PROJECT SPECIFICATIONS

EKWOK SEWAGE SYSTEM

PROJECT SPECIFICATIONS

1.0 GENERAL

1.1 Drawings. All drawings contained within this bound document for individual on-site systems and separately bound Sheets 1 through 6 shall be a part of this specification. Wherever a conflict exists between the drawings and specifications, the specifications shall take precedence.

1.2 Scope of Work. The work included on this project is to be performed within the Village of Ekwok, Alaska. The general Scope of Work for the project includes, but is not limited to, the following:

a. Install individual or combined septic and soil absorption systems to 18 homes. Sixteen (16) absorption systems are required and 18 - 1,000 gallon septic tanks.

b. Install a community sewage system with sewage collection piping, manholes, and service piping for 16 homes. The system includes a 10,000 gallon septic tank volume, dosing chamber, and three absorption fields.

Install one community sewage lift station.

The installation contractor should be familiar with the community and the conditions affecting the project prior to construction.

1.3 Materials and Workmanship. All materials and workmanship shall be in accordance with the regulations of the Alaska Department of Environmental Conservation (A.D.E.C.) and as specified or indicated within the Contract Documents.

1.4 Intent of Documents. All excavations and designs presented are based on information available at the time of design. If conditions are discovered during construction which require modification, changes may be authorized and made by coordination with the Engineer.

1.5 Location of Existing Utilities and Structures. The locations indicated on the drawings are shown from field examinations and existing maps or drawings. Exactness and accuracy cannot be guaranteed and all locations shall be verified and confirmed in the field prior to construction.

MATERIAL TAKE OFF AND COST ESTIMATES

INDIVIDUAL ON-SITE SYSTEMS

Item	Quantity	Unit	Unit Cost $	Total Cost $
Perf. 4" PVC Pipe (ASTM D2729)	1500	l in.ft.	1.00	1,500.00
Solid 4" PVC Pipe (ASTM D3034)	2100	l in.ft.	1.30	2,730.00
Airtight Caps	105	ea.	3.00	315.00
2" Dow Styrofoam Insulation (blue board) 2X8 sheet	65	ea.	20.00	1,300.00
Typar drainage fabric	6700	sq.ft.	.75	5,025.00
PVC glue (8 oz. cans)	8	ea.	6.00	48.00
PVC pipe couplings	190	ea.	2.75	522.50
PVC-90° elbows	40	ea.	3.75	150.00
PVC-45° elbows	4	ea.	3.75	15.00
PVC-22½° elbows	4	ea.	4.00	16.00
PVC-tees	70	ea.	5.00	350.00
PVC-sweep tees	50	ea.	5.00	250.00
1000 gallon septic tank	18	ea.	1,000.00	18,000.00
Mechanical couplings @ tank	72	ea.	7.00	504.00
TOTAL MATERIAL COST				$31,000.00
Installation: Includes clearing, excavation, sand and/or gravel, pipe installation, tank installation, backfill, and miscellaneous	16	ea.	4,000.00	64,000.00
TOTAL INDIVIDUAL SYSTEMS COST				$95,000.00

COMMUNITY SEWAGE SYSTEM

All costs include excavation, backfill, and all other installation components.

Item	Quantity	Unit	Unit Cost $	Total Cost $
8" Polyethylene	1800	lin.ft.	40.00	72,000.00
4" Polyethylene	2000	lin.ft.	25.00	50,000.00
48" diameter manhole 6 ft. deep	5	ea.	5,000.00	25,000.00
Cleanout	2	ea.	700.00	1,400.00
Service saddles	16	ea.	100.00	1,600.00
Couplings (8" victaulic type)	12	ea.	150.00	800.00
Couplings (4" victaulic type)	30	ea.	100.00	3,000.00
Sewage lift station	1	ea.	15,000.00	15,000.00
10,000 gallon volume septic tanks	1	-LS-	6,500.00	6,500.00
Dosing champer siphon	1	ea.	10,000.00	10,000.00
4" cleanouts on services	16	ea.	200.00	3,200.00
4" Wye	4	ea.	100.00	400.00
4" 45° Elbows	5	ea.	150.00	750.00
Trench insulation	5000	sq.ft.	2.00	10,000.00
	Subtotal			$199,650.00

