43713

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
Alaska Hydrologic Survey

WATER WELL LOG Revised 08/18/2016

Drilling Started: ___/___/_____ Completed: 8 / 14 / 1998 Pump Install: 8 / 18 / 1998

City/Borough	Subdivision	Block	Lot	Property Owner Name & Address
Fairbanks North Star Borough	Endecott Homestead		20	Cross Roads Baptist Church AK,

Well location: Latitude 64.82064500000001 **Longitude** -147.443025
Meridian F Township 001S Range 001E Section 13 , SE 1/4 of SE 1/4 of SE 1/4 of SE 1/4

BOREHOLE DATA: (from ground surface)
Suggest T.**M. Hanna's hydrogeologic classification system*** https://my.ngwa.org/NC__Product?id=a185000000BYub3AAD

	Depth From	To
sand	0	5
sand - pea gravel	5	16
small coarse gravel. some sand	16	30
sand - some coarse gravel	30	33
pea-coarse gravel some sand	33	40

Include description or sketch of well location (include road names, buildings, etc.):

North

AS 41.08.020(b)(4) and AAC 11 AAC 93.140(a) require that a copy of the well log be submitted to the Department of Natural Resources within **45 days of well completion**. Well logs may be submitted using the online well log reporting system available at:

https://dnr.alaska.gov/welts/

OR email electronic well logs to

dnr.water.reports@alaska.gov

Drilling method: ☐ Air rotary, ☐ Cable tool, ☐ Other _____
Well use: ☒ Public supply, ☐ Domestic, ☐ Reinjection, ☐ Hydrofracking
☐ Commercial, ☐ Observation/Monitoring, ☐ Test/Exploratory, ☐ Cooling,
☐ Irrigation/Agriculture, ☐ Grounding, ☐ Recharge/Aquifer Storage,
☐ Heating, ☐ Geothermal Exploration, ☐ Other _____
Fluids used: _____

Depth of hole: 40 ft Casing stickup: _____ft
Casing type: _____ Casing thickness: _____ inches
Casing diameter: 6 inches Casing depth: _____ ft
Liner type: _____ Depth: _____ ft Diameter: _____inches
Note: _____

Well intake opening type: ☐ Open end, ☐ Open hole, ☒ Other perforated
Screen type: _____, Screen mesh size: _____
Screen start: _____ ft, Screen stop:_____ ft, Perforated ☒ Yes ☐ No
Perforation description:_____ Perf from: _____ ft, Perf to: _____ft, Perf from: _____ ft, Perf to: _____ ft
Gravel packed ☐ Yes ☒ No Gravel start: _____ ft , Gravel stop:_____ ft
Note: _____

Static water (from top of casing): 10 ft on___/___/_____ Artesian well ☐
Pumping level & yield: _____ feet after _____ hours at 40 gpm
Method of testing:_____
Development method:_____ Duration: _____
Recovery rate: _____ gpm

Grout type: _____ Volume _____
Depth: From _____ft, To _____ft

Final pump intake depth: 29 ft Model: 10GS05412
Pump size: .5 hp Brand name: _____

Was well disinfected upon completion? ☐ Yes ☒ No
Method of disinfection: _____
Was water quality tested? ☐ Yes ☒ No
Water quality parameters tested: _____

Well driller name: Chris Nuss
Company name: Aurora Drilling
Mailing address: P.O. Box 61618
City: Fairbanks State: AK Zip: 99706
Phone number: (_____) _____- _____
Driller's signature: _____
Date: _____/_____/_____

Anchorage Municipal Code 15.55.060(I) and North Pole Ordinance 13.32.030(D) require that a copy of this well log be submitted to the Development Services Department/City within **30 days of well completion**.

City Permit Number: _____
Date of Issue: _____/___/_____

Parcel Identification Number: _____-_____-_____

*Guide for Using the Hydrogeologic Classification System for Logging Water Well Boreholes by Thomas M. Hanna NGWA Press

AURORA DRILLING

A DIVISION OF AMERICAN ARCTIC COMPANY
P.O. BOX 81618 • FAIRBANKS, ALASKA 99706 • PHONE (907) 456-6712 • FAX (907) 451-4356

Well Log

OWNER Crossroads Baptist Church

Mailing Address P.O. Box 56758 North Pole, AK 99705

Well Location Corner of Badger & Peede/ Holmes Road North Pole

Size of Casing 6" Depth of Well 40' Cased to 40' + 2'

( ) Screen

Static Water Level 10' Yield in GPM 40 (XX) Perforated 5'

Driller Damon Willford Date 8-14-98

Formations Encountered

0	to 5	Sand		to	
5	to 16	Sand - pea gravel		to	
16	to 30	Small coarse gravel some sand		to	
30	to 33	Sand - some coarse gravel		to	
33	to 40	Pea-coarse gravel some sand		to	
	to			to	

Pump Installation

Date Installed 8-18-98 Type Submersible Size 1/2 HP

Pump Model 10GS05412 Water Line 1" Soft 'K' Copper

Wire 10/4 Heat Tape 5 Watt Chromalox

Pipe 1" Galvanized Pump Depth 29'

Pitless Adaptor 6"x1" Maass Weld-on Pressure Tank

Water Analysis

PH Hardness(GPG) Iron(PPM) Manganese(PPM)

Design Science & Engineering

1351 Shypoke Lane, P.O. Box 81832
Fairbanks, AK 99708-1832
Ph: 907.479.3684; Fx: 907.479.3687
Dse@ptialaska.net

May 18, 1998

Mr. Stan Justice
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, AK 99709-3643

Subject: Request for a "Certificate to Construct" a Class B water supply well in variance of a separation distance.

