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LOCATION  
of  
WABASH-M. K. & T. CUT-OFF.  
at  
COLUMBIA, MISSOURI.  
by  
D. E. Hill  
and  
C. S. REAGAN. (22)

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A T H E S I S  
for the  
DEGREE OF BACHELOR OF SCIENCE  
In Civil Engineering.

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UNIVERSITY OF MISSOURI  
DEPARTMENT OF ENGINEERING.

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Thesis "Wabash-Edwards Brick Yard Connection"--Harrah,

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Baker's Masonry Structures.

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INTRODUCTION.

The object of this investigation is to determine the best and cheapest route connecting the Missouri Kansas and Texas R. R. with the Wabash R. R. Such a connection, we believe would be feasible because of the amount of freight to be transferred from one road to the other. A complete estimate of the cost of construction has been made and the reasons set forth, for the selection of the final route.



METHOD OF TREATMENT OF THE SUBJECT.

In making the reconnoissance between the M. K. & T. R. R. and the Wabash, it was decided to connect on the M. K. & T. at the point where it is north of Broadway and on to the Wabash at the Nifong ice plant or a little farther north. It was thought that the line could be run near Flat Branch and in that way use property of little value.

A line of levels was run starting from a B. M. on the steps of the Colored Church, located on Broadway, and the difference in elevation was found to be about 50 feet between the nearest points with which we could connect. This showed us that the line must have a rather high grade.

The part of the town thru which we wished the line to go was occupied by little houses, mere shacks, and barns and to compare different routes, it was decided to make a detail topographic map of that section and to make the locations on paper. The





topography for this map was taken with a transit and stadia and the contours on the map, that the estimates were made from, were placed one foot apart in elevation.

The first two trial locations were made as near Flat Branch as possible and connected with the Wabash at the Nifong ice plant. These were the shortest routes that we could get. The profiles were then made and a continuous grade drawn connecting the two terminal points. This showed that a heavy embankment was necessary except for about four hundred feet near the M. K. & T. end.

Another problem presented itself at this point. From the profiles we found that a heavy fill was necessary at the points where the lines crossed the two paved streets, Eight and Tenth. The height of the track above the street grade was not great enough so we could make an over-head crossing and if we crossed on an embankment the entire grade of the street would have to be changed costing a great amount of money. After carefully considering the matter we decided to bring the line



to the grade of the street if possible.

Three more trial locations were made with their profiles. Each of these was made a little farther up the hill than the one before it. These locations were very much better as regards the cuts and fills. The grade of the line could be varied so as to cross the paved streets at grade. These locations, while being better in this respect, went through property that is much more valuable.

To remedy this, it was decided to make a sixth location and to use the city streets as much as possible for the right of way. This was done and a line found that destroyed very little property but on which a 2% grade was required for a short distance in order to cross the paved streets at grade. This line was chosen as the one most feasible.

The grades chosen were as follows:- From Sta. 0 to Sta. 15, 1.40%; from Sta. 15 to Sta. 24, 0.78%; from Sta. 24 to Sta. 31, 2.00%; from Sta. 31 to Sta. 38, where the line joins the Wabash R.R., a 1.50% grade.



Having decided upon the location of the line and fixed the grade all that remains is to make an estimate of cost of such a line.



ESTIMATE OF COST.

Right of Way.

2 Houses and Lots facing Rigers St. @ \$3,000	6,000.00
1 House and Lot on 10th St.	5,000.00
Damage to property on 10th St.	2,000.00
Vacant Lots on 9th St.	2,000.00
House on 8th St.	3,000.00
Damage on Lyons St.,	1,000.00
Property and Damages on 5th St.	3,000.00
Property and Damage	<u>3,000.00</u>
Total Cost of Right of Way.	* <u>25,000.00</u>

Bridge.

End Walls and Coping.	
24 Cu yds Masonry @ \$20.00	480.00
Arch including Side Walls and Backing	
50.0 cu yds @ \$20.00	1,000.00
Concrete for Foundation.	
35 cu. yds. @ \$6.00	180.00
Cobble for Flooring.	
25 Ft. @ \$2.00	<u>50.00</u>
Total Cost of Bridge	<u>1,710.00</u>





Track in Place Complete.

Rails

83.6 Tons of 65# rails @ \$28.60 \$ 2390.96

Angles

140<sup>prs.</sup> angles @ \$1.20 288.00

Bolts & Nuts.

1920 bolts and nuts @ 2 1/2¢ 48.00

Spikes

3850 lbs spikes @ 2¢ per lb. 77.00

Cross-Ties

1950 cross-ties @ 70¢ 1365.00

Ballast

1960 cu. yds. gravel ballast @ \$.40 784.00

Lumber for Crossing.

720 Bd. Ft. @ \$22.50 per M. 16.10

Total Cost of Track

\$ 4968.96

Miscellaneous Expenses

Vitrified Pipe.

200 ft. 6" Pipe @ \$.10 20.00

Fencing.

2000 Ft. Wire netting @ \$.04 80.00

Cattle Guards.

5 sets @ \$5.00 25.00

Labor

2000.00

Engineering and Administration

1600.00

Legal and Genreal Expenses

2000.00

Total Cost of Miscellaneous Expenses

\$ 5725.00



SUMMARY OF COST.