Soil Absorption Bed

8" Polyethylene	350	lin.ft.	40.00	14,000.00
2" perf. PVC (ASTM D2729)	1700	lin.ft.	15.00	25,500.00
6" PVC (ASTM D3034)	135	lin.ft.	25.00	3,375.00
2" PVC caps	42	ea.	3.00	126.00
6" PVC fittings 6"X2" cross	42	ea.	8.00	336.00
8" H.D.P.E. fittings - 90° elbows	3	ea.	350.00	1,050.00
8" H.D.P.E. fittings - 45° elbows	4	ea.	250.00	1,000.00
6" PVC Caps	3	ea.	5.00	15.00
	Subtotal			$ 45,402.00

TOTAL COMMUNITY SYSTEM $245,052.00

SUMMARY TOTAL PROJECT COSTS

Individual On-Site Systems	$ 95,000.00
Community Sewage System	245,100.00
Subtotal	$340,100.00
Contingencies @ 10%	34,000.00
TOTAL ESTIMATE	$374,100.00

1.6 Easements and Permits. In locations where easements or permits are required, the Owner shall obtain same prior to construction.

1.7 Interpretations and Questions. The Engineer shall be responsible to interpret the intent and meaning of the Contract Documents. All questions shall be directed to CORWIN & ASSOCIATES, INC., 1549 E. Tudor, Suite 204, Anchorage, Alaska 99507. Telephone (907) 561-6151.

2.0 EXCAVATION, BACKFILL, AND MATERIALS

2.1 Excavation and Backfill. Placement and locations of components have been generally indicated on the drawings. Excavation shall be provided as necessary to install components taking care as to not excavate any excess otherwise not required. If necessary, during excavation, the extent of excavation should include all material which may cause problems or damage to new components. This might include roots, trees, trash, muck, or rocks.

Backfill materials may be classified as native soil, gravel, and sand. All backfill shall be clean and free from all debris. Gravel to be used for backfill may be obtained from the local gravel pit areas in the community. Sand may also be obtained locally. In all cases, backfill materials should come from a source as close as possible to the site of construction. Backfill not classified as sand or gravel may be clean excavated material.

Gravel for beds or trenches shall be screened to 0.5 to 2.5 inches as much as possible. Sand shall have a uniform size of 0.4 to 0.6 mm and a uniformity coefficient of not more than 4.

All excavation and backfill shall be provided as indicated on the drawings. Care shall be taken to protect the bottom of excavation from compaction where sewage systems are to be installed. In all cases, except pipeline trenches where percolation is not necessary, the bottom of the excavation shall be raked with the backhoe blade to ensure the bottom has not been compacted during excavation. All bottom excavations shall be plus or minus 2 inches from depth indicated on drawings.

2.2 Insulation. Where insulation is indicated for on-site sewage systems, the insulation shall be Dow extruded blue styrofoam insulation board or equal of 2 inch thickness.

2.3 Engineering Fabric. Fabric to be used in on-site sewage systems shall be Typar 3401 or equal.

2.4 Distribution Piping. All piping to be used in soil absorption systems shall be as follows:

Perforated Rigid PVC	ASTM D2729
Rigid Solid PVC	ASTM D3034

Piping shall be installed as specified and in accordance with the provisions of ASTM Standards. Distribution piping shall be installed flat within a tolerance of 0.03 with no reverse grade acceptable. Joints on PVC piping shall be glued and solid joints. Standpipes shall be provided in the locations indicated on the drawings and shall have an airtight cap as indicated on the detail for standpipes. Individual residence cleanouts shall be installed with sweep tees and cleanouts and all provisions of standard practice and State regulations. All installation within 5 feet of houses and interior plumbing will be provided separately by others.

2.5 Sewage Collection Piping. Piping for house service lines and collection on the community system shall be High Density Polyethylene piping (H.D.P.E.). Pipe and materials shall be manufactured as governed by the following:

ASTM D1248	Polyethylene Plastics Molding and Extrusion Materials
ASTM D3035	Polyethylene Plastic Pipe Based on Controlled O.D.
ASTM D3350	Polyethylene Plastic Pipe and Fitting Materials

A. Materials:

Unless otherwise specified herein, all materials used in the manufacture of pipe, fittings, and accessories shall confirm to the governing standards.

a. Pipe Material

The pipe shall be made from polyethylene resin compound qualified as Type III, Class C, Category 5, Grade P34 in ASTM D1248 and have recommended designation values of 3-3-5-4-3-3-C as referenced in ASTM D3350. The minimum density of the base resin shall be 0.941 as determined by ASTM standard procedure for measurement of density D 792, Method B.