Dear Mr. Justice:

On behalf of our client, Mr. Troy Gourley of the Cross Roads Baptist Church of North Pole, Alaska, Design Science & Engineering (DS&E) presents this petition for approval to construct a Class B water well in variance from the required 200-foot separation distance from an on-site wastewater sewer cleanout (18 AAC 80.030, Table A).

Project Understanding

We understand that the current church well does not adequately meet the supply requirements of the facility, and accordingly Mr. Gourley wishes to install a new well to serve church staff and members. Although the proposed site for the well is located approximately 100 feet from a cleanout of the church facility's sewer line, we believe that site-specific conditions of soil, groundwater, and surface topography permit the preferred location for the new well to meet the intent of the separation distances imposed by 18 AAC 80.030, and as such provide adequate health protection from the onsite wastewater system for the users of the new water supply.

Location

Cross Roads Baptist Church is located at approximately 64°50'04" north latitude, 147°22'24" west longitude, at approximately 462.2 feet above mean sea level (amsl). The site's approximate legal description is T1SR1ES13SE1/4SE1/4, Fairbanks Meridian, and situated on the northwest corner of the intersection of Badger, Peede and Holmes roads. The area is zoned in the Fairbanks North Star Borough as GU-1, and the site of the proposed well installation is located at the extreme northeast corner of Lot 20, Tract U of the Endecott Homestead subdivision (Figures 1, 2).

Site Layout

Figure 3 is a plan view representation of the proposed well installation, and displays the site layout and surrounding elements of concern. As can be seen, the proposed installation is located approximately 200 feet east of the church's septic tank, greater than 200 feet west-north-west of the Badger Gas underground storage tank installation across Badger Road, and greater than 200

feet north from the septic cleanout of a small, 2-bedroom home across Holmes Road. The sewer cleanout in question is located approximately 100 feet west-south-west from the proposed well installation, at the church building's northeast corner.

Soil Characteristics

Soils at the project site are characterized in the Fairbanks Area Alaska Soil Survey (SCS, 1963) as the Salchaket series (Sm), textured as very fine sandy loam, well-drained, over rounded alluvial gravel. A typical profile is: silt loam (0 in. to 3 in.), very fine sandy loam (3 in. to 10 in.), fine sand (10 in. to 26 in.), and very gravelly sand (26 in. +). Depth to the underlying gravelly material typically varies from 10 inches to 6 feet.

Hydrogeology

Figures 4 and 5 are adapted from a USGS Water-Resources Investigations Report (USGS, 1996), and illustrate measured ground-water elevations at the site. It should be noted that that study's monitor well "FP-0B" is located on the same lot (i.e., lot 20) as the proposed well, at the lot's southeast corner. Figure 4 and the measurement station's accompanying documentation in the report's appendix indicates that during a period of high stage in the Tanana River (July 17, 1987) the ground-water surface was measured at 453.84 feet amsl, i.e., 8.36 feet below ground surface (bgs), and at a period of low stage in the Chena and Tanana rivers (March 31, 1988) at 453.3 feet amsl, i.e., 8.91 feet bgs. Using Figures 4 and 5 it can be estimated that the gradient of groundwater flow is approximately 4 ft/mile (0.0008) during that high stage period, and 6 ft/mile (0.001) during the low stage period.

As can be seen by examination of the potentiometric contours of the groundwater surface in the immediate vicinity of the proposed installation, the direction of groundwater flow is generally slightly to the west of north during the high stage period referred to above, and approximately north during the low stage period referred to above. It is therefore evident that the site of the proposed well installation is approximately cross-gradient to the cleanout in question.

It is also reported (USGS, 1996) that the water supply aquifer at the site is characterized as Chena alluvium of quaternary age. Assuming that the alluvium is textured as sandy gravel with an approximate hydraulic conductivity of 100 ft/day, a mean gradient of 5 ft/mile and a porosity of 0.3, the approximate seepage velocity of septic system effluent is:

$$v = \frac{ki}{\phi} = \frac{(100\,ft/day)(5\,ft/mi)}{0.3} = 0.3\,ft/d$$

i.e., it would require approximately 320 days for a release from the septic cleanout in question to travel 100 feet in a homogeneous sandy-gravel aquifer. Only three-to-five percent of fecal coliforms and 18–37 percent of enteroccoci survived 7 days of flow time in a 1973 study of the 0°C water of the Tanana River (Gordon, 1973). Groundwater in the Fairbanks area is usually 0°C to 2°C (USGS, 1978). Although in reality alluvium consists of lenses and discontinuous layers of

silt, sand and gravel that may result in faster seepage travel times, the above result assists in conceptualizing the potential risk of granting the requested variance, and supports the view that the cross-gradient position and distance of the proposed well from the sewage cleanout does not pose a risk to potential water system users.