Right of Way	\$ 25,000.00
Bridge	1,710.00
Track in Place	4,968.96
Miscellaneous Expenses	<u>5,725.00</u>
TOTAL COST	\$ <u>37,403.96</u>





ESTIMATE OF QUANTITIES.

FINAL LOCATION.

Sta.	Cut	Fill	End Sect.	Exc. Cu. Yds	Emb. Cu. Yds.
0	0			15	
1	0.4		8	26	
2	0.3		6	113	
3	2.5		55	324	
4	4.8		120	426	
5	4.3		110	389	
6	4.0		100	196	
7	0.3		6		270
8		7.0	140		415
9		4.2	84	117	116
10	1.2		27	96	
11	1.0		25	54	
12	0.2		4	7	
13	0.0		0		46
14		1.0	25		93
15		1.0	25	25	24
16	1.2		27	139	
17	2.0		48	179	
18	2.0		48	179	
19	2.0		48	179	
20	2.0		48	163	
21					



Sta.	Cut	Fill	End Sect.	Exc. Cu. Yds	Emb. Cu. Yds.
21	1.8		40	131	
22	1.4		31	168	
23	1.2		27	120	
24	1.6		36	90	
25	0.6		12	22	
26	0.0		0	22	
27	0.6		12	22	
28	0.0		00	22	
29	0.0		00	00	
30	0.4		8	15	
31	1.4		31	72	
32	1.8		40	131	
33	2.2		50	167	
34	2.2		50	148	
35	2.2		50	148	
36	1.8		40	167	
37	1.4		31	131	
38	1.0		22	98	
Total				<u>4149</u>	<u>964</u>