The material shall have a hydrostatic design basis when tested and analyzed by ASTM Standard Method D2837 of not less than 1450 psi, Table I of that standard not withstanding.

The raw material shall contain two percent (2%) carbon black for ultraviolet protection and shall be homogeneous. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material supplier.

The pipe and fitting shall be designed for thermal butt fusion jointing except as otherwise defined in this section.

b. Pipe Design

The pipe shall be designed in accordance with the relationships of the ISO - modified formula ASTM D3035.

$$\frac{2S}{P} = \frac{DO}{t} - 1$$

where S = hydrostatic design stress (psi), DO = outside diameter (inches), P = design pressure rating (psi), and t = minimum wall thickness (inches).

The design pressure rating shall be expressed in terms of the static working pressure in psi for water at 73°F according to ASTM D2837. The minimum allowable pressure rating for the pipe shall be 100 psi except the 4 inch sewer service to the property which may be 45 psi.

Unless otherwise specified, pipe shall be manufactured in 38-foot lengths.

It is essential that the pipe be capable of withstanding the freezing of water, under its rated service pressure, without breaks, leaks, gross deformities, or impaired service characteristics. The Contractor shall verify by submitting appropriate test data that the pipe furnished complies with the paragraph.

c. Fittings

Fabricated polyethylene fittings for pipe sizes 3-inches in diameter and larger shall be made in either a molded or a mitered fashion. The

fittings shall be at least the same grade as the polyethylene pipe.

All fittings furnished shall be fabricated using the thermal butt fusion process as applied by the manufacturer under controlled factory conditions. Fabricated pipe fittings shall be jointed to the polyethylene pipe by using Victaulic "Hugger" type couplings. The Contractor shall provide the proper bolts, back-up rings, and gaskets for the fittings. Bolts shall be provided for the intended use. Gaskets shall be reinforced black rubber, asbestos-rubber compound, or Buna N red rubber.

d. Service Connections

Sewer service connections will be made to the main line piping. Fabricated sewer service saddles are to be provided under this Contract in accordance with the drawings.

e. Manhole Provisions

Pipe fittings for sewer piping shall be cast in the walls of precast concrete manholes as shown on the drawings. Fittings shall be extended inside manhole portion, but Victaulic "Hugger" type assemblies shall be provided on the outside as shown on the drawings. The plain ends shall be 20-inches minimum, and 24-inches maximum from the outside face of the manhole.

The manufacturer shall provide two water stop collars as indicated on the drawings to be attached to the pipe prior to placement in the manhole. Details shall be submitted to the Engineer for approval.

The top portion of the fitting shall be cut for ready access as shown on the drawings. Bolts for Victaulic type couplings shall also be provided.

Detailed drawings of each manhole fitting shall be provided by the Contractor for approval prior to manufacture.

B. Testing and Inspection:

Testing and inspection of the polyethylene pipe and fittings shall be performed as outlined herein and shall be the responsibility of the Contractor. It shall be performed at his expense. Visual inspections described herein shall be performed on a piece-by-piece

basis. Laboratory tests required by the ASTM standards shall be conducted.

After completion of the pipe, joints, fittings, and appurtenances, the Engineer's representative shall visually inspect the items prior to installation. The results of all laboratory tests shall be made available at this time. If, during the final, inspection, considerable deficiencies are apparent, the Contractor will be directed to correct them before inspection continues. Any additional tests, verifications, or re-inspections shall be at the expense of the Contractor.

C. Shipping and Packing:

a. Pipe Lengths

Pipe shall be packed in bundles capable of being shipping by barge. The pipe shall be crated or packaged in containers to provide the required degree of protection for the contents to reach the designated destination without damage. If crating is to be used, crate design shall be submitted to the Engineer for approval prior to fabrication. Crates shall contain a full end protection. The truss work and woodwork in general shall be of substantial nature. Pictures of desired crating are available for the manufacturer from the Engineer.

b. Fittings

All fittings shall be packaged in crates of reasonable size. The crates shall be designed to provide the required degree of protection for the contents to reach the designated destination without damage.

c. Shipping Lists

Each crate or container shall contain a packing list of exactly what is contained within.

D. Submittals:

All bidders are required to submit the following information with their bid:

a. Polyethylene Pipe and Fittings

ASTM D 3350 cell classification.

Manufacturer's literature on service life, temperature, and pressures as related to the SDR number. Certification of ASTM D 2837 pressure rating.

Standard dimensions of pipe and fittings.

Certification of NSF approval.