Well Installation

Figure 6 presents a cross-sectional view of the design elements of the proposed well installation. The six-inch diameter steel casing will be installed to a total depth of 40 feet, with a screened interval extending from approximately 35 feet depth to the casings terminal end. Source protection will be achieved by maintaining close compliance with the specifications of 18 AAC 80.015.

Also attached is the estimate by the drilling contractor, Aurora Drilling, which lists the mechanical elements of the well and appurtenant piping. Soil characteristics will be confirmed and recorded when the drilling contractor Aurora Drilling has completed its well log. At that time DS&E will review the well log, sample the well, collect as-built information for graphical presentation, and provide the ADEC with a summary report.

Sequence

1. DS&E applies for a variance of separation distance as required by the ADEC.

2. DS&E applies for a Water Right on behalf of the client.

3. Cross Roads Baptist Church receives permit to drill well.

4. DS&E obtains analytical sample in accordance with 18 AAC 80.310(1)(C), and documents as-built configuration.

5. DS&E submits final report for complete variance acceptance and case closure.

Limitations

1. The analysis, designs and recommendations made in this report are based on site conditions as they presently exist. If during construction subsurface conditions are different than those predicted and upon which design assumptions were made, then it is the owner's responsibility to advise us immediately so that we can reconsider our recommendations.

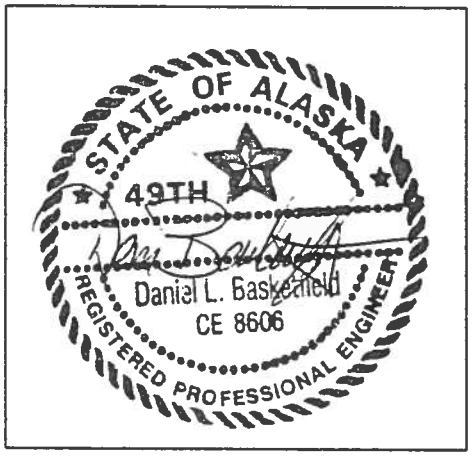
2. Design Science & Engineering has neither created nor contributed to the existence of any hazardous, radioactive, toxic or otherwise dangerous substance or condition at the site, and it's compensation for design services is in no way commensurate with the potential risk of injury or loss that may be caused by exposure to such substances or conditions.

3. Should a substantial amount of time elapse between the submission of this report and the start of work at the site, or conditions have changed for any reason then this report becomes null and void without our expressed written authorization.

4. This report was prepared for the exclusive use of the owner in permitting and installing the subject facility. It should be made available to contractors for relative factual information, and not as a warranty of subsurface conditions.

Design Science & Engineering

Daniel Basketfield, P.E.
Senior Environmental Engineer



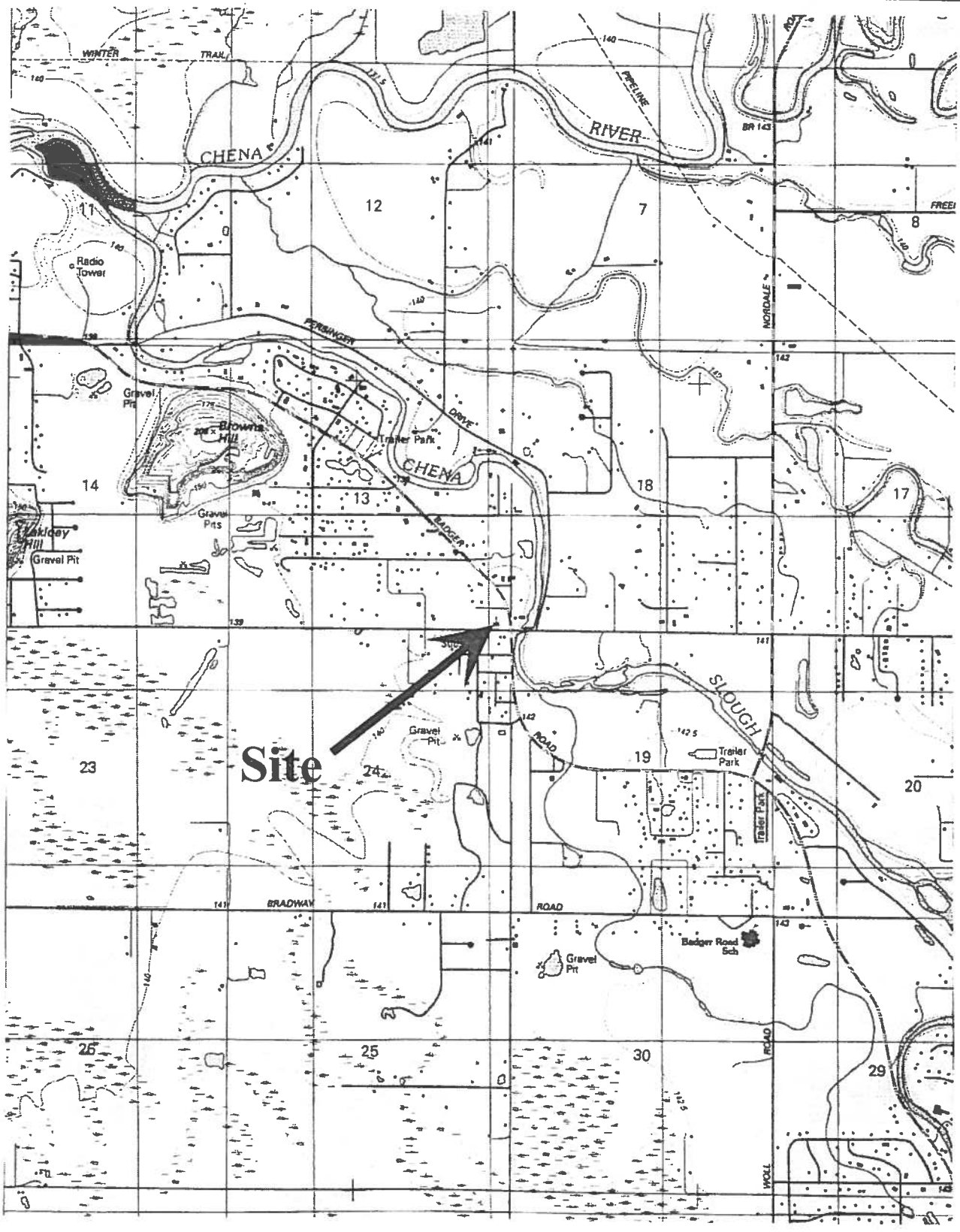
Reviewed and Approved by: Daniel L. Basketfield, P.E.