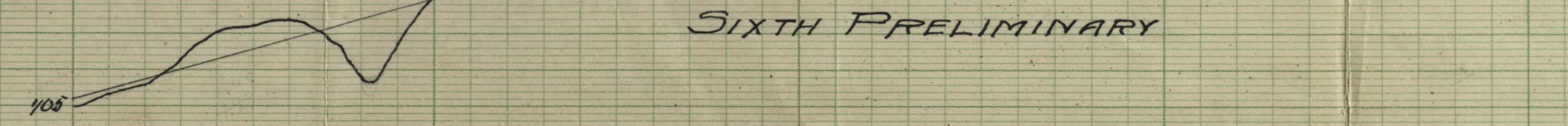
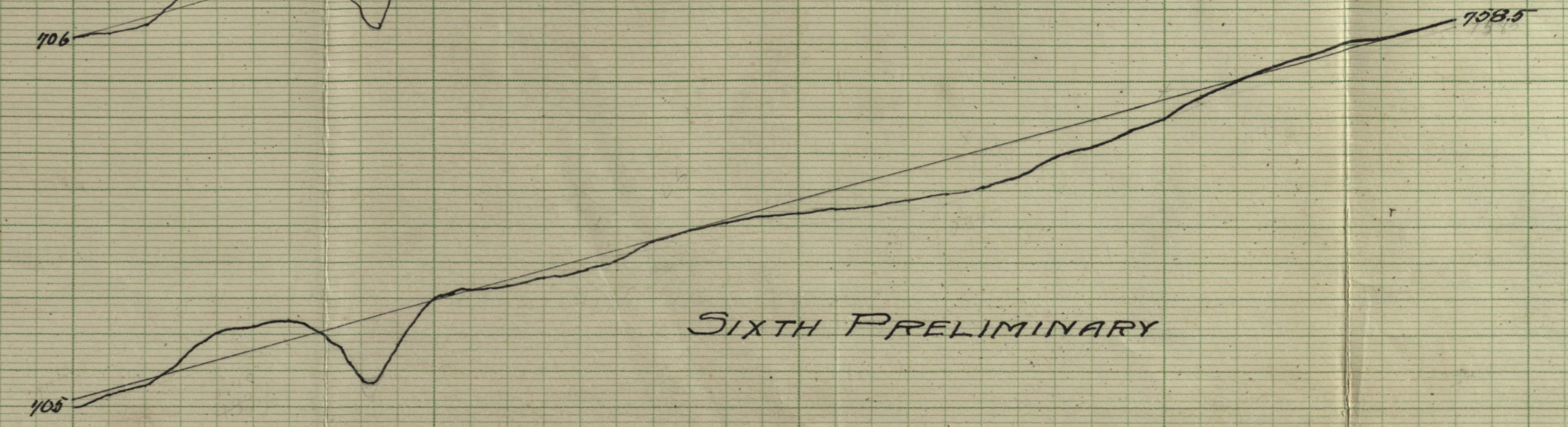
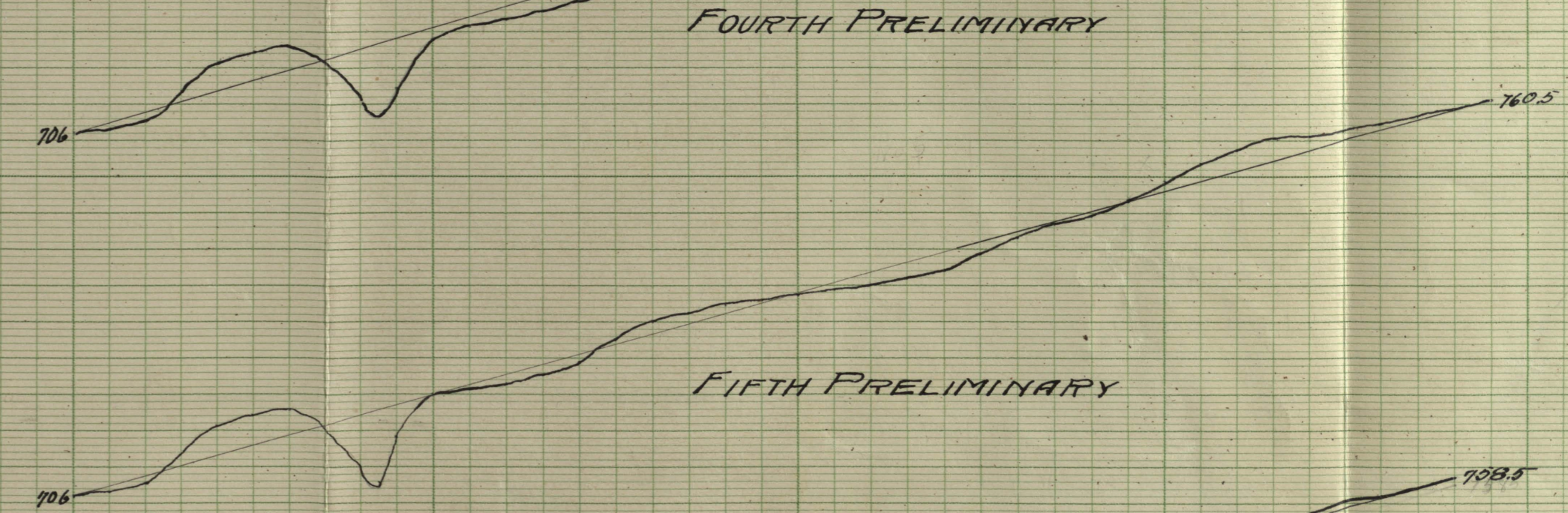
