GOVERNMENT OF BRITISH COLUMBIA

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MEMORANDUM

TO: Mr. V. Raudsepp
..ef Engineer
Water Investigations Branch

FROM: Mr. J. Foweraker
Geological Engineer
July 15th 19 64

SUBJECT: Ground-Water Test Drilling
Nechako Improvement District

OUR FILE: 0242686

YOUR FILE:

Selection of Test Well Sites

On the basis of available information from well logs and Mr. Livingston's field notes, I would recommend that the three well sites proposed in the drawings accompanying the recent report by Messrs. Allan W. Kerr & Associates, are suitable for inclusion in the proposed test drilling program . These three well sites are located on the attached illustrations and designated as Test Wells Nos. 1, 2 and 4 in this memo.

Besides these three test well sites, I would suggest that the Nechako Improvement District Trustees also arrange to obtain at this time easements for three additional sites. These test well sites should be selected where practical, somewhere near to the following locations:

(1) Test Well No. 3 (alternative site #1), near to the Esso Service Station which is located on Lot 7, Plan 9085, D.L. 4377 in Improvement District area B.

(2) Test Well No. 3 (alternative site #2) near to the Schell Motel Court, Hart Highway, which is located on the undivided part of the East ½ of D.L. 2424, outside the northern boundary of Improvement District Area "C". (The exact location of this motel is not known but a legal description could be obtained from the Assessor's Office, Prince George).

(3) Test Well No. 3 (alternative site #3) 1000 feet north of the proposed 100,000 gallon woodstave storage tank located on the undivided part of D.L. 4048 (east ½) southwest of the Improvement District Area "C". The actual site location could be selected in the field when required. Alternative Site #3 is located outside the boundary of Area "C", and if the well was successful and was utilized by the District, it would mean an additional cost to them of approximately $4,400.00 for 1,000 feet of 8-inch C150 A.C. pipe ($4.40 per foot) to connect the well up to the proposed storage tank.

It should be noted that as information becomes available from the drilling logs of the test wells, it may be preferable to select some alternative site to those suggested here. Information on the availability of water for drilling is not known at this time.

2 . . . . . .

Estimate of Costs for Three Test Wells

(For details see additional notes on the proposed test drilling program, attached).

Although the information on the geology is limited, it is quite likely that these test wells may have to be deep holes (up to 400 feet) and consequently the costs would be high. Assuming removal of the casing after the completion of the test wells, I would estimate the total cost of Test Holes Nos. 1, 2 and 3 to be approximately $14,500.00. It is understood that if one (or more) of the test wells should be so successful that the Improvement District decides to take it over as a production well of small capacity, then the District is to pay the well driller the additional cost of the casing retained in the well and the cost of the screen.

Estimate of Costs of Two Additional Test Wells

Assuming the removal of the casing after the completion of the test wells, I would estimate the total cost of Test Wells Nos. 4 and 5 to be approximately $6,400.00.

Estimated total cost of Test Holes Nos.1 - 5 inclusive (if deep holes are drilled) approximately $20,900.00.

J. C. Foweraker

J. C. Foweraker
Geological Engineer

JCF/ls
Attachs.

ADDITIONAL NOTES ON THE PROPOSED TEST DRILLING PROGRAM FOR THE NECHAKO IMPROVEMENT DISTRICT

Test Well No. 1.

General

This site is located in Area "B" of the Nechako Improvement District. Most of the information that is available on this area comes from wells dug for domestic supply into the overlying sands. These wells are mostly less than 100 feet deep and show a static level between 30 and 50 feet. About 2000 feet outside the northern boundary of Area "B", is a well 218 feet deep. Gravel has been reported at 216 feet and overlying the gravel is a considerable thickness of till.

For test well No. 1, it is recommended that an 8-inch diameter hole (this would allow a reduction to 6 inches in a deep hole), be drilled to a depth of up to 400 feet, if geological conditions warrant it.

Estimate of Costs

Assuming the removal of the casing after the completion of the test well, I would estimate the cost of Test Well No. 1 to be approximately as follows: 250 - 300 g.p.m.