References:

1. Soil Survey, Fairbanks Area, Alaska, United States Department of Agriculture, Soil Conservation Service in cooperation with the Alaska Agricultural Experiment Station, Series 1959, No. 25, issued September, 1963.
2. Hydrologic Information for Land-Use Planning, Fairbanks Vicinity, Alaska, open-file report 78-959, United States Department of Interior Geological Survey, prepared in cooperation with Fairbanks North Star Borough, U.S.E.P.A., and U.S. Army Corps of Engineers, Gordon L. Nelson, Anchorage, Alaska, 1978.
3. State of Alaska, Department of Environmental Conservation, 18 AAC 80 (Drinking Water).
4. Ground-Water Levels in an Alluvial Plain Between the Tanana and Chena Rivers Near Fairbanks, Alaska, 1986-93, U.S. Geological Survey, Water-Resources Investigations Report 96-4060, by Roy L. Glass, Michael R. Lilly, and David F. Meyer, prepared in cooperation with the Fairbanks North Star Borough, Anchorage, Alaska, 1996.

Attachments:

1. Figures 1 – 6
2. Parts list and installation estimate, Aurora Drilling # 54, May 6, 1998.



1/2 3/8 1/4 1/8 0 1/4 1/2

Approximate Scale, Miles

N

crossrpor.dsf

Figure 1
Location & Access
Cross Roads Baptist Church

Mr. Troy Gourley

Design Science & Engineering

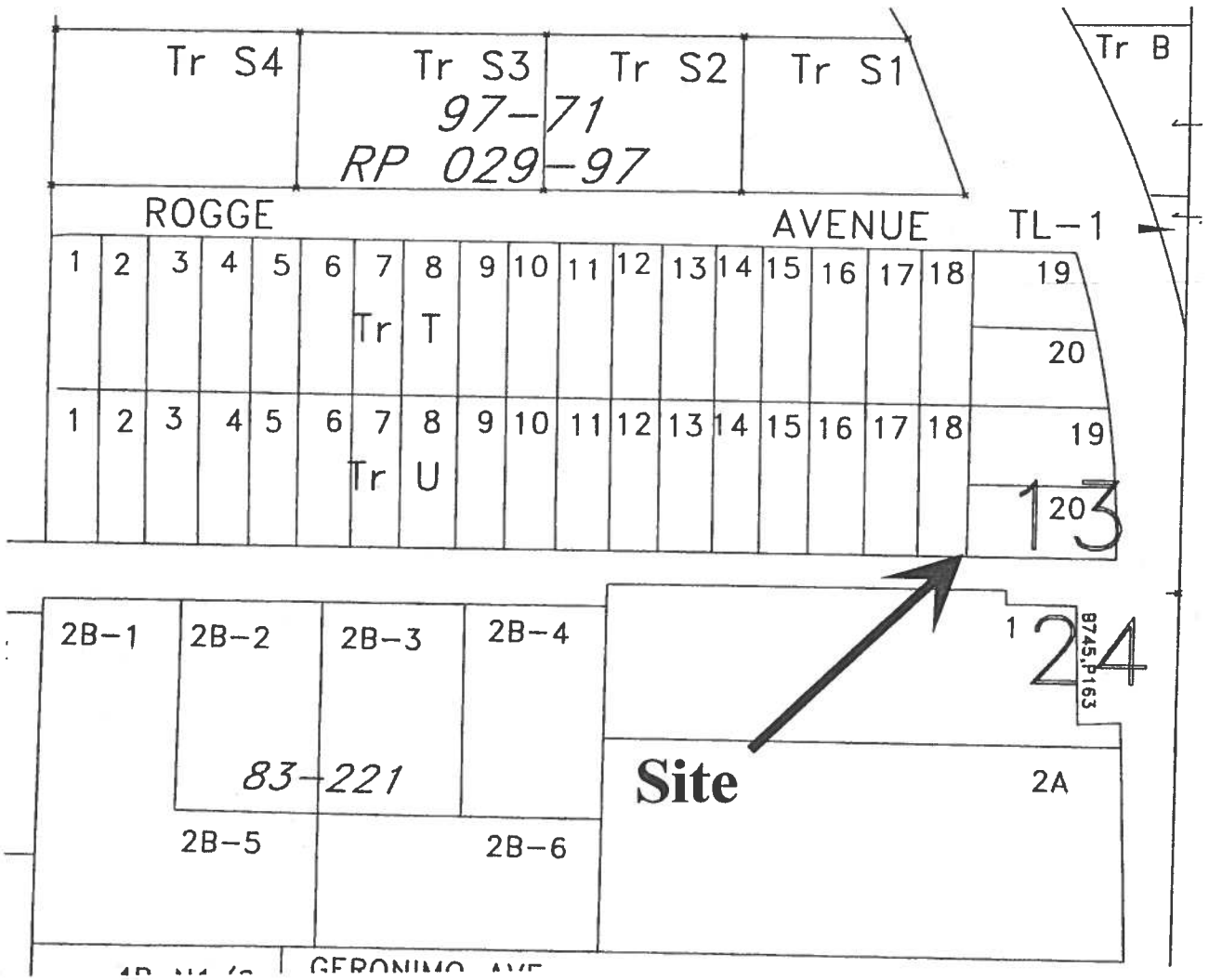


Figure 2
FNSB Lot Designation
Cross Roads Baptist Church

Mr. Troy Gourley

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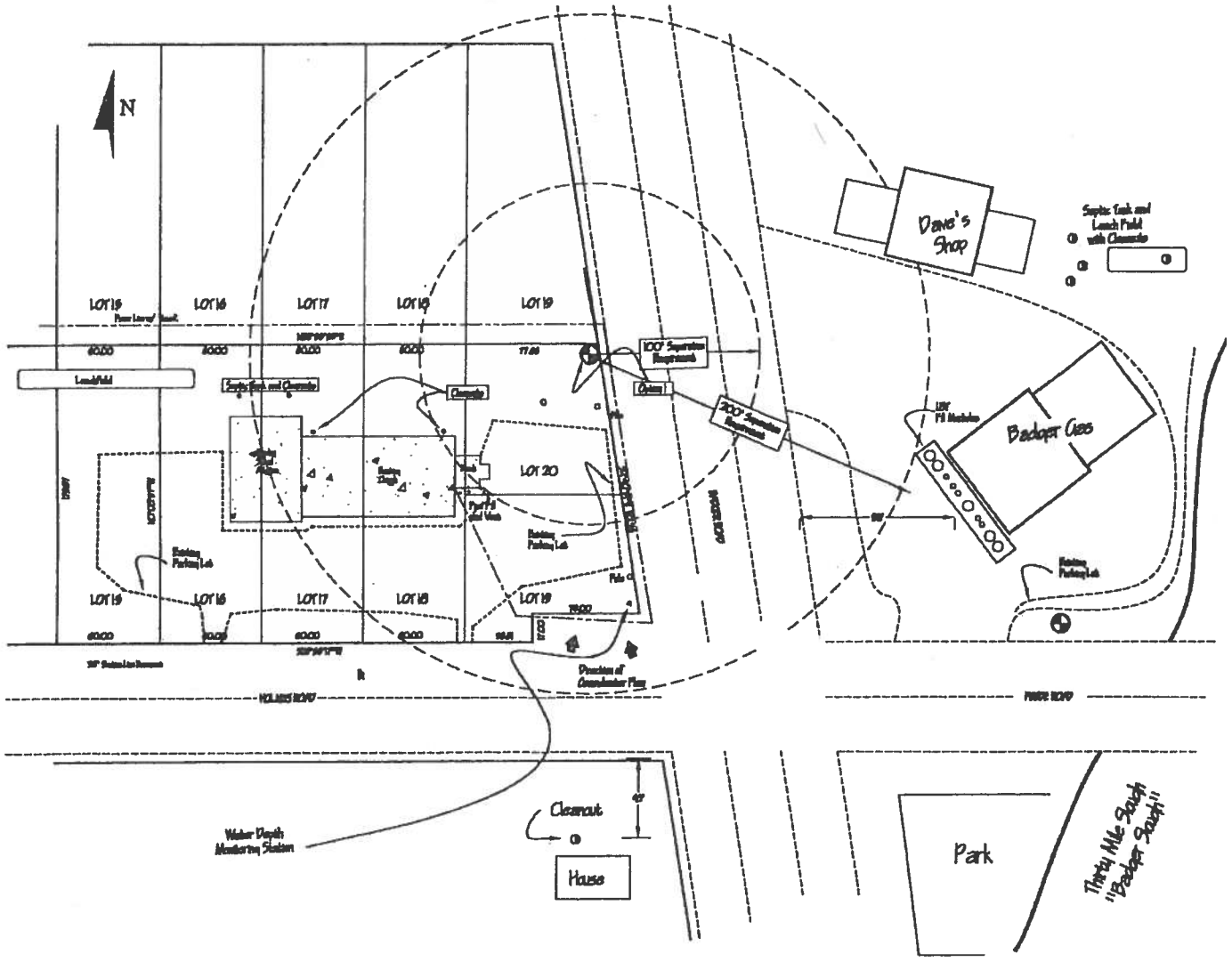
Design Science & Engineering