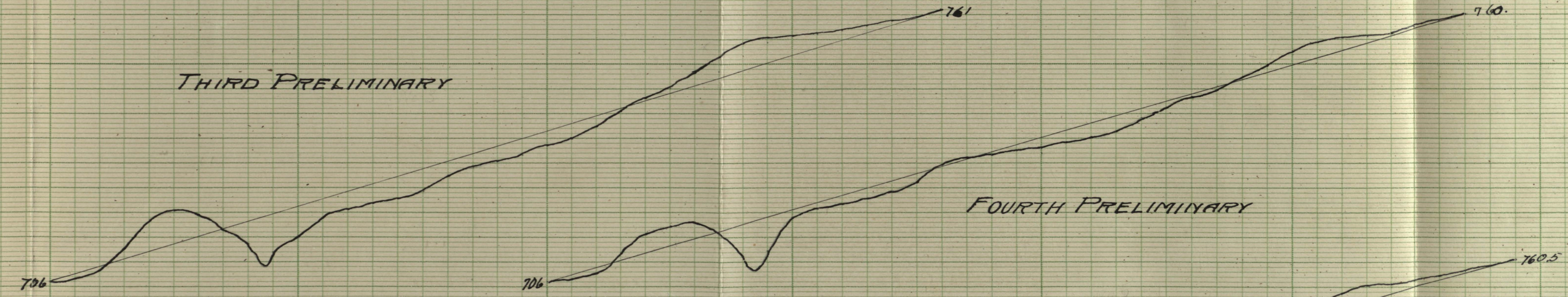
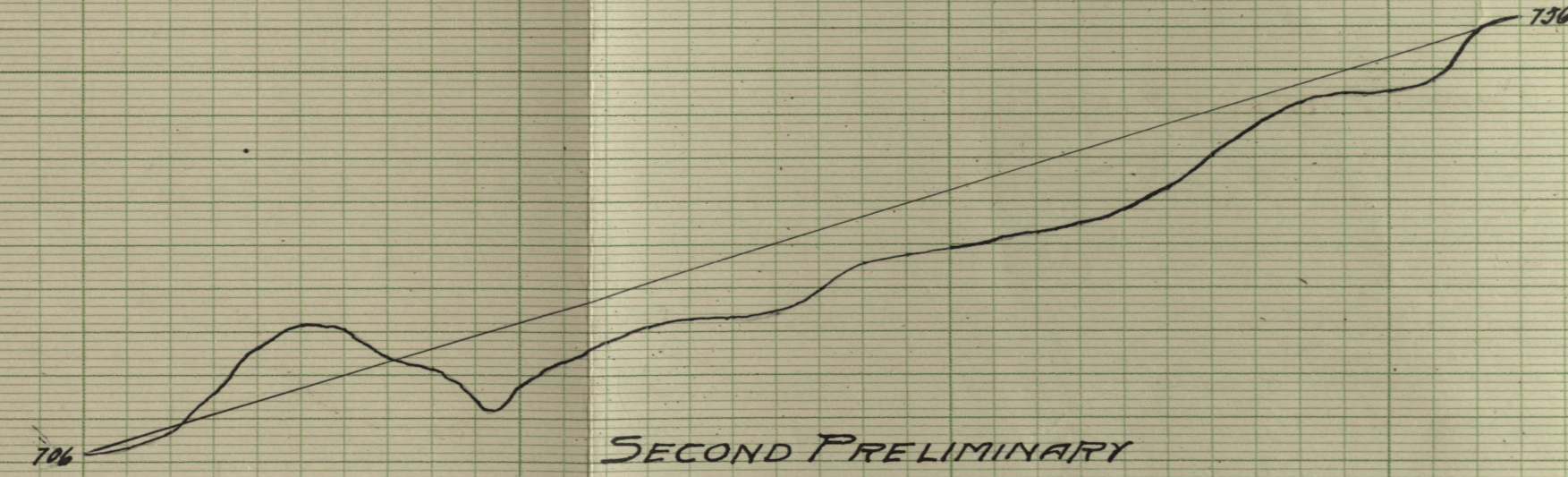
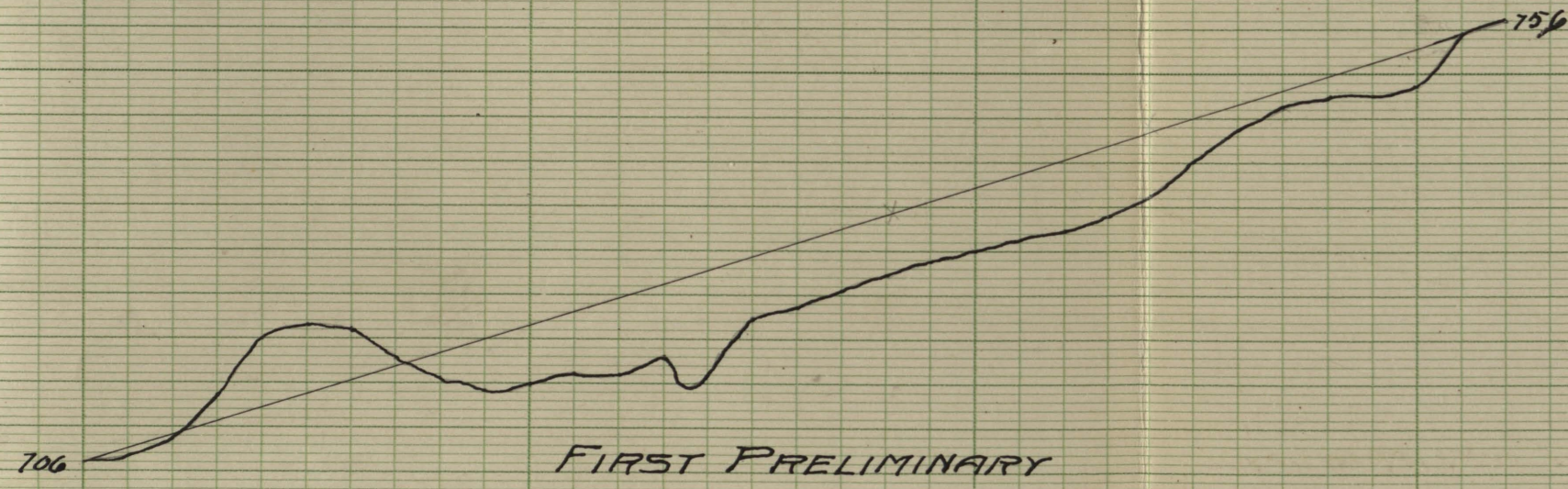