Manufacturer's recommended procedures for installation temperatures and pressures. This should include standard procedures manual for Contractor use when installing pipe.

b. Fittings

Details of fittings, including fabrication method.

Also, proposed schedule of delivery for fitting assemblies to be placed in reinforced concrete manholes.

c. Laboratory Testing

Testing laboratory who will be receiving and examining material specimens.

d. Schedule Fulfillment

A detailed listing describing the schedule and approach to be used to satisfy the project requirements. The manufacturer must assure the Owner of their capabilities of meeting the schedule based on previous experience.

2.6 Septic Tanks. All septic tanks shall be supplied by a manufacture who performs such construction to all requirements of State and other accepted standards. The manufacturer shall provide all components necessary so that all that will be necessary is to install the tanks in their location as indicated on the drawings. Septic tanks shall be GREER or equal.

2.7 Mechanical Couplings. At each septic tank a mechanical coupling will be installed as detailed on the drawings. The couplings on the 4 inch piping shall be Fernco or equal. Other mechanical couplings shall be Rockwell or equal.

2.8 Sewage Lift Station. The sewage lift station shall be provided as indicated on the drawings. The manufacturer of the station shall provide an operation and maintenance manual along with warranties on the mechanical components for 5 years. Drawings and

details shall be submitted to Engineer for approval prior to manufacture. The Contractor shall provide a complete package including all electrical and mechanical equipment required for a complete pump station.

2.9 Manholes. Sewer manholes shall be constructed complete with covers, steps, fittings, and otner appurtenances, in accordance with the drawings.

Manholes shall be made of precast concrete.

Materials shall be as follows:

Precast Sections	Circular precast sections made of concrete; ASTM C478, except as modified.
Minimum thickness	As indicated on drawings.
Reinforcement	Standard.
Openings	Horseshoe shaped boxout or equivalent to install pipe section. Must provide watertight mortar bond.
Nonshrinking Mortar	Premixed or job mixed; job mixed shall be one part shrinkage correcting aggregate, one part portland cement, one part sand.
Portland Cement	ASTM C150
Sand	Concrete sand (fine aggregate) sieved through 8 mesh screen.
Shrinkage Correcting Aggregate	Master Builders "Embeco", Sika "Kemos", Sonneborn "Ferrolith G-DS", or equal.
Gaskets	
Mastic	Fed Spec SS-S-210, K.T. Snyder, "Ram-Nek", or equal.
Rubber	Neoprene or other synthetic, 40 plus or

minus hardness whenmeasured by ASTM D2240, Type A durometer.

Drawings and details of manholes shall be submitted to Engineer prior to manufacture.

2.10 Dosing Chamber Siphon. The structure and components shall be installed as detailed on the drawings. The dosing chamber shall be as manufactured by GREER, or equal. Dosing siphons shall be provided as indicated on the drawings. Drawings and details of proposed construction shall be submitted to the Engineer prior to construction.

3.0 INSTALLATION AND TESTING

3.1 Shop Drawings. Wherever called for in the specifications, submittals shall be made to the Engineer in triplicate. Construction will not be allowed on any particular item until review and acceptance are complete.

3.2 Installation. All components shall be installed as indicated on the drawings and as recommendated by the manufacturer. Sewer piping shall be laid at the grades indicated on the drawings to an accuracy of 0.03 feet. No negative grades or slopes will be acceptable. Service line slopes shall be provided so as to ensure a positive slope to the mainline. In no case shall the installed slope be less than the minimum acceptable.

3.3 Testing. All tests called for separately shall be provided and the sewer piping shall be subjected to an air test of acceptable quality to ensure the Owner that there are no leaks. Plugs or other devices shall be provided to protect questionable ends from leakage during testing.

3.4 Responsibility. The installation contractor shall be responsible to install all components as indicated on the drawings and specified herein. Adequate insurance shall be provided by the Contractor to provide adequate protection for himself, the Owner, and the Engineer from any claims or injuries arising in the work. If any component fails to pass tests or is found to be installed incorrectly, it shall be repaired or replaced to satisfy Owner of satisfactory performance.

4.0 MATERIAL SHIPPING

4.1 Delivery. All components necessary for the project shall be packaged and delivered to the site of work in original unharmed condition. Packaging and crating

shall be provided to protect all components from damage.

4.2 Scheduling. A detailed schedule of material delivery shall be prepared and submitted for approval by the Engineer to ensure timely construction.

