7.5 6.7 7.1 7.8  
24 113 134 156 200 211 224 243 256 271

N N

+66=00 cut. 17.

3.1  
7.1

8.1 8.1 7.5 6.9 6.2 4.9 8.2 4.20 4.05 3.95 4.05 4.1 4.1 4.0 4.1 4.3 4.5 4.3 3.7 3.8  
7.5 6.4 5.8 4.8 3.8 2.6 2.0 1.5 1.1 1.1 1.5 2.0 2.3 2.8 3.3 3.9 4.4 5.9 7.2

4.4 4.3 4.0 3.9 3.74 3.62 3.72 3.8 3.7 3.6 3.4 3.0  
5.0 3.7 1.9 1.5 1.1 1.1 1.5 1.9 2.5 3.0 5.0

4.4 4.2 3.9 3.8 3.52 3.47 3.52 3.6 3.0 3.3 3.0 2.8  
5.0 4.1 2.5 1.5 1.1 1.1 1.5 1.9 2.8 3.8 4.3

3.37 4.6 4.1 3.6 3.25 3.34 3.4 3.3 3.3 3.1 2.9 2.6  
1.1 5.0 3.6 1.9 1.1 1.5 1.9 2.7 3.5 4.3 5.1

✓  
918.04

53+19

+30

+46

+50  $\phi$  24' x 69' S.C.C New Pipe. /

Sod 7' x 9' = 7 Sq. yd /  
7' x 9' = 7 " " /

T.P            253            923.30            227            915.27

+76

54

8°

50	10	27	322	3.13	322	32	32	32	31	30	29
50	34	26	11		11	15	19	27	34	43	50

85	75	56	27	23	32	30	293	304	310	31	39	47	46	44	41
58	48	35	25	19	15	11		11	15	23	32	42	50	63	75

27	80	61	34	30	28	267	260	272	28	30	31	45	60	69	66
48	38	33	23	19	15	11		11	15	19	23	28	32	35	42

2.9

35

6.7

29

7.3

76=00 rx Lt.

110	105	101	79	76	739	731	739	77	79	88	96	112	106
48	40	30	19	15	11		11	15	19	27	33	41	49

+76=00 rx Rt

96	97	87	74	71	693	685	695	72	74	84	95	110	110	96	88	85	88
50	37	26	19	15	11		11	15	19	27	36	46	54	60	67	74	82

923.30

54 + 56

55

+ 27

+ 50

56

+ 50

3<sup>3</sup>

6.4 6.6  
81 74

85 88 86 78 65 63 597 589 604 63 65 76 90 104 111 104 87 73  
56 49 41 28 19 15 11 11 15 19 26 35 44 49 57 62 68

+95=00 rx Lt.

76 76 29  
84 80 72

105 96 82 69 55 53 504 495 508 5.4 5.8 73 83 100 106 107 103 80  
53 44 35 26 19 15 11 11 15 19 27 35 45 50 53 57 66

5<sup>3</sup>

9.4  
79

125 113 89 69 50 47 458 450 465 50 53 80 91 100 105 100 96 92 93  
55 49 37 27 19 15 11 11 15 19 34 41 46 51 54 58 65 71

5<sup>2</sup>

+45=00 rx Rt.

140 126 110 59 46 44 415 410 425 45 47 77 90 100 100 99 104  
66 56 46 25 19 15 11 11 15 19 34 40 49 55 60 69

+90=00 rx Rt

130 123 106 63 39 36 325 316 330 35 36 67 87 91 90 80  
60 54 38 30 19 15 11 11 15 19 33 41 50 62 72

5<sup>3</sup>

8.7 8.4 78 4.7 29 27 240 225 222 24 27 48 66 65 5.7 60  
57 53 45 29 19 15 11 11 15 19 31 44 51 58 64

923.30 ✓

57

T.P. 768 930.13 ✓ 0.85 922.45

+50

+ 63 Ent. Lt 15' x 28' S.C.C. New Pipe 27' x 2.5' = 50 Cords ✓ Emb  
32 Sad 8' x 7.0 = } 12 Sq yd. |  
" 8' x 7.0 = }

58

+50

59

+50

57+00=000x Lt.

3.3

55 42 20 18 152 125 120 15 17 36 47 50 46 41 41  
15 31 19 15 11 11 15 19 29 35 44 50 56 61

83 89 89 106 104 84 77 77 751 723 698 73 75 94 103 107 107 94 86 78  
46 45 43 38 52 23 19 15 11 11 15 19 31 36 41 48 54 60 68

0.1

70 73 80 90 89 83 69 68 663 623 601 62 65 86 97 99 94 80 78  
48 45 39 34 32 28 19 15 11 11 15 19 32 39 46 51 59 71

0.1

535 43 54 78 81 79 63 61 581 539 505 52 54 84 90 92 89 83 79 74 73  
356 51 46 35 31 27 19 15 11 11 15 19 36 42 48 56 63 73 84 91

0.3

+3.1 +2.3 05 40 71 72 70 56 53 509 455 410 43 46 61 78 86 88 80 69 59  
76 69 60 46 34 31 27 19 15 11 11 15 19 30 40 48 56 64 71 79

+69 +21  
81 84

158 00 23 56 61 62 59 16 43 410 366 332 34 36 64 73 84 79 68  
76 57 56 36 33 31 28 19 15 11 11 15 19 35 43 54 63 71

930.13

60

+50

61

T. P.

5.79

934.05

1.87

928.26

+50

+70

62

0.15

82 75 75.2 0.0 54 56 54 78 36 332 290 259 27 28 47 68 79 8.1 74 5.9 3.4  
88 82 72 54 35 31 27 19 15 11 11 15 19 32 42 51 59 65 71 79