100 75 50 25 0 50 100

Approximate Scale, Feet

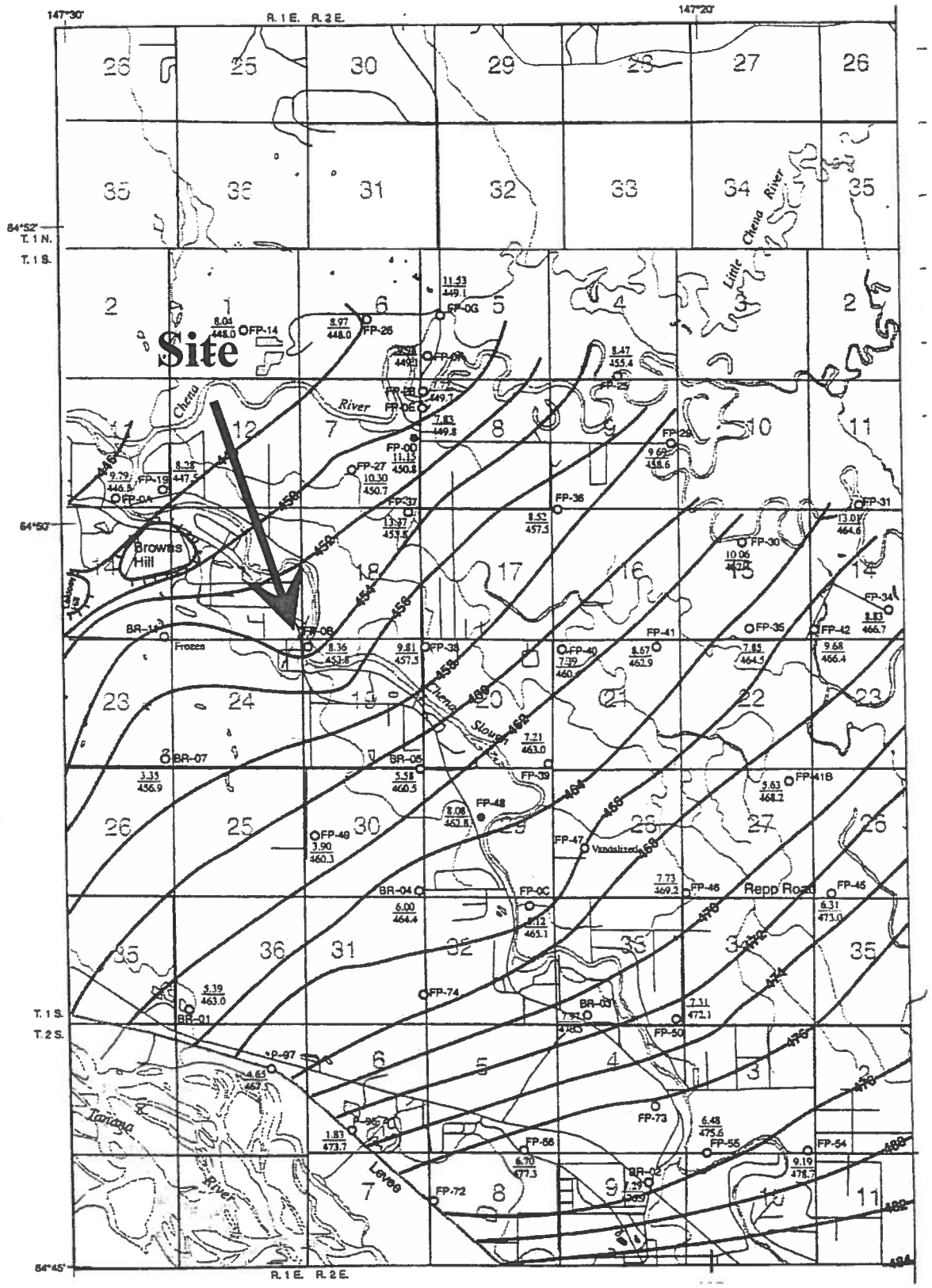
N

crosslan.dsf

Figure 3
Project Site and Significant Elements
Cross Roads Baptist Church

Mr. Troy Gourley

Design Science & Engineering



Approximate Scale, Miles

N

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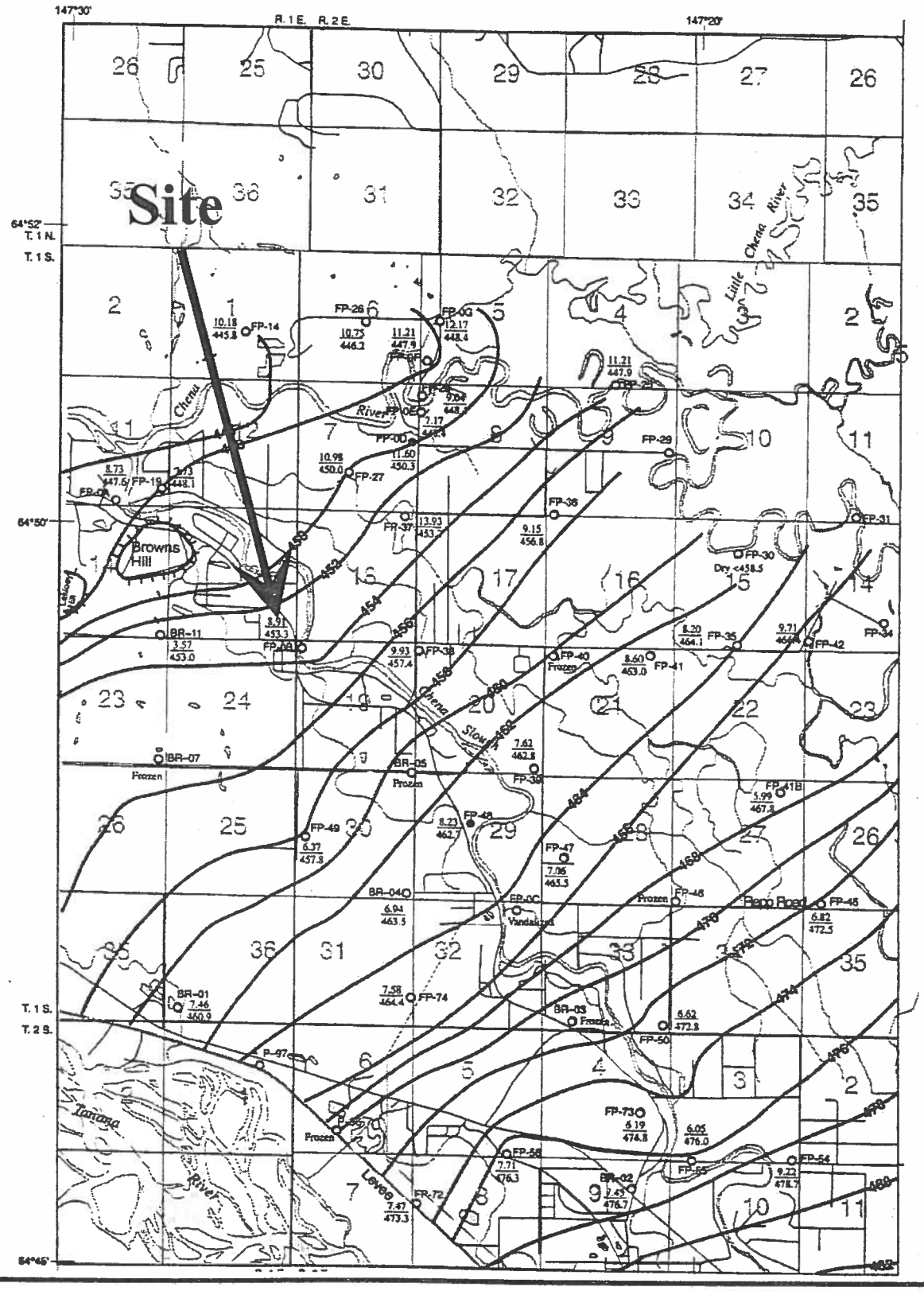
Figure 4
Ground-Water Levels
High Stage of Tanana River
July 17, 1987

Design Science & Engineering



1 3/4 1/2 1/4 0 1/2 1

Approximate Scale, Miles

N

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Figure 5
Ground-Water Levels
Low Stage of Chena and Tanana Rivers
March 31, 1988