CONCLUSION.

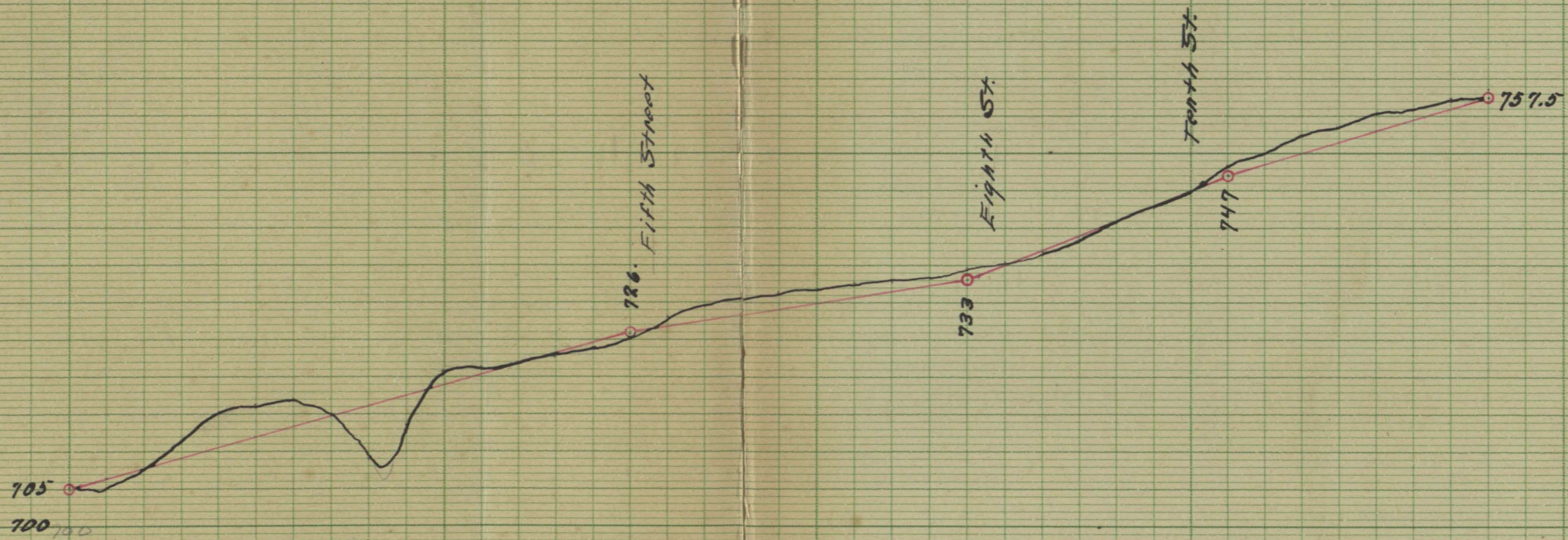
In making a comparison of the six possible locations, all were eliminated except the last one. The line of all others passed through that part of town occupied by valuable residences or on ground that would cause the height of embankment necessary to make the cost too great for such a cut-off, as the maps and profiles show.