79 72 49 0.0 48 51 48 33 30 275 233 200 21 22 52 74 77 73 55 45 43  
83 76 69 52 35 31 27 19 15 11 11 15 19 33 45 56 63 70 75 77

108 0.0 15 41 46 43 2.7 24 222 18 1.50 1.7 1.9 5.1 71 20 65 49 33  
62 54 49 39 33 29 19 15 11 11 15 19 35 46 52 61 69 75

105

81 81 80 60 58 563 531 507 52 5.4 68 88 104 108 105 94 85 71  
51 38 28 19 15 11 11 15 19 28 36 44 51 59 66 69 74

105

103 84 82 79 59 57 544 516 503 51 53 76 97 107 106 97 79 67  
60 49 38 29 19 15 11 11 15 19 30 41 49 57 66 71 75

67 72 80 78 56 54 523 495 489 51 53 82 97 105 99 88  
48 42 36 30 19 15 11 11 15 19 34 43 52 59 67

934.05 ✓

62 + 50

63

B.M

6.30

927.75

927.75

+ 50

+ 97 Ent. Lt. 15" x 24' CMP old Pipe 26' x 21' x 2' 40 Co yd ✓ Emb.  
 32' Sod 8.0 x 7.0 = } 12 Sq. yd. ✓  
 " 8.0 x 7.0 = }

64

+ 50

65

405

659 74 78 83 80 67 55 52 498 480 484 50 52 77 90 99 101 94 77  
52 47 40 38 35 31 26 19 15 11 11 15 19 32 40 47 54 60 67

205

70 26 82 83 76 54 51 48 472 485 50 52 68 78 89 95 92 88 72 62 59  
54 98 41 35 30 19 15 11 11 15 19 34 36 44 49 53 58 67 74 77

SPK. 17 24" OOK 65' Lt. 63 + 10

205

150=0012 Lt. 88 84 73 55 51 481 471 488 52 54 73 86 96 92 86  
35 33 29 19 15 11 11 15 19 30 38 47 56 59

+66=0012 Rt.

205

72 50 50 492 481 496 52 53 66 82 88 90  
29 19 15 11 11 15 19 26 32 35 38

87 82 76 55 50 502 492 509 53 55 65 81 88 96  
39 34 29 19 15 11 11 15 19 25 33 37 39

91 81 56 54 521 507 526 55 56 67 78 87 96  
35 30 19 15 11 11 15 19 26 32 37 42

934.05 ✓

65+50

T.P.

4.30

932.64

5.71

928.34

66

+50

67

+50

68

92 92 7.8 58 5.6 531 5.19 5.39 5.7 59 72 82 93  
40 39 29 19 15 11 11 15 19 27 31 43

55=0012 Lt

+70=0012 Rt

63 63 77 81 86 73 58 44 43 405 375 4.10 4.3 4.5 5.8 67 83 83 73 71 56 5.1  
55 51 42 39 36 33 28 19 15 11 11 15 19 27 33 40 45 54 65 72 76

51

77

46 45 66 77 86 82 70 46 44 4.15 4.10 4.25 4.5 4.7 6.3 7.8 9.1 9.4 8.3 7.6 61 52  
57 55 47 42 38 34 32 19 15 11 11 15 19 29 37 44 49 57 64 69 74

66 69 83 87 81 71 48 45 4.30 4.23 4.36 4.6 4.9 7.0 8.9 9.7 9.6 7.7 57 50  
52 48 42 39 35 32 19 15 11 11 15 19 29 41 48 55 63 70 77

10.8 10.6 10.2 6.7 4.9 4.6 4.43 4.37 4.48 4.8 5.2 7.5 9.2 10.0 10.0 8.4 63 5.4  
63 55 47 29 19 15 11 11 15 19 30 38 48 55 63 70 76

13.5 13.1 11.5 8.9 5.0 4.7 4.56 4.49 4.59 4.9 5.2 7.4 9.2 10.7 10.6 8.5 68 6.3  
57 56 51 36 19 15 11 11 15 19 30 38 50 56 66 72 77

932.64

68 + 58.6

+65 ± 24" x 92' S.C.C. New Pipe'

Lt. Sod 9' x 6' = 6 Sq. Yd ✓

Rt " 9' x 7' = 7 " "

B.M.

948

932.43

9.69

922.95

69

+33.6

+60

+87.8

128 133 120 88 53 49 459 463 494 51 53 73 97 113 123 124  
 53 50 48 34 19 15 11 11 15 19 29 39 48 53 55

Flow Lines

1320

47

12.63

45

Clear - Mild

\* Mark. Top. R.R. Colvt. N. End Rt. 68 + 80 May. 21. 1943

Boq. Fill

95 100 96 79 50 47 445 452 483 52 55 77 96 108 112 121  
 67 52 41 33 19 15 11 11 15 19 31 40 53 63 68

69 72 77 78 76 51 48 450 461 503 53 56 80 102 108 111 105 109  
 56 51 43 37 31 19 15 11 11 15 19 31 42 52 63 70 71  
 69 + 35 = 100

48

55

49 52 61 70 74 75 73 52 49 461 470 506 54 56 86 102 107 108 109  
 52 48 42 37 34 31 28 19 15 11 11 15 19 34 45 55 63 70

+ 75 = 00 R.

30 30 36 46 71 73 71 52 49 474 478 506 54 56 81 100 101 101 101 103  
 60 58 53 47 34 30 27 19 15 11 11 15 19 33 46 55 61 66 69

932.43

70

+554

71

+30.4

72

+50

T.P.