Moving costs (including a portion of the total costs for transportation to and from Prince George)	$ 200.00	
8-inch diam. drilling at $8.00 per foot for 400 feet	3,200.00	
($6.50 per foot allowed for 6-inch diam.hole)		
Rental of test screen	100.00	
Installation of test screen, well development, pumping tests, 70 hours @ $12.00 per hour	840.00	
Removal of casing	650.00	
		$ 4,990.00

It is understood in these estimates that if one (or more) of the test wells should be so successful that the Improvement District decides to take it over as a production well of small capacity, then the District is to pay the well driller the additional cost of the casing retained in the well and the cost of the screen.

Test Well No. 2

General

This site is located just outside the southern boundary of Area "C" of the Nechako Improvement District. To the north of the proposed site are several wells up to 100 feet deep which are reported to have been dug in sand with silt and clay layers. Many of these wells bottom on till and the static

level is generally low about 90 feet. There is a record of one well located 500 feet further northwest along the Highway, from Test Well No. 2, which is reported to have reached a depth of 200 feet, the last 100 feet in till. It is recommended at this site, that an 8-inch diameter test well (this would allow a reduction to 6-inches in a deep hole) be drilled, to a depth of up to 400 feet, if geological conditions warrant it.

Estimate of Costs

Assuming removal of casing after the completion of the test hole, I would estimate the costs would be approximately the same as in Test Well No. 1 $ 4,990.00

Test Well No. 3

Alternative Site #1 is to be located somewhere near to the Esso Service Station which is located on Lot 7, Plan 9085, D.L. 4377 in Improvement District Area "B". Several of the wells in this general area show a variable thickness of sand over till. The static level appears to be generally between 10 and 40 feet from the surface.

Alternative Site #2 is to be located somewhere near to the Schell Motel Court, Hart Highway, outside the northern boundary of Improvement District Area "C". A well was drilled at the Motel to a depth of 118 feet through till, then outwash (?) and down into 50 feet of sand. However, the well was not developed due to the sand clogging the pipe, and the casing was blasted off at 67 feet. With the exception of one well which was abandoned at 214 feet in clay, most of the wells immediately to the south of the proposed site are less than 50 feet deep. Till is reported near or at the bottoms of several of the wells.

Alternative Site #3 is to be located 1,000 feet north of the proposed 100,000 gallon Woodstave Storage Tank, southwest of the Improvement District Area "C" This site is located near a depression, one of a series which extend westward as a long prominent zone. This zone is thought to be the site of a former channel of the Stewart River which probably flowed into the Nechako-Fraser River system near Prince George. The depressions are thought to be kettles formed after a tongue of ice which must have occupied the channel at one time, melted, and caused the overlying materials to collapse. It may be worthwhile to explore the ground-water possibilities in this area as it is reasonably close to the proposed distribution system.

Tentatively, an 8-inch test well up to 350 feet depth is proposed for one of the three alternative sites suggested for Test Well No. 3. The actual site that is selected could be determined partly on the results and information obtained from the previous two holes.

3 . . . . . .

Estimate of Costs

Assuming the removal of the casing after the completion of the test hole, I would estimate the cost of Test Hole No. 3 to be approximately as follows:

Moving costs	$ 200.00	
8-inch diam.drilling @ $8.00 per ft. for 350 ft. ($6.50 per ft. allowed for 6-inch diam. hole)	2,800.00	
Rental of test screen	100.00	
Installation of test screen, well development, pumping tests, 70 hours at $12.00 per hour	840.00	
Removal of casing	600.00	
		$ 4,540.00
Estimated total cost of Test Wells Nos. 1, 2 and 3		$14,520.00

Test Well No. 4 150 gpm

General

This site is located in Nechako Improvement District Area "A". Adjacent to the proposed site a well has been dug to 26 feet by the Cariboo Brewery into the clean gravels of the Nechako River bench. The well was test pumped at 500 gpm which is a high yield for a well of this type. Test Well No.4 is located about 750 feet west of the Brewery well. Logs of other wells located in this area show gravels overlying a considerable thickness of clay. It is estimated thatthis test well will be less than 60 feet deep.

Estimate of Costs

Assuming removal of the casing after the completion of the test hole, costs for a 6-inch diameter, 60 feet deep test hole would be approximately as follows:

Moving costs	$ 200.00	
Drilling @ $6.50 per foot for 60 feet	390.00	
Rental of screen	100.00	
Installation of screen, development of well, pumping tests, 70 hours at $12.00 per hour	840.00	
Removal of casing	300.00	
		$ 1,830.00

Test Well No. 5

General

The site location may be selected from one of the remaining sites listed under Test Well No. 3, but will depend on the information and results obtained in the previous holes. Allowance has been made for up to 350 feet

of drilling of 8-inch diameter hole (a reduction to 6 inches may be necessary for a deep hole).

