Thesis.

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Methods and Results in the Subdivision of Unimproved Land for Residence and Farming Exploitation. With Illustrating Drawings Attached.

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Respectfully submitted in application for the Degree of Civil Engineer

to

The Virginia Polytechnic Institute,
Blacksburg, Virginia.
June, 1912.

By
H.M.Trenor,
Graduate Student and Student Assistant
in the Civil Engineering Department.

Respectfully forwarded through the approval of Col. R.A.Marr, Dean Engineering Dept.

And

I certify on honor that the within work has been done individually by me .

(Signed) H.M.Trenor.

Approved and respectfully forwarded to
Dr.P.B.Barringer, Pres't
Virginia Polytechnic Institute,
Blacksburg, Virginia.

June 5th, 1912.

Dean Eng.Dept.

W.N.E. 6-26-'35

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To

Prof R. A. Marr C.E.

Dean of the Engineering Dept.,

of the

Virginia Polytechnic Institute

as Thesis

for

Degree in Civil Engineering

Until recent years land development projects were unheard of from an engineering standpoint. To day there are many in all parts of the United States. It has been quite a money making project in the west for several years. Now it has begun to reach the East as well as the South.

It Consists in buying all the available land that the promoters are able to obtain and subdividing it up into smaller units or tracts and seeing it for truckning or orchard purpose.

The first thing to do is to take options on all the land that is wanted in the mean time attorneys are employed to look up all the titles of land under option to see that they are good This is done by in a reasonable time during this time parties are put in the field to make surveys of the property under option and a complete set of notes are obtained these are plotted up in the office into one Consolidated map this showing the entire project giving acreage also timber and cleared land all roads are located buildings are located and in rugged country

topography is taken and plotted up showing exactly the elevation of the land the rivers and streams. Since the promoters know their exact acreage they have, the amount of clearing there is to do they can have a good idea as to how much they can pay per acre of land. The land being purchased then it necessary to organize a sales department to bring in customers and prospective buyers by doing this it becomes necessary to have certain contracts which are signed by both seller and buyer and deposited with some trust company until the expiration of their contract and at then end of this if the firm can deliver the land fulfilling the contract the buyer then owners the land at the same time the firm makes buyer a deed for so many lots in such a section. The general map being made and recorded in record books of the Court. giving metes and bounds of each lot.
These lots are in nearly all cases to have as much frontage on a road with say 10% as a maximum grade. These roads are giving some local name so that the roles as well as the field men can distinguish

them at once.
There is also "Villa Sites" layed out a lot in the villa Site is given away with every lot that is purchased they are usually 50 by 100 feet.
The Roads are the next thing to be located and it is a very different proposition sometimes to locate them in rugged Country.
After the roads are located it is in many cases Changes the original location and dimentions of the lots.
There is three or four roads located and built on the property as soon as operation are started so as to bring the prospective buyers over the property.
Parties of prospective buyers are gotten up by some salesman in some City like New York or Philadelphia possible a dozen at one time and shown over the property.
The firm has an entertainment house on the property where they entertain the guest while they are on property.
So much for the general analysis of the proposition we will return to the engineering department
The engineering department consists of a Chief Engineer, about four Transitmen, a Draftsman, Chainmen rodmen and laborers.

The sales department consist of about four or five salesman
The operating department consists of a general Superintendent Chief Clerk, Auditor, Purchasing agent for the Commissaries Bookeeper, and three or four time keeper, according to the size of operations.
The General Superintendent has charge of all the operations - directs the operating department recommends any changes that are to be made in any department and is consulted in all important propositions.
The Chief Engineer has sole control of all the engineering work both office and field and may consult the General Superintendent on any changes he desires to make.
The work of the Engineering depart. is to make all surveys of property layout all roads and lot lines.
In the surveys of the old lines where it has not been surveyed for 50 or 100 years it is very difficult to follow out the old lines as they were possible measured by a grape vine or rope and the bearing were those of a compass and when a transit is used to retrace the old lines it proves very difficult many times when the property is platted up it overlaps which is due to the crude manner in which it was original surveyed.

In many cases no closing line is given in the description, the closing of a survey is worded thus (thence by a straight line to the beginning.
This is plotted up and found if it checks out if it does not it is run then replatted calculated by latitudes and departure. The different tracts of land are joined together on one map or section map.
Then the roads are run and connected on the plat to some station so it can be plotted upon the section map. This being done the side lines of the road are next plotted which are 15 feet from the center line making the width of the road bed 30 feet.
The next thing to be done is to calculate the side lines of the roadway.
This is done by knowing the distance on center line of the two hubs and the bearings of the two lines which intersect at the hub or the deflection angle stating whether it is right or left. Knowing the deflection angle take half of it and find the natural tangent for half the deflection angle and with 15' as half the distance of the roadway. Then can calculate how much is to be added or subtracted to the side line