479

931.12

6.10

926.33

6.70

N

4 27 38 48 64 70 71 71 52 50 477 485 510 5.4 57 77 92 98 98 100 101  
 2 57 50 45 39 34 31 28 19 15 11 11 15 19 31 40 49 60 68 70

N

51 47 53 67 68 63 51 50 490 497 520 55 58 78 91 90 88 87 82 75  
 56 51 44 35 31 27 19 15 11 11 15 19 30 38 47 59 67 71 73

N

66 65 69 67 55 52 499 509 521 57 61 75 81 85 88 88 83 82  
 43 36 30 26 19 15 11 11 15 19 27 35 45 56 67 73 76

N

69 68 70 71 69 57 53 504 517 552 58 61 80 87 90 92 91 99  
 42 39 33 30 26 19 15 11 11 15 19 29 36 46 58 65 73

N

58 61 69 72 69 55 54 522 540 575 59 62 79 90 88 97 95 102  
 46 40 35 32 29 19 15 11 11 15 19 29 39 48 58 66 71

30 33 43 72 76 72 57 55 530 540 582 60 60 80 92 97 96 107  
 55 51 46 36 30 27 19 15 11 11 15 19 32 42 54 60 64

931.12

72+78.8

73

+53.8

74

+50

75

24 27 32 44 60 65 63 45 43 410 424 462 48 5.0 65 74 89 91  
57 54 49 42 37 33 28 19 15 11 11 13 19 28 33 37 41

50 57 66 6.6 46 44 420 432 491 51 53 63 72 85 102  
46 41 35 30 19 15 11 11 15 19 26 34 39 46

+ 30=0012 Lt.

+ 10=0012 Rt

109 93 81 49 46 438 440 470 49 5.0 69 88 102 116 95 73  
47 43 27 19 15 11 11 15 19 30 41 50 61 66 72

110 81 63 51 48 457 454 476 49 51 69 79 100 104 101 74 64  
46 35 27 19 15 11 11 15 19 29 35 45 52 63 70 74

116 76 52 50 480 472 486 51 55 74 91 103 109 92 73 63  
45 30 19 15 11 11 15 19 30 39 49 60 65 70 73

117 102 68 5.5 52 499 487 498 53 5.7 76 100 105 105 81 61 55  
48 39 26 19 15 11 11 15 19 31 43 52 60 66 73 75

931.12

75 + 50

+66  $\Phi$  24" x 92' S.C.C. New Pipe  
Sod at End only 9' x 7' = 7 So. yd.

76

+50

T.P.	4.14	929.20	6.06	925.06
------	------	--------	------	--------

77

+50

119 110 100 54 53 510 500 515 54 56 75 99 106 103 83 69 57  
 52 49 31 19 15 11 11 15 19 32 42 55 62 67 71 75

12.42  
 47'

F. line 15.80  
 M.H.  
 15.32

Tab Grate M.H.  
 10.77  
 48' ± M.H.

116 108 82 56 55 533 531 537 57 60 85 105 106 101 80 59  
 48 44 32 19 15 11 11 15 19 35 45 54 61 66 74

107 103 82 61 58 552 544 538 59 62 83 100 104 102 77 64 59  
 41 39 29 19 15 11 11 15 19 32 42 52 60 68 71 75

+ 0.5 = 0.01x Lt.

69 67 43 40 382 371 386 41 43 65 76 81 79 56 45  
 40 33 19 15 11 11 15 19 30 39 50 62 70 76

53 56 64 62 43 41 403 397 413 43 68 7.7 8.2 8.0 62 50 44  
 44 40 34 36 19 15 11 11 15 31 42 53 61 67 72 77

929.20

78

+50

B.M. 357 928.32 4.44 924.76 924.75

79

+19

M.H.

+24

+30

+41.8 Edge Pvt. New Brighton Rd

255  
661  
53

38 43 58 66 62 47 43 416 421 443 46 50 70 76 81 76 60 53 41  
51 45 38 33 28 19 15 11 11 15 19 31 44 55 64 71 76 79

67 68 70 67 50 47 44 446 478 51 53 70 76 81 73 64 58 49  
42 37 32 27 19 15 11 11 15 19 30 42 56 63 71 77 81

+55 = 000 LT.

SPR. 17 P.P. 36' LT. 79+33

84 77 59 18 16 43 412 407 420 44 48 61 67 69 65 56 49 46  
48 42 33 25 19 15 11 11 15 19 32 42 54 62 68 75 80

Excess 1353  
Total H. 689  
-48.5

E566

E542

78 57 55 48 45 437 431 423 429 430 46 50 61 61 58 52 45 42  
74 56 48 34 27 18 11 11 17 23 35 44 52 62 68 74 80

+26 = 000 RT

E560

E566

82 46 49 495 430 421 420 430 46 48 51 50 45 43  
84 52 42 25 11 11 22 32 42 52 62 72 80

4?