Estimate of Costs

Assuming removal of the casing after completion of the test hole, the costs for an 8-inch diameter, 350 feet test well would be approximately the same as for Test Well No. 3	$ 4,540.00
Estimated total cost of Test Wells Nos. 4 and 5	$ 6,370.00
Estimated total cost of Test Holes Nos. 1 - 5 inclusive	$20,890.00

J. C. Foweraker

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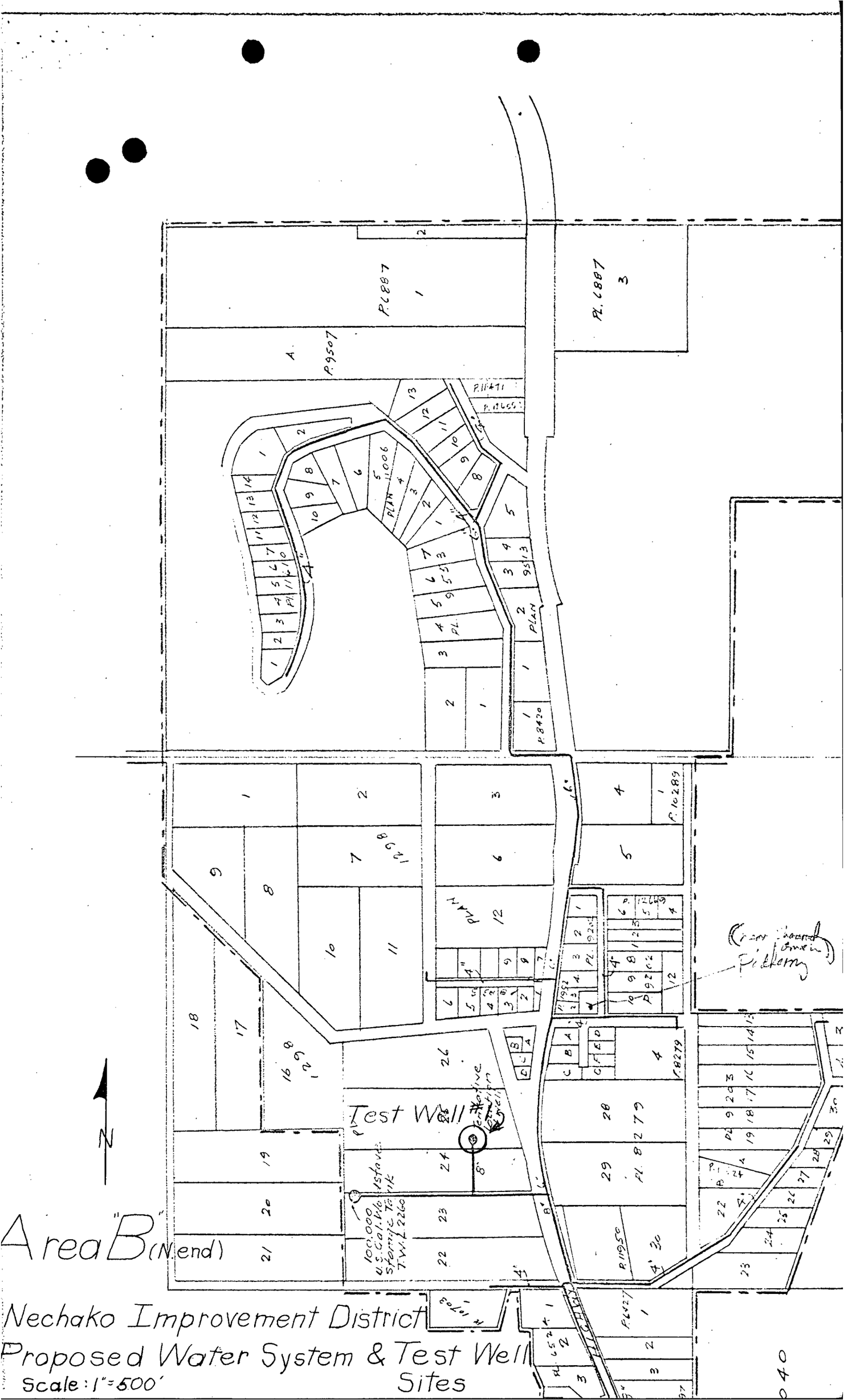
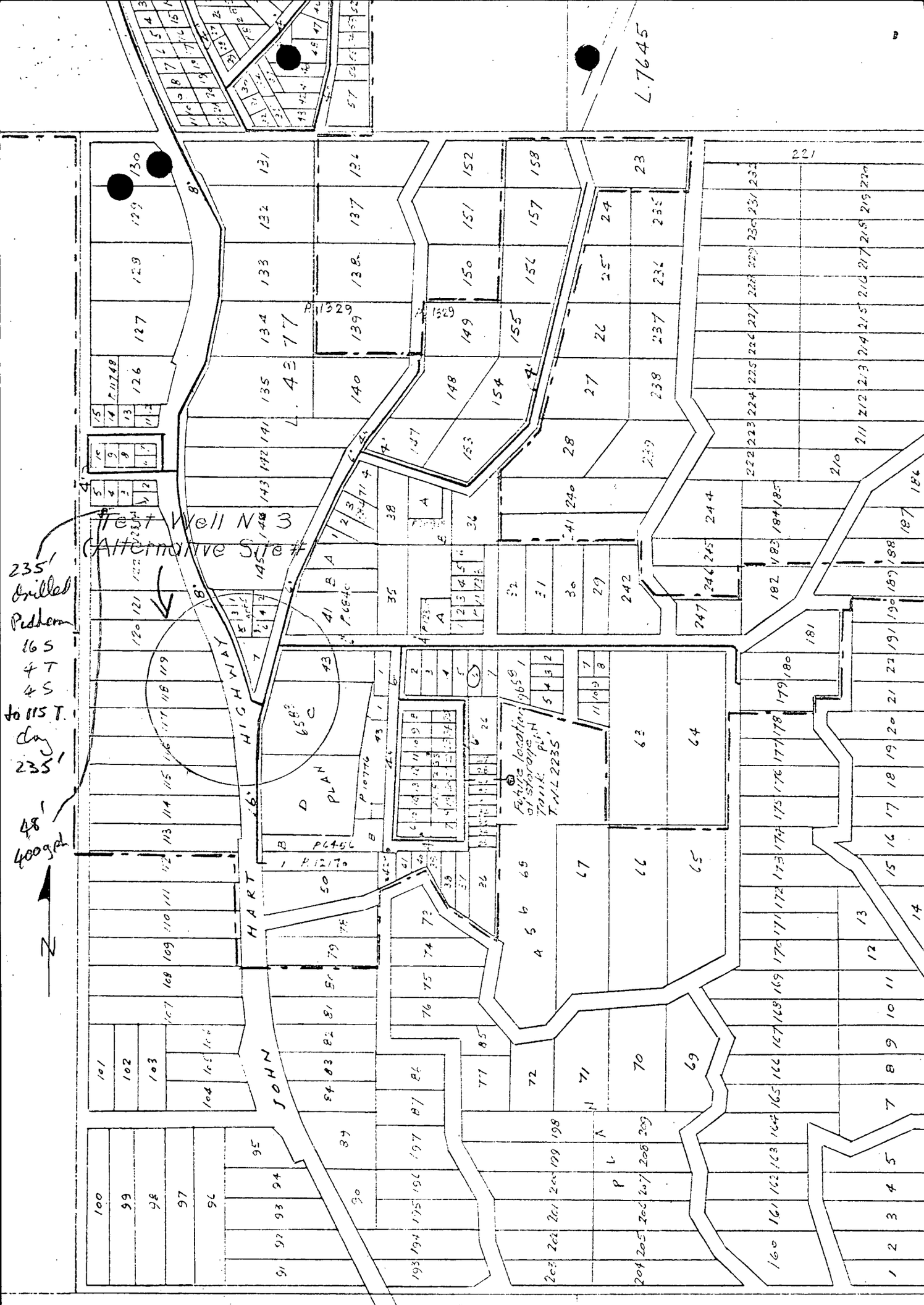
Geological Engineer