In order to locate this last route, it is necessary to condemn some valuable property, but the cost of locating the line on the grade of the streets otherwise lowers the cost so that this is by far the most practicable and economical route.

The estimate as made shows the cost as it would be at the present.

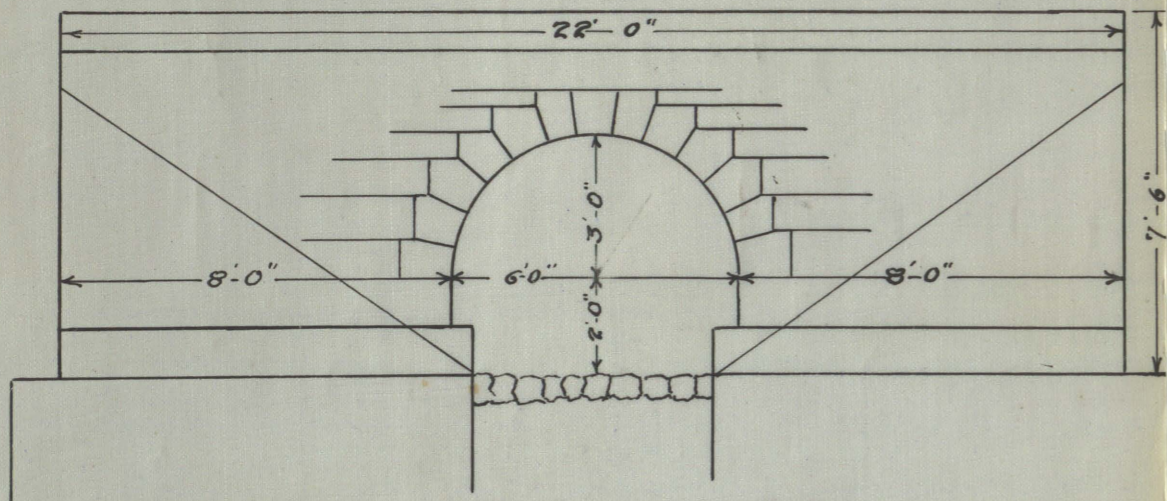


PRELIMINARY LOCATION  
 PROFILES  
 WABASH-MK<sup>3</sup>/<sub>10</sub>T CUT-OFF  
 THESIS '10  
 C.S. REAGAN DE. HILL

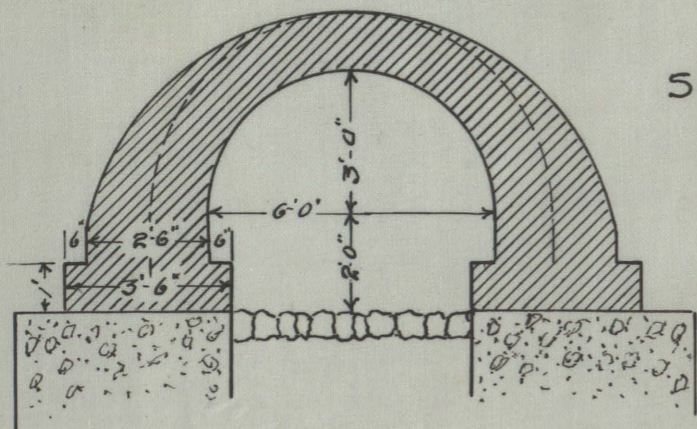


LOCATION PROFILE  
 WABASH-M.K. <sup>10</sup>/<sub>100</sub> T CUT-OFF  
 THESIS 1910