Station	dist	Left	Tan	Right	Def Angle	L or R	Remarks
4+95.8	199.6	197.98	19	201.77	1°-27	L	
6+95.4	234.5	236.21	1.73	233.79	10°-50	L	
9+29.9	93.6	93.98	3.14	93.32	23-39	R	
10+35.5	293.1	290.76	2.86	295.44	21-26	L	
13+16.6	673.0	675.77	.52	670.33	4°01	R	
19+89.6	172.1	172.67	2.15	171.52	16°-21	R	
21+61.2	991.1	990.42	1.58	993.38	13°-02	L	
31+53.6			.10		0°-45		

Having computed the side lines
the next step is to transfer the
lots as shown in tracing to a book
which is kept for each section
as shown in figure I
The side lines are recorded on the
sketch the stations and calculated bearings
and bearing of the lot lines
Knowing the bearings of the road
and side lines which are parallel and
the bearing of the lot lines. Then from
a traverse table triangles are computed
which the depth of the lot are computed
from this gives the dimensions of
the lots which is given to the field
parties and they lay out each lot
separately.
If the lot is in forest and the
Contract Calls for 5 acres to be
Cleared it becomes necessary to
to run Clearing lines on the lots
this usually done on a list of lots
possible as many as Thirty lots
It also becomes necessary to calculate
the intersection of lot lines and
side lines of the road which means
the solution of a right triangle.
The distance from some hub is measured
and an angle turned that will
give the bearing of a lot line
and the distance which is the cosine
of the angle of intersection and with
½ feet half the width of roadway
the distance to intersection lot

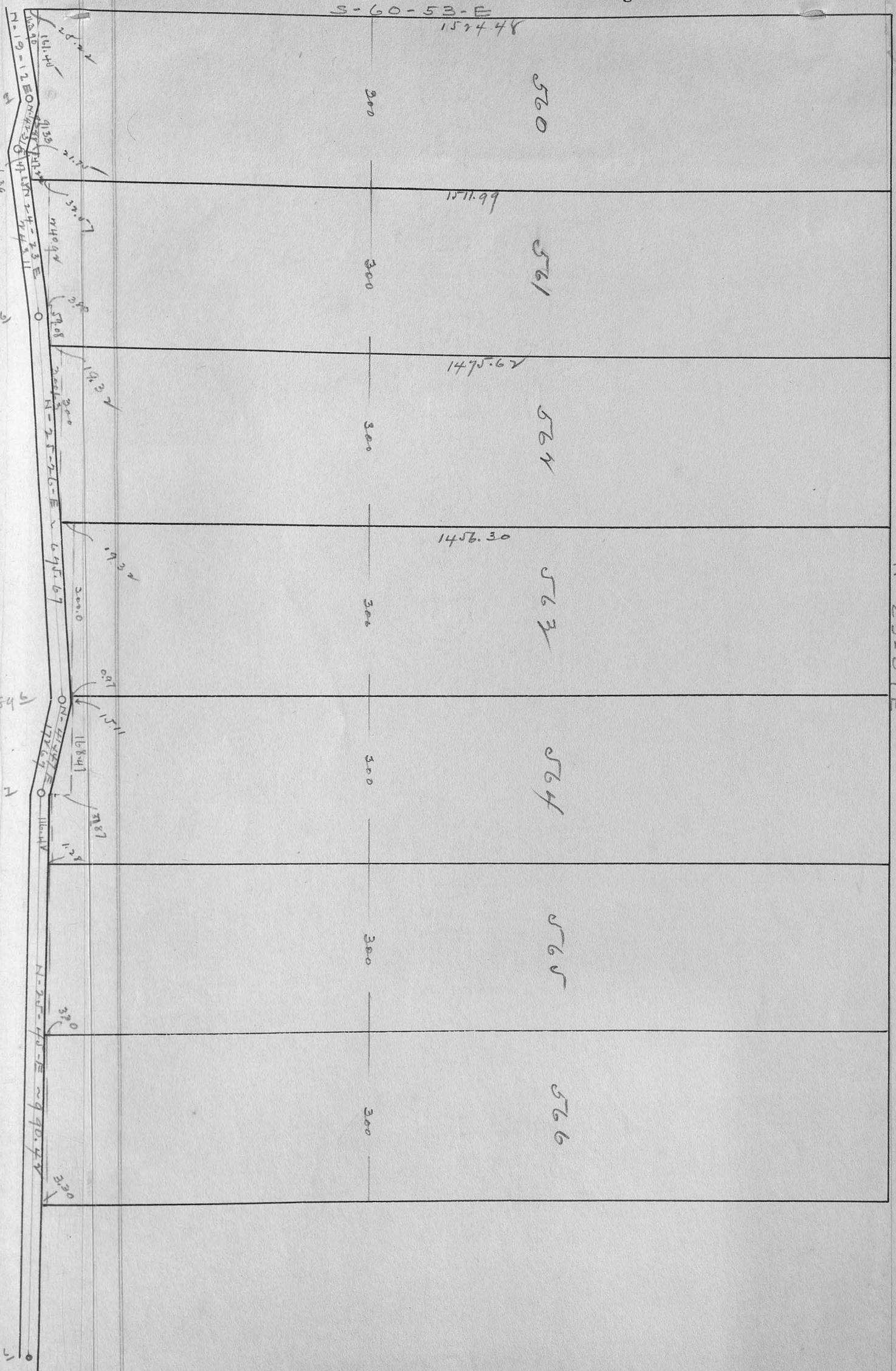
line and side line can be calculated and measured.