JCF/ls

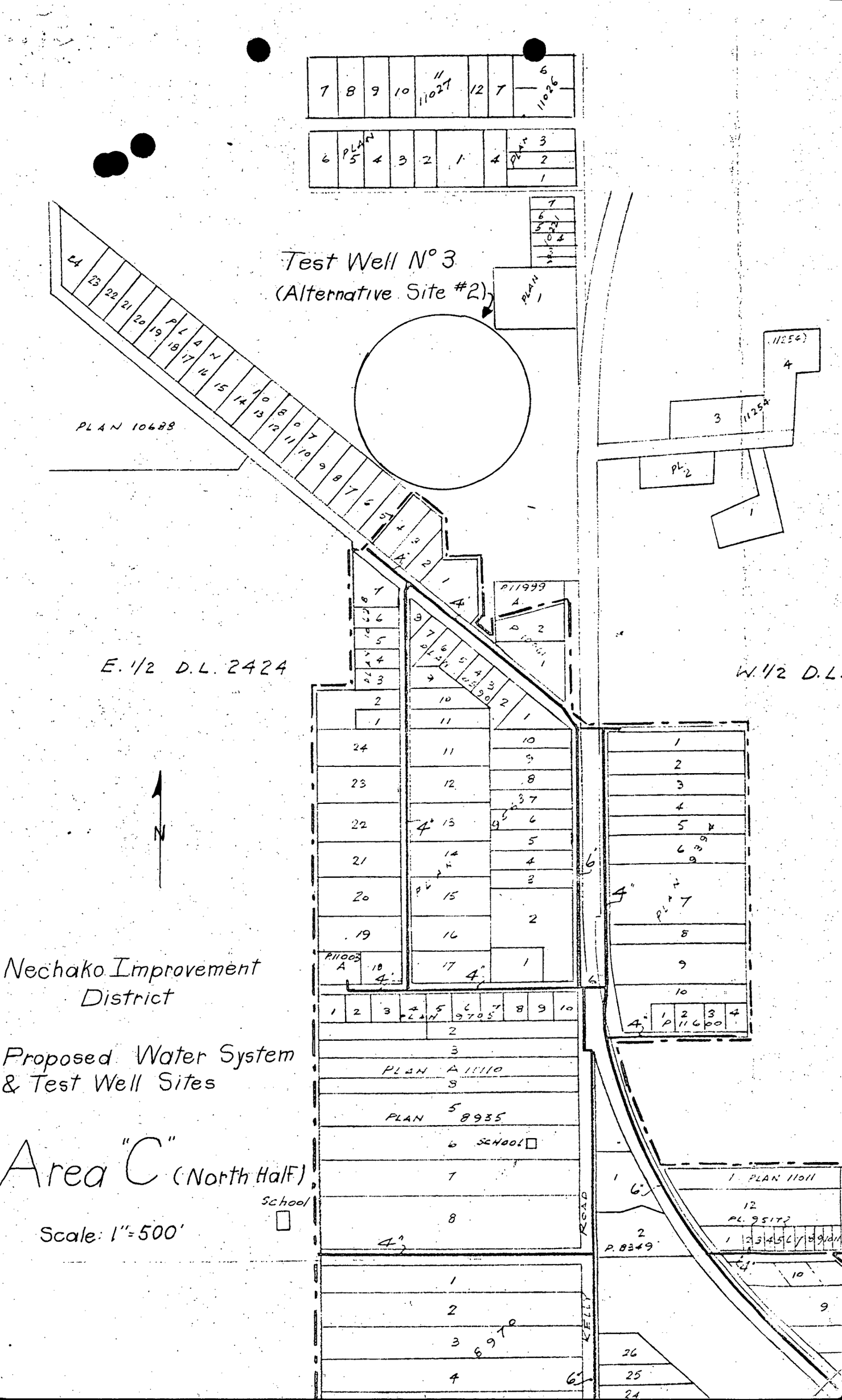

Test Well #1
Area "B" (N. end)
Nechako Improvement District
Proposed Water System & Test Well Sites
Scale: 1" = 500'
N