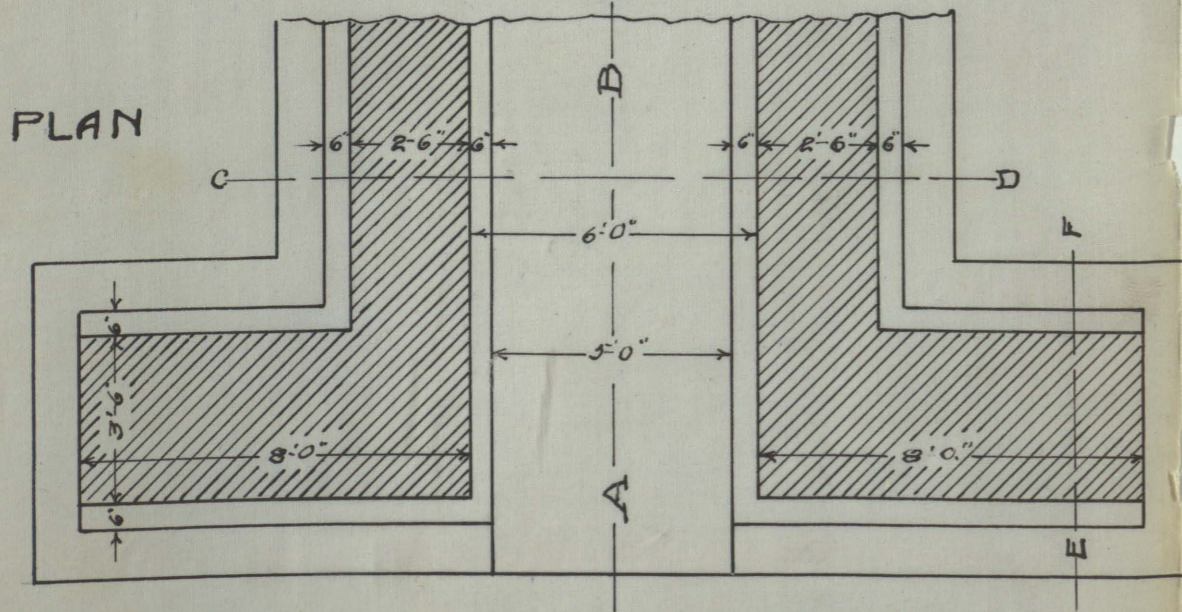
C. S. TREAGAN      D. E. HILL



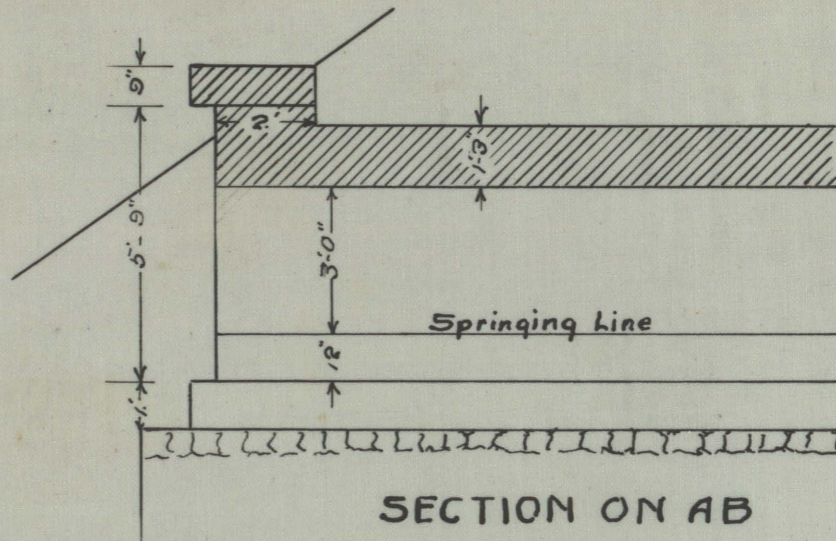
ELEVATION



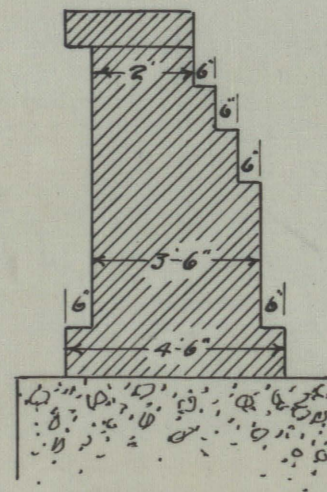
SECTION ON CD



PLAN



SECTION ON AB



SECTION ON EF

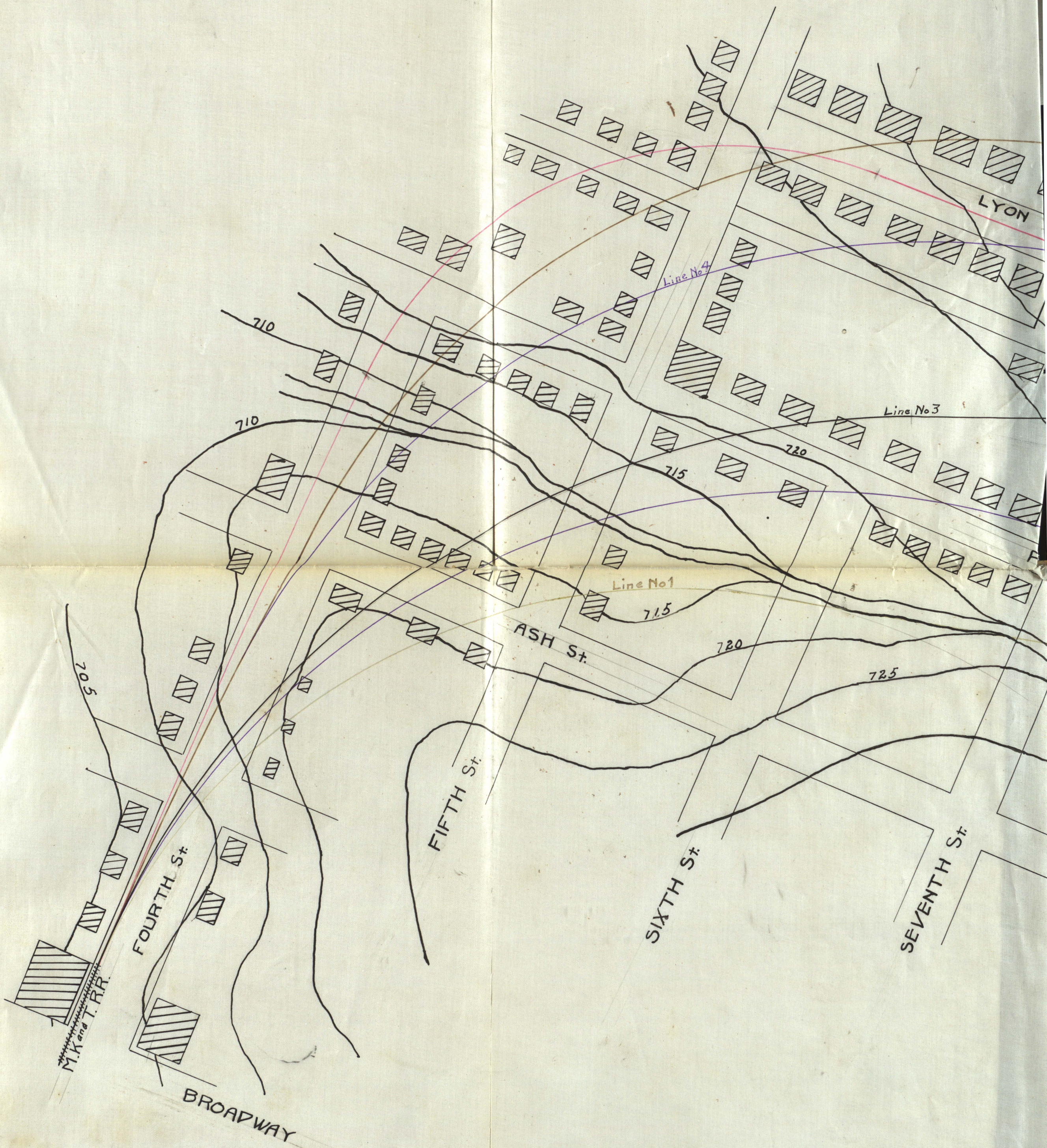
SIX FOOT ARCH CULVERT  
OVER  
FLAT BRANCH  
WABASH-M, K, <sup>2ND</sup> T TRANSFER TRACK