438 444 434 425 419 411 411 412 405 411 42 403  
46 49 36 11 11 15 26 40 51 58 73

928.32

79+61.8 E. Edge PVF

+70

+81

80

+50

81

87

035 437 424 422 418 419 415 410 412  
60 51 26 11 11 21 33 45

556 8.3 Ed. 561

43 46 46 434 437 432 435 4.42 43 4.1 4.1  
84 69 47 27 11 11 32 46 60 75

566 566

456 447 439 4.41 4.50 47 49 5.2 49 45 4.2 4.4 46  
19 11 11 21 30 39 46 52 58 63 75 78

+ 85 = 00124

+ 90 = 00124

566 566

50 45 48 46 62 64 62 49 46 437 430 4.41 46 48 55 63 69 68 64 56 50 48.50  
88 58 47 42 34 30 27 19 15 1.3 12 15 19 22 34 41 47 51 58 64 72 77

44 51 70 74 75 74 71 52 49 465 447 4.59 49 52 70 84 84 83 76 65 56 53 50  
52 47 39 36 33 20 27 19 15 11 11 15 19 30 39 45 49 56 64 70 74 77

52 56 67 77 82 83 79 53 51 481 473 487 52 56 72 87 93 95 89 78 66 59 58  
56 52 46 42 39 34 29 19 15 11 11 15 19 29 39 47 52 57 62 67 76 73

1  
928.32

81 + 50

T. P.	0.37	923.15	5.54	922.78
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82

+50

83

+50

T. P.	3.02	926.06	0.11	923.04
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84

+45 = 00 12 Lt.

81755 M.H. 2d 19.83

FLING

706 M.H.

13.18

57

116	112	100	57	53	50	4.94	5.06	5.3	5.5	2.9	10.0	11.5	12.8	13.7	11.9	10.7	7.8
53	45	37	19	15	11		11	15	19	32	43	57	55	59	62	65	73

129	122	74	10	05	0.16	0.03	0.12	0.3	0.7	2.6	5.2	7.3	7.2				
81	66	44	19	15	11		11	15	21	31	46	60	65				

125	124	72	10	08	0.53	0.46	0.57	0.8	1.1	3.4	6.3	7.4	7.5				
70	66	44	19	15	11		11	15	19	34	53	63	66				

142	124	77	13	11	0.79	0.68	0.84	1.1	1.3	4.1	6.6	7.1	6.9				
79	62	44	19	15	11		11	15	19	37	55	62	65				

1.9	1.40	1.26	1.33	1.07	3.1	0.9	0.71	0.41	0.50	0.7	1.0	3.0	5.8	6.5	6.4		
1.9	86	73	70	56	29	15	11		11	15	19	32	50	59	64		

15.6 outlet 26" C.M.P. Lt 83+50

79' Lt.

1.65	9.7	3.3	3.0	2.79	2.72	2.79	3.0	3.4	4.9	7.0	8.4	9.2	9.0	9.4			
7.3	4.4	1.9	1.5	1.1		1.1	1.5	1.9	3.0	4.1	5.0	5.8	6.3	6.5			

926.06

84 + 5<sup>0</sup>

85

+ 39

+ 42

Ent Lt.

18" x 28' S.C.C. New Pipe

38'

24' x 28' x 2.5' = 62 Cu. Yd. Emb.

Sod 9' x 7' = 7 Sq. Yd.

" 9' x 7' = 7 " " "

+ 50

T.P.

651

931.93

0.64

925.42

86

152 138 68 26 24 219 212 229 25 28 43 69 78 83 86 90 88  
 70 64 36 19 15 11 11 15 19 30 43 49 56 63 67 68

119 115 70 21 18 155 150 160 18 20 44 64 70 69 64 60 49  
 77 63 42 19 15 11 11 15 19 35 46 53 58 63 67 70

35 = 0012 LT

+15 = 00 12 RT

3.1 50 39 24 12 11 093 0.89 093 11 14 34 45 57 63 56 47 35 2.8  
 530 47 37 27 19 15 11 11 15 19 34 39 48 52 60 66 71 74

2.4 4.3 3.8 2.1 12 11 088 0.82 088 11 13 28 46 59 62 58 47 36 2.7  
 53 47 37 27 19 15 11 11 15 19 31 39 46 52 58 65 70 74

1.1 1.9 2.8 3.2 2.9 1.3 1.0 0.9 0.76 0.69 0.72 0.9 11 36 55 61 57 43 3.0  
 49 46 36 34 32 23 19 15 11 11 15 19 34 44 52 58 66 73

0.6 0.9 4.5 8.1 8.4 8.3 7.7 6.4 6.1 5.77 5.72 5.76 6.0 6.2 8.4 10.1 11.2 11.4 10.9 9.5 9.1  
 7.2 5.9 5.1 3.8 3.5 2.9 2.6 1.9 1.5 1.1 11 15 19 31 40 47 53 61 70 7.5

931.93

86 + 80

+ 88

+ 94

87

+ 50

88

10.8

+3.0 +4.5 +4.5  
69 78 82

00 23 49 68 72 74 68 54 52 491 484 495 52 54 8.4 106 112 109 99 91 84  
60 53 48 36 34 30 26 19 15 11 11 15 19 35 45 53 58 66 73 77

+5.5 +5.8  
78 87

+46 00 35 63 64 65 60 46 44 427 420 430 46 48 8.1 105 109 103 92 89 84  
73 59 48 37 33 30 26 19 15 11 11 15 19 35 45 56 64 72 75 77

+5.8 +6.0  
78 86

+52 00 26 62 65 65 57 45 44 47 410 419 44 47 8.0 96 105 108 105 98 90 83  
74 58 50 37 33 30 25 19 15 11 11 15 19 35 42 47 55 62 68 74 77

+5.9 +6.2  
78 89

+52 00 15 62 63 64 56 45 43 408 404 411 44 46 7.1 9.1 104 107 100 90 83  
74 59 53 36 33 30 25 19 15 11 11 15 19 32 40 46 56 66 73 77

+7.1 +7.3  
79 82

+60 00 18 55 58 57 51 40 36 335 328 338 36 38 66 96 106 100 94 86 82  
73 56 50 36 33 30 25 19 15 11 11 15 19 34 46 54 62 68 73 77