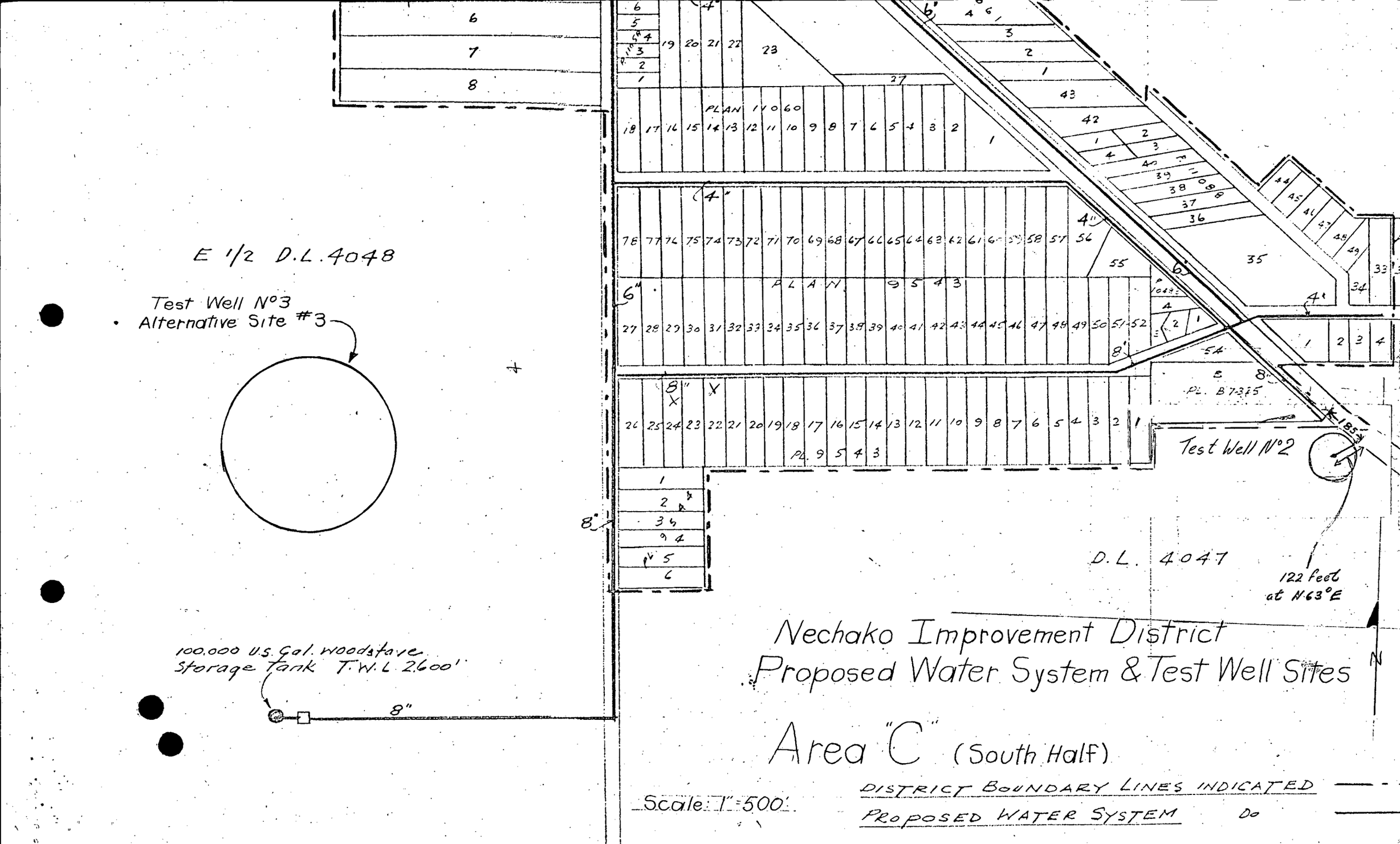


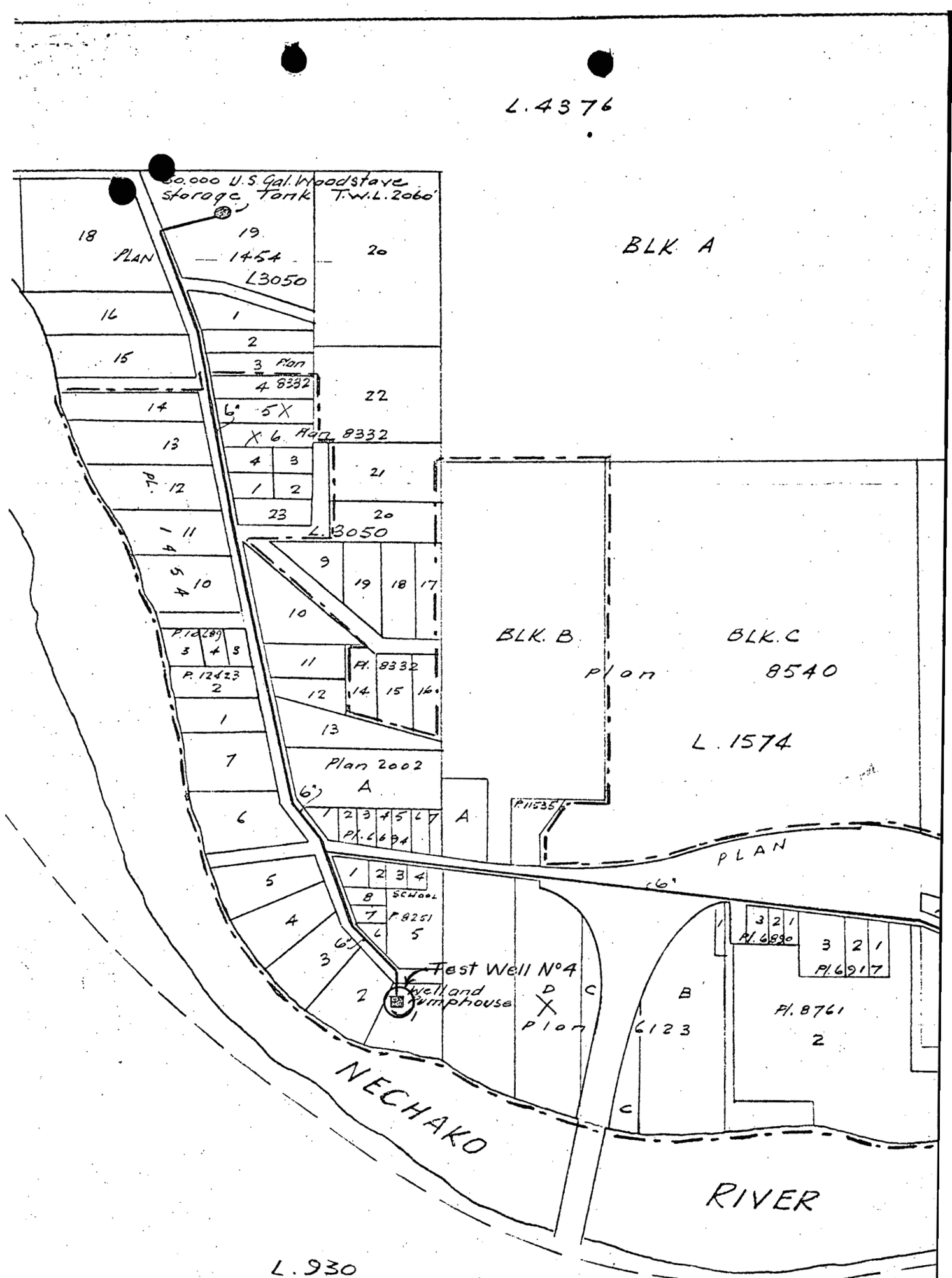
Nechako Improvement District
Proposed Water System & Test Drill Sites

Area "B" (S. End)

Scale: 1" = 500'


Test Well N° 3
(Alternative Site #2)
PLAN 10688
E. 1/2 D.L. 2424
W. 1/2 D.L.
N
Nechako Improvement District
Proposed Water System & Test Well Sites
Area "C" (North Half)
School
Scale: 1" = 500'
PLAN A 11110
PLAN 8935
SCHOOL
ROAD
KELLY
PLAN 11011
P. 8349


E 1/2 D.L. 4048
Test Well N°3
Alternative Site #3
100,000 U.S. Gal. woodstave
storage tank T.W.L. 2600'
8"
D.L. 4047
Test Well N°2
122 feet
at N.63°E
PLAN 1060
PLAN 9543
PL. 9543
PL. B7385
Nechako Improvement District
Proposed Water System & Test Well Sites
Area "C" (South Half)
Scale: 1" = 500'
DISTRICT BOUNDARY LINES INDICATED
PROPOSED WATER SYSTEM do
N



Nechako Improvement District
Proposed Water System & Test Well Sites

Area "A"

Scale 1" = 500'

——— DISTRICT BOUNDARY LINES INDICATED

——— PROPOSED WATER SYSTEM