Clearing lines being run a clearing force is put to clearing the lots are cleared and burned where there is clearing to do. It cost from $30 to $40 acres to clear and burn an acre.

Then base lines are run and stakes are set for trees. The trees are staked from 30 to 40 feet apart, this is followed by setting the trees.

A record of the number of feet of roads the number of feet clearing lines, the number of feet of lot lines and the number of tree stakes that are set in a book for each month. Also in a similar book is kept a record of No of lots are numbered, the ones are cleared, burned, logged and staked. The Horticulture department then takes the trees into care for five years at the end of that time they are turned over to the purchaser.

Fig I


S-60-53-E
1524.48
560
300
1511.99
561
300
1475.62
562
300
1456.30
563
300
564
300
565
300
566
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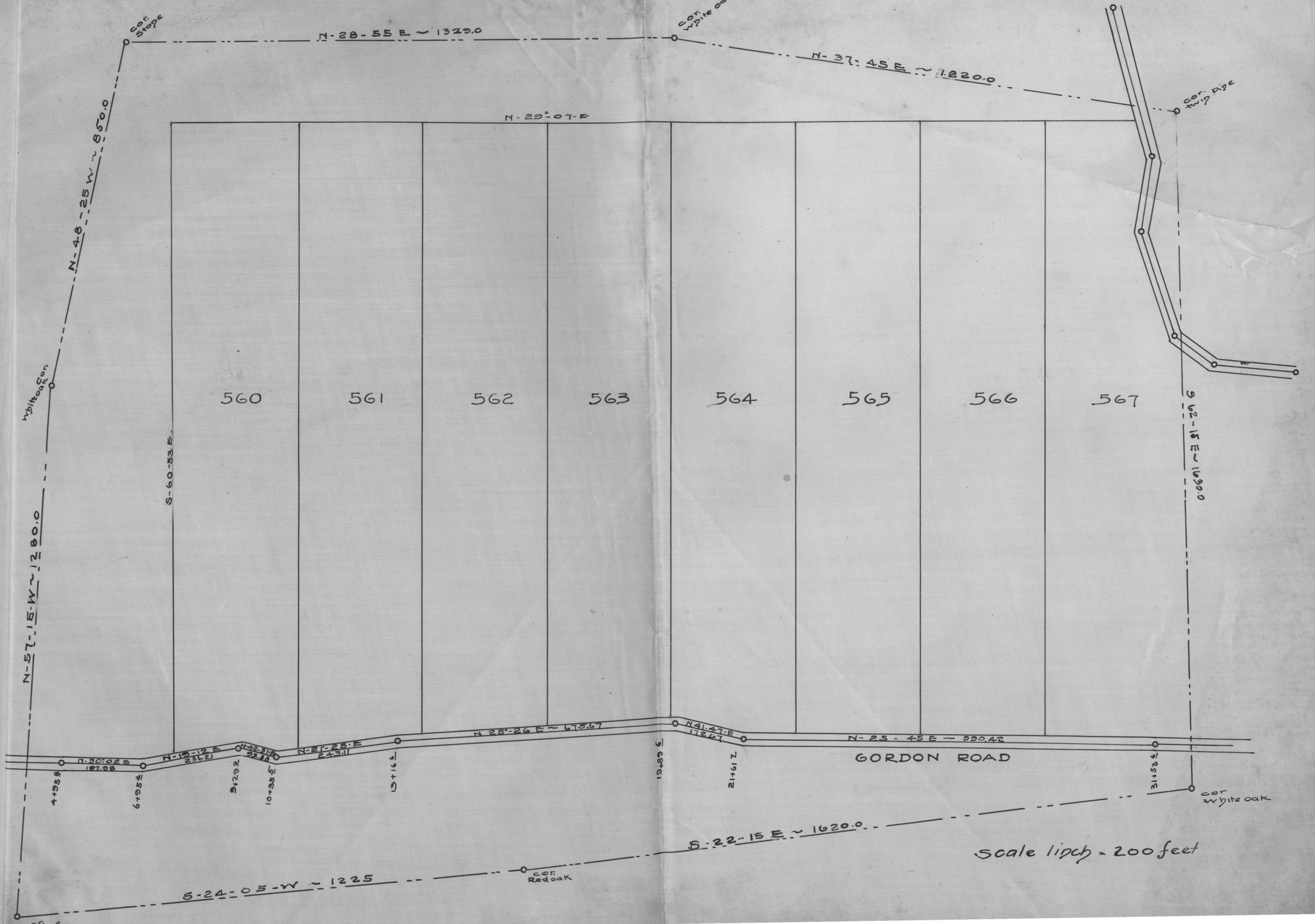
N-19-12E
N-25-26-E ~ 675.67
N-25-45-E ~ 990.42

THE GORDON FARM



Scale 1 inch = 200 feet