+6.9  
80

+62 +5.1 0.0 50 52 50 46 34 30 284 278 289 31 33 68 94 98 91 87 84 81  
74 69 54 36 33 30 25 19 15 11 11 15 19 36 46 57 65 71 76 78

931.93

88+50

+60

+65

89

T.P

2.89

932.19

2.63

929.30

+50

90

5.6

5.6 + 5.0 + 4.2 0.0 4.3 4.7 4.6 4.0 2.8 2.7 2.4 2.4 2.5 2.7 3.0 6.8 8.8 9.7 9.4 8.7 8.3  
7.7 7.2 6.7 5.3 3.6 3.3 3.0 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.6 4.5 5.4 6.6 7.3 7.8

5.4 + 5.1 + 3.1 0.0 4.2 4.7 4.6 4.0 2.8 2.6 2.4 2.3 2.4 2.6 2.9 6.8 8.9 9.7 9.3 8.7 8.3  
8.8 7.2 6.5 5.2 3.6 3.3 3.0 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.7 4.6 5.4 6.7 7.3 7.8

1.99

5.4 + 5.2 + 4.2 0.0 4.3 4.6 4.4 4.0 2.8 2.6 2.4 2.3 2.4 2.6 2.9 6.5 9.2 9.4 8.7 8.4  
7.7 7.3 6.7 5.2 3.6 3.3 3.0 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.6 4.6 6.4 7.3 7.8

5.8 + 4.6 + 3.8 0.0 4.2 4.4 4.4 3.9 2.7 2.5 2.4 2.2 2.3 2.6 2.9 6.3 9.9 9.8 8.7 8.6  
7.1 6.9 6.6 5.2 3.5 3.3 3.0 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.4 5.0 6.3 7.2 7.7

+3.6  
-6.8

2.19

+3.1 + 2.6 0.0 4.7 5.0 4.8 4.2 3.0 2.8 2.6 2.5 2.3 2.6 2.9 3.3 7.2 9.8 10.7 10.4 9.5 9.3  
6.6 6.4 5.5 3.6 3.3 3.0 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.6 4.7 5.7 6.5 7.2 7.5

+2.1 + 1.5 0.0 4.9 5.3 5.2 4.4 3.3 3.1 2.8 2.8 2.8 3.2 3.7 6.9 10.2 11.0 11.0 10.1 8.9  
6.5 6.0 5.5 3.6 3.3 3.0 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.5 4.9 5.4 6.2 7.1 7.7

932.19

90 + 50

91

+50

92

+50

T.P.

2.82

927.44

7.57

924.62

93

2.19

13 46.7 20 56 57 58 52 37 35 331 325 333 35 39 80 111 110 101 94  
4 59 56 35 33 30 25 19 15 11 11 15 19 37 52 65 72 76

110 46.6 0.0 58 64 64 44 41 393 385 375 42 46 85 100 113 116 112 101 96  
61 59 57 36 33 30 19 15 11 11 15 19 38 47 53 59 66 74 77

0.7 0.9 66 69 70 63 52 50 478 466 480 5.0 55 8.7 10.9 11.7 11.5 10.6 9.7  
59 56 38 33 30 25 19 15 11 11 15 19 35 50 59 65 71 77

73 30 72 77 78 75 62 60 573 565 575 60 63 8.9 11.2 12.0 11.9 10.6 9.9  
57 53 40 33 30 25 19 15 11 11 15 19 34 46 55 65 73 77

2.19

34 38 81 85 8.7 82 74 70 680 672 680 7.0 7.4 103 116 120 113 102  
55 52 37 33 30 25 19 15 11 11 15 19 38 50 61 69 76

7.112

0.0 0.5 4.7 5.1 5.3 3.6 3.4 3.15 3.08 3.19 3.3 3.6 5.8 7.2 7.4 7.5 6.9 6.4 5.4  
52 50 36 33 30 19 15 11 11 15 19 33 43 53 62 69 75 79

1  
927.44

93 + 50

94

B.M.

5.65

1  
921.79

921.79

+50

95

T.P.

2.36

921.79

8.01

919.43

+50

96

(7.24)

22 35 59 62 67 58 47 44 427 418 430 45 49 69 83 83 83 71 66  
2 50 45 36 33 30 25 19 15 11 11 15 19 30 45 53 64 70 76

52 55 64 74 78 73 66 57 55 534 526 536 55 57 85 89 90 92 79 76 66  
50 47 43 38 33 30 25 19 15 11 11 15 19 33 44 56 62 68 75 79

SPK. in 12" oak 65' Lt. 94 + 25

94 91 91 90 87 78 69 67 646 638 648 68 71 88 98 99 100 87 78 76  
44 39 35 33 30 25 19 15 11 11 15 19 28 39 50 61 65 71 76

+ 55 = 00 R Lt.

+ 90 = 00 R Beg. ditch fill

108 100 101 98 87 79 77 756 747 761 78 81 108 111 110 111  
37 34 33 30 25 19 15 11 11 15 19 33 44 55 65

(1.19)

70 60 53 43 33 31 296 287 298 32 34 63 62 62 65 67  
37 33 30 25 19 15 11 11 15 19 34 42 53 62 64

77 69 62 51 42 40 378 372 378 40 43 71 70 70 68  
38 33 30 25 19 15 11 11 15 19 36 48 60 67

✓  
921.79

96 + 50

97

+50

98

+50

99

T.R.