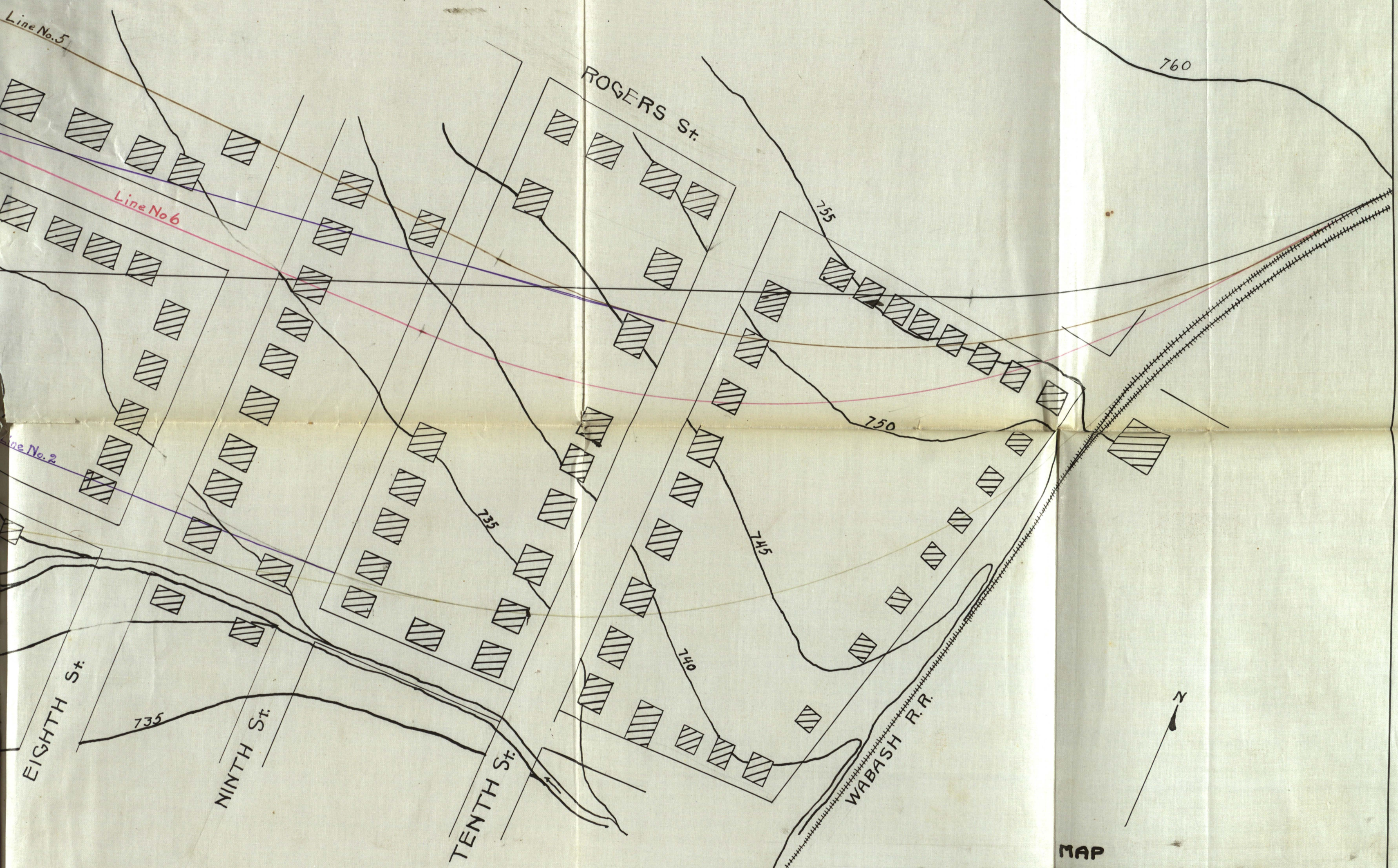
THESIS 1910

D.E. HILL

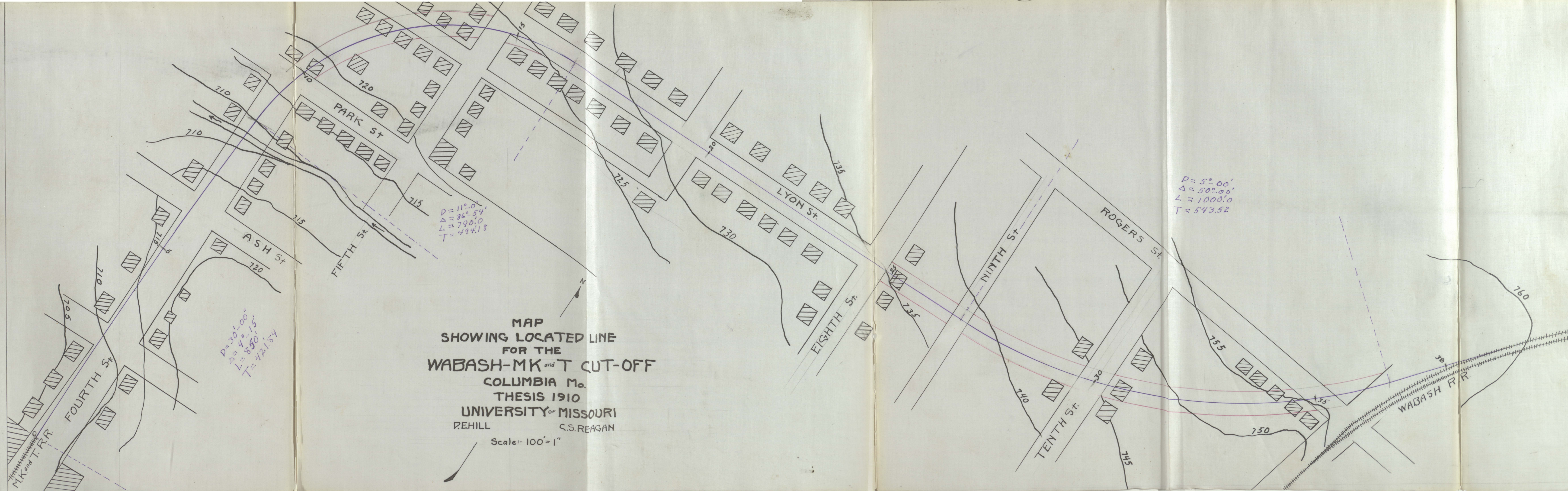
C.S. REAGAN

Scale 1" = 4'





MAP  
SHOWING PRELIMINARY LINES  
FOR THE  
WABASH - MK<sup>and</sup> T CUT-OFF  
COLUMBIA MISSOURI  
THESIS 1910  
UNIVERSITY of MISSOURI  
D.E.HILL C.S.REAGAN  
Scale: 100' = 1"



MAP  
SHOWING LOCATED LINE  
FOR THE  
**WABASH-MK and T CUT-OFF**  
COLUMBIA Mo.

THESIS 1910  
UNIVERSITY OF MISSOURI  
REHILL C.S. REAGAN

Scale: 100' = 1"

$D = 30'-00''$   
 $\Delta = 4^\circ-15'$   
 $L = 830'-15''$   
 $T = 421.84$

$D = 11'-0''$   
 $\Delta = 36'-54''$   
 $L = 790.0$   
 $T = 494.18$

$D = 5'-00''$   
 $\Delta = 50'-00''$   
 $L = 1000.0$   
 $T = 543.52$

**LIBRARY ANNEX**