Design Science & Engineering

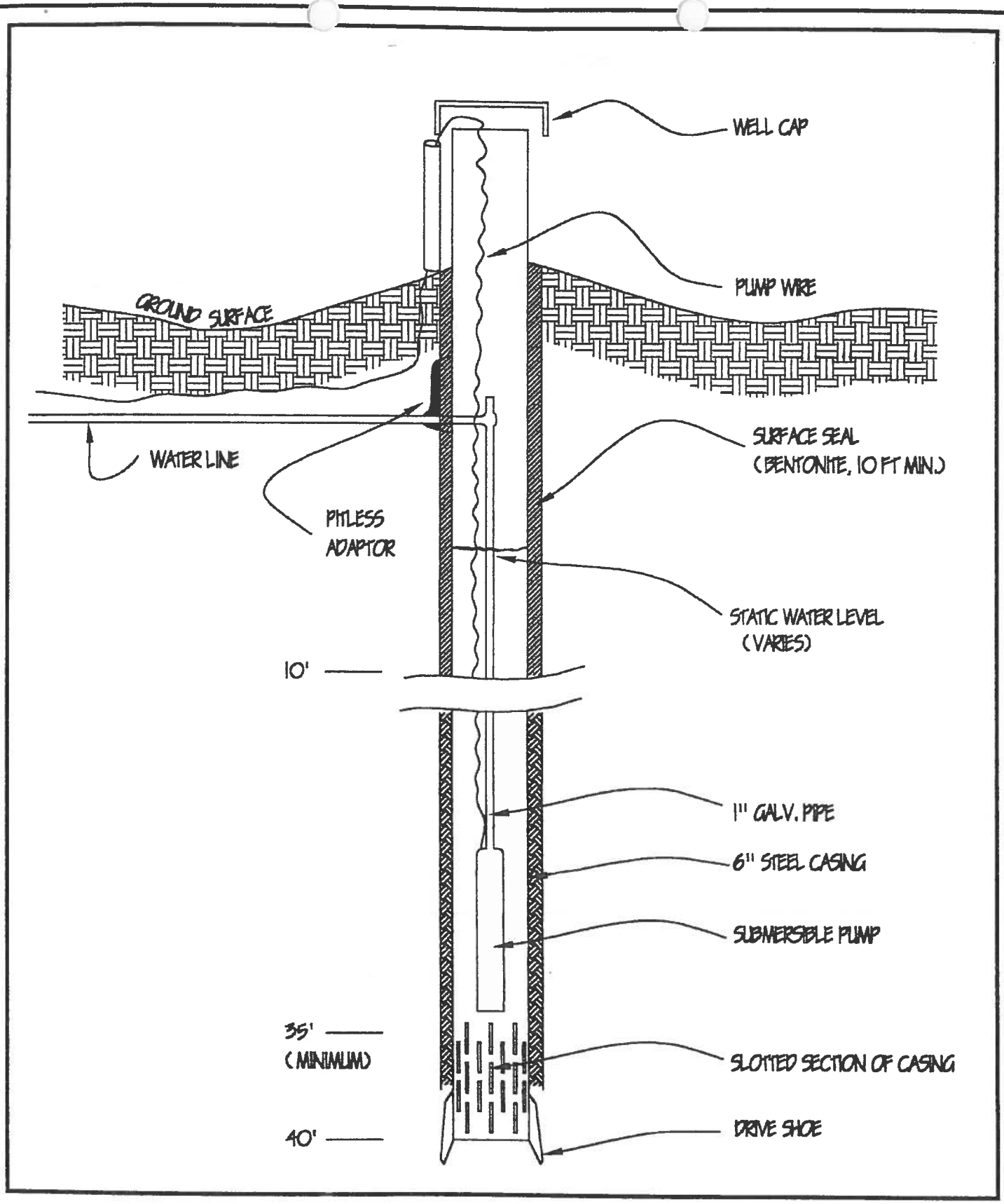

Figure 6
Design Typical
Class B Water Supply Well
Cross Roads Baptist Church

crossrpor.dsf

Design Science & Engineering

Mr. Troy Gourley

AURORA DRILLING

A DIVISION OF AMERICAN ARCTIC COMPANY
P.O. BOX 61618 • FAIRBANKS, ALASKA 99706 • PHONE (907) 456-6712 • FAX (907) 451-4356

Estimate

DATE	ESTIMATE NO.
5/6/98	54

NAME / ADDRESS

Crossroads Baptist Church
Corner of Badger & Peede/Holmes Road
North Pole, AK

QTY	DESCRIPTION	RATE	TOTAL
40	ft. 6" Water well, drilled, cased & developed	32.00	1,280.00
	10% Discount - $1,000.00 Max Home Show '98	-10.00%	-128.00
2	ft. 6" Well casing	9.68	19.36
1	Goulds 10GS07412 submersible pump	616.00	616.00
21	ft. 1" Pipe, galv.	1.60	33.60
155	ft 10/4 Pump wire	1.30	201.50
1	6" Well cap	18.00	18.00
1	Wire splice kit	10.00	10.00
1	6"x1" Mass weld-on pitless adaptor	58.00	58.00
100	ft 1" Soft copper 'K' tubing	3.15	315.00
112	ft. Chromalox Heat Tape	3.75	420.00
100	ft Pipe insulation 1/18'ID 3/4 wall	1.50	150.00
1	Clayton Mark CM10050 44 Gal. pressure tank	370.00	370.00
1	3/4HP 230V Franklin Electric motor control box	57.00	57.00

Please respond to:
PO Box 61618, Fairbanks, AK 99706
Visa and Mastercard accepted

Total

AURORA DRILLING

A DIVISION OF AMERICAN ARCTIC COMPANY
P.O. BOX 61618 • FAIRBANKS, ALASKA 99706 • PHONE (907) 456-6712 • FAX (907) 451-4356

Estimate

DATE	ESTIMATE NO.
5/6/98	54

NAME / ADDRESS

Crossroads Baptist Church
Corner of Badger & Peede/Holmes Road
North Pole, AK

QTY	DESCRIPTION	RATE	TOTAL
	Misc. fittings	150.00	150.00
7.5	hrs Labor to install pump, pipe, wire, pitless, waterline & pressure tank. Assuming installation is completed during the first trip out.	80.00	600.00

This is an ESTIMATE and is NOT a guarantee of exact depth or exact cost. Lengths and quantities may vary. Prices subject to change without notice. Price DOES NOT include backhoe service to dig and backfill waterline ditch.

Please respond to:
PO Box 61618, Fairbanks, AK 99706
Visa and Mastercard accepted

Total $4,170.46

AURORA DRILLING

A DIVISION OF AMERICAN ARCTIC COMPANY
P.O. BOX 81818 • FAIRBANKS, ALASKA • 99708 • PHONE (907) 456-6712 • FAX (907) 451-4356

To: Stewart Magahee Date: 5-11-98

Company: Design Science & Eng. Fax# 479-3687

From: Rocky

Company:

Number of pages being transmitted including cover sheet 2.

A 10GS05412L pump was picked to replace jet pump for two reasons. It provides approximately twice the volume at higher pressure And is the most economical pump for the price in its class. Flow rate at a 40psi/60psi setting averages 13 gallons per minute.