4.70

↓  
920.87

5.62

9/6.17

1.79

82 72 66 57 49 47 451 443 456 47 5.0 73 75 75 74 73  
39 33 30 25 19 15 11 11 15 19 30 41 53 62 68

92 8.0 74 64 53 52 499 492 5.03 5.2 54 77 79 8.1 78 76  
40 33 30 25 19 15 11 11 15 19 31 43 54 64 68

97 90 84 78 67 57 55 535 529 5.35 55 57 78 8.4 83 81 8.0  
39 35 33 30 25 19 15 11 11 15 19 28 42 56 63 68

101 98 94 89 81 71 6.0 57 551 542 5.49 5.7 6.0 82 90 90 8.3  
40 39 35 33 30 25 19 15 11 11 15 19 30 45 58 69

98 90 82 70 59 57 553 546 552 5.7 6.1 8.6 95 95 94 95 90 8.0  
44 33 30 25 19 15 11 11 15 19 31 41 46 52 60 66 69

+60 = 00 DC 2f.

98+95 = 00 5.11 = 00 DC RT

93 94 94 99 91 85 72 6.0 58 558 550 559 5.7 6.0 8.1 93 97 96 92 86  
44 41 37 35 33 30 25 19 15 11 11 15 19 29 35 47 56 63 67

920.87

99 + 50

100

+ 50

101

+ 50

+ 91 Ent. Lt. 24' x 26' C.M.P. old Mt. ✓

31

12' x 26' x 3' = 35 Cu. Yd. Emb.

Sod 9' x 6' = 6 Sq. Yd. ✓

" 9' x 6' = 6 " " ✓

102

087

80 88 92 93 88 64 52 50 471 462 470 49 52 74 85 91 92 88 83  
43 39 37 35 34 25 19 15 11 11 15 19 29 35 43 48 56 63

75 88 93 90 87 52 50 478 469 478 49 50 78 86 88 87 86 85  
43 38 36 35 34 19 15 11 11 15 19 31 38 43 51 60 63

Note: use shots  
from 50' out on  
Rt. for orig. Ground  
IF Spec. Pit by  
is taken out, from  
99+50 to 102+50

82 83 91 92 92 52 50 485 476 484 50 52 79 82 83 79 76  
44 41 37 35 33 19 15 11 11 15 19 31 42 52 54 68

53 27 75 76 87 89 85 51 486 477 480 52 55 76 79 79 75 74 70  
19 48 43 41 33 3 28 15 11 11 15 19 29 40 50 54 61 62

+45=00 IX RT.

75 83 88 83 54 52 490 485 493 51 53 80 85 86 86 83  
41 34 31 29 19 15 11 11 15 19 32 40 49 57 64

73 80 90 92 90 79 66 56 52 506 491 499 52 54 78 91 95 92  
41 36 33 32 31 28 25 19 15 11 11 15 19 29 37 53 63

920.87 ✓

102 + 50

TP

7.07

920.59 ✓

7.35

913.52

103

+50

104

Relay

→ 12' old!

+16

± 14' x

66' S.C.C.

54' New!

+50

Soil 9' x 7' = 75 sq. yd!

" 9' x 7' = 7 " " !

105

67

0.87

7.8 8.0 8.8 9.0 8.6 6.2 5.5 5.3 5.0 4.9 4.5 0.3 5.2 5.5 7.9 9.6 10.0 9.8  
4.3 4.1 3.7 3.4 3.1 2.3 1.9 1.5 1.1 1.1 1.5 1.9 2.9 4.0 6.2 6.5

Neel Mark w. End 24' C.M.D Lt. 101 + 75 June - 1 1913

0.89

7.6 8.7 8.7 8.4 7.3 5.3 5.1 4.8 4.7 4.8 5.1 5.2 9.1 10.6 11.1 12.8 10.5  
4.3 3.6 3.4 3.2 2.8 1.9 1.5 1.1 1.1 1.5 1.9 3.4 4.3 5.1 5.8 6.3

7.5 7.9 8.7 8.8 8.5 7.0 5.4 5.1 4.8 4.7 4.9 5.2 5.6 8.9 11.2 12.0 11.7 11.4  
4.4 4.0 3.6 3.3 3.1 2.6 1.9 1.5 1.1 1.1 1.5 1.9 3.3 4.2 5.0 5.6 6.1

7.1 7.7 8.6 8.7 8.4 7.3 5.3 5.1 4.7 4.8 4.9 5.2 5.2 9.4 11.0 11.7 11.9 11.7 11.4  
4.4 4.0 3.7 3.4 3.0 2.7 1.9 1.5 1.1 1.1 1.5 1.9 3.7 4.3 5.0 5.6 6.0 6.4

11.53

9.16

28'

10.31

7.6 7.9 8.1 7.6 5.1 5.1 4.9 4.8 4.9 5.0 5.2 5.6 8.5 11.3 11.6 11.6 11.1  
4.2 3.7 3.3 2.9 1.9 1.5 1.1 1.1 1.5 1.9 3.3 4.4 5.6 6.2 6.5

38

+90=00 rx Lt

0.89

8.0 8.0 7.6 5.8 4.9 4.8 4.7 4.6 4.6 4.8 4.9 8.2 11.4 12.1 12.2 11.4  
4.5 3.9 3.2 2.5 1.9 1.5 1.1 1.1 1.5 1.9 3.4 4.4 5.4 6.0 6.5

✓  
920.59

105 + 50

$$+54.0 = 105 + 54.4$$

T.P.

6.17

922.34

1.12

916.17

B.M.