4.3 Cost. All costs for shipping are to be paid for in material pricing. No separate payment will be made for shipping costs.

5.0 LABOR AND EQUIPMENT

5.1 Local Labor. To the greatest extent possible, local labor shall be utilized to carry out work tasks. Supervisory tasks should be handled by a competent foreman skilled in installation of systems of this type and variety.

5.2 Equipment. All equipment necessary for the installation of project components shall be provided.

5.3 Mobilization and Demobilization. The installation contractor shall handle all aspects of mobilizing and demobilizing men, materials, and equipment to the site.

6.0 PAYMENTS

The form to be used for bidding by the Contractor shall be a Bid Form and any added or deleted items shall be paid for at the unit cost listed in the schedule.

Payment for items constitutes payment in full and the only method for obtaining additional funds on any item will be by adding extra items.

Measurement of installed piping and materials, as applicable, will be made by tape after all installation and testing are complete. Payment for other components shall be made when installation is complete.

EKWOK, ALASKA

SEWAGE DISPOSAL SYSTEMS

Prepared for:

THE VILLAGE OF EKWOK, ALASKA
and
THE VILLAGE SAFE WATER PROGRAM
Alaska Department of Environmental Conservation
Anchorage, Alaska

Prepared by:

CORWIN & ASSOCIATES, INC.
1549 E. Tudor, Suite 204
Anchorage, Alaska 99507

January 1985

SUMMARY AND RECOMMENDATIONS

The analysis and final design data presented herein are the result of all investigations performed for the Ekwok, Alaska sewage disposal systems. The final design for the community consists of individual on-site systems for the majority of the residences and a community type system for those homes located in the lower flat portion of the community below the bluff. The community type system is most economical if an absorption type field is used for disposal rather than a lagoon or other alternative.

Our recommendations for final construction and adequate installation of the complete sewage systems are as follows:

1. Each individual on-site system should be located by staking in the field prior to construction, but not prior to Spring break-up.

2. It is recommended that a final inspection of soil types be made at each system prior to installation to ensure design is appropriate. Inspection of final construction would also provide positive insurance of long term bed life. This would also ensure all State standards have been followed in construction.

3. The community wells or private wells not used any longer should be abandoned and permanently capped.

4. The community system collection piping should be polyethylene so that adequate variance may be obtained from well separation distances required by the Alaska Department of Environmental Conservation. This is basically due to butt-fused joints vs. open joints in other pipe materials.

5. A soil absorption system is much more practical and economical for the community system than a lagoon type treatment unit. It is also less harmful to the environment if located properly. Separate cost analysis has been submitted to demonstrate economics.

6. A person or persons within the community should be appointed to have responsibility to ensure proper maintenance is performed on the new sewage systems and to maintain the new sludge disposal trailer when acquired.

7. A site should be selected by the Village of Ekwok for disposal of septage when pumped from septic tanks.

8. The entire final design and information presented herein should be approved and accepted so that construction may begin in Spring 1985.

INTRODUCTION

The Village of Ekwok, Alaska, in association with the Village Safe Water (V.S.W.) branch of the Alaska Department of Environmental Conservation, entered into a contract with Corwin & Associates, Inc., on September 29, 1984, to design a sewage system for the community. The Village had just recently completed a similar project with V.S.W. which installed new wells to each residence. The two projects are unrelated and this analysis and design deals with sewage systems only. The location of sewage systems was not coordinated with well locations prior to well installation.

The basic design parameters established with V.S.W. and the Village of Ekwok were as follows:

1. Obtain soil data sufficient for design of approx. 22 home individual on-site systems and the community system.

2. Provide sufficient survey to establish location of systems in relation to wells and property lines.

3. Design a community type system for houses located in the lower part of the community near the Nushagak River (Approximately 7 homes).

4. Coordinate work with Village representative and individual homeowners.

5. Prepare site plans for all systems to be used in construction.

6. Obtain approval of designs from the Alaska Department of Environmental Conservation.

7. Prepare material take off list and a total project cost estimate.

8. Investigate local gravel source for use in sewage system construction.

After the project began, changes were requested including expanding the community system and adding additional homes for a total of 34 homes (18 individual and 16 community).

SOILS INVESTIGATIONS

Thirteen (13) test holes were dug using a backhoe located in the Village. Results of the test holes and percolation testing or visual analysis are shown and indicated on Sheet 2 of 5 in the

project plan set. These various test holes were used to design the individual on-site septic systems and drainfields.

The abandoned gravel