4.48

917.96

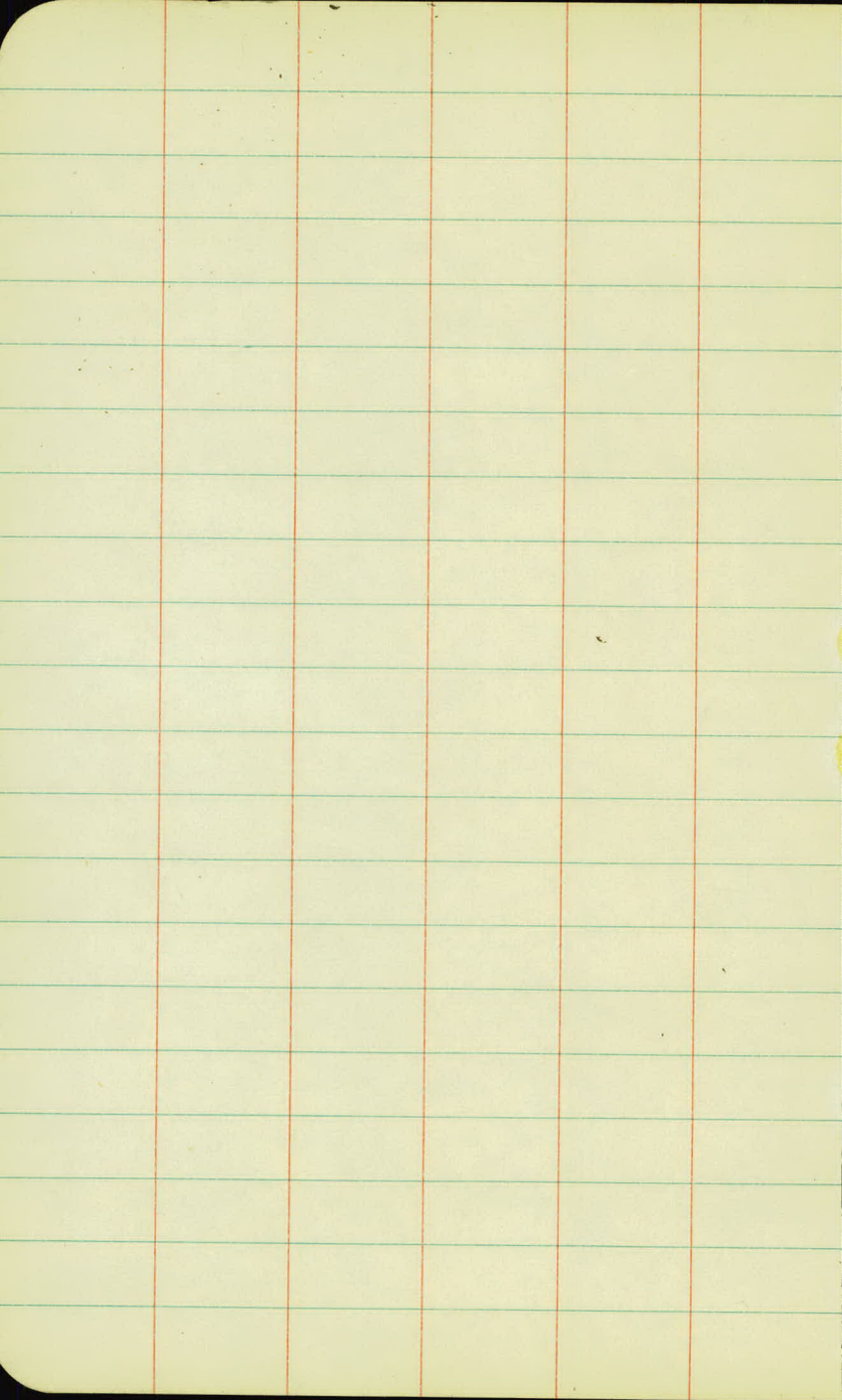
917.91

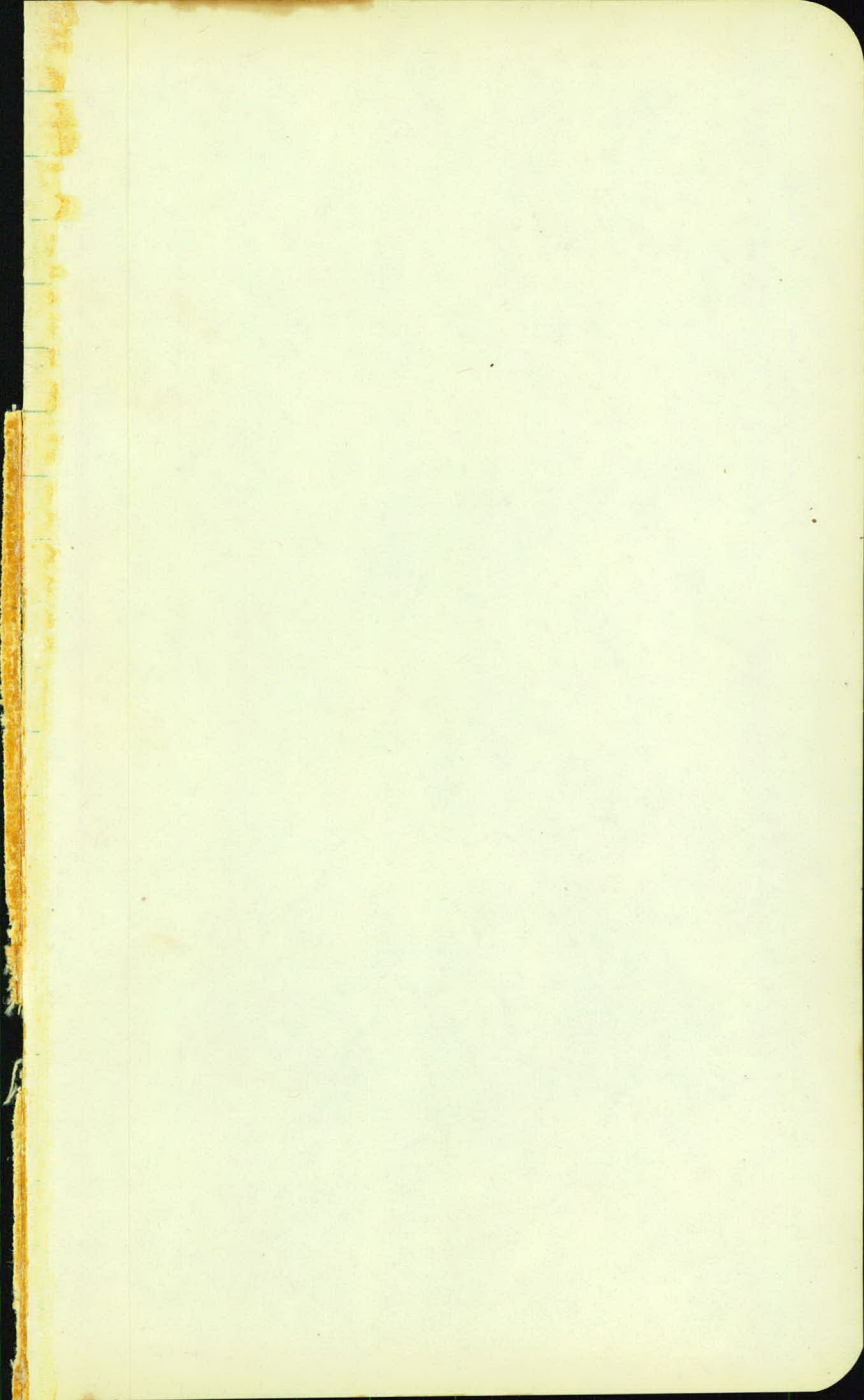
0.59

37 37 37 38 38 37 37 378 38 39 45 4.7 49  
52 46 32 19 15 11 11 15 19 31 43 52

258 361 367 369 372 373 376  
48 30 11 11 29 48

SPK. 14 TEL. P. 31' RT. 108 + 19





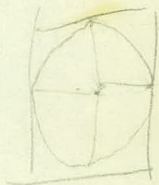
120 S Black Top Cleveland

87 n

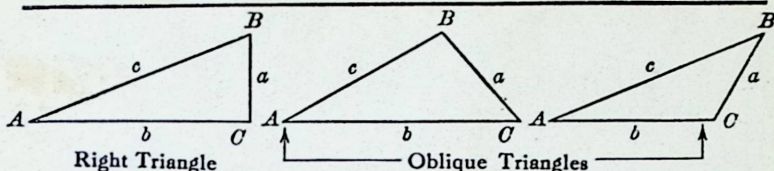
$$\frac{90}{360} \times 3.1414 \times 42^2 =$$



$$\begin{aligned} & \left(\frac{d}{2}\right)^2 \times \pi \times \frac{h}{2} \\ & \frac{d^2}{4} \times 3.1416 \times \frac{h}{2} \\ & \frac{d^2}{4} \times 7.854 \\ & (42)^2 \times (84)^2 \end{aligned}$$



# TRIGONOMETRIC FORMULÆ



Right Triangle

Oblique Triangles

## Solution of Right Triangles

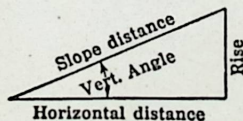
For Angle  $A$ .  $\sin = \frac{a}{c}$ ,  $\cos = \frac{b}{c}$ ,  $\tan = \frac{a}{b}$ ,  $\cot = \frac{b}{a}$ ,  $\sec = \frac{c}{a}$ ,  $\operatorname{cosec} = \frac{c}{a}$

Given	Required	Formulas
$a, b$	$A, B, c$	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
$a, c$	$A, B, b$	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
$A, a$	$B, b, c$	$B = 90^\circ - A, b = a \cot A, c = \frac{a}{\sin A}$
$A, b$	$B, a, c$	$B = 90^\circ - A, a = b \tan A, c = \frac{b}{\cos A}$
$A, c$	$B, a, b$	$B = 90^\circ - A, a = c \sin A, b = c \cos A$

## Solution of Oblique Triangles

Given	Required	Formulas
$A, B, a$	$b, c, C$	$b = \frac{a \sin B}{\sin A}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$
$A, a, b$	$B, c, C$	$\sin B = \frac{b \sin A}{a}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$
$a, b, C$	$A, B, c$	$A + B = 180^\circ - C, \tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$ $c = \frac{a \sin C}{\sin A}$
$a, b, c$	$A, B, C$	$s = \frac{a + b + c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$ $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}, C = 180^\circ - (A + B)$
$a, b, c$	Area	$s = \frac{a + b + c}{2}, \text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
$A, b, c$	Area	$\text{area} = \frac{bc \sin A}{2}$
$A, B, C, a$	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

## REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle =  $5^\circ 10'$ . From Table, Page IX.  $\cos 5^\circ 10' = .9959$ . Horizontal distance =  $319.4 \times .9959 = 318.09$  ft. Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle) With the same figures as in the preceding example, the following result is obtained.  $\cos 5^\circ 10' = .9959$ .  $1 - .9959 = .0041$ .  $319.4 \times .0041 = 1.31$ .  $319.4 - 1.31 = 318.09$  ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft. slope distance = 302.6 ft. Horizontal distance =  $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$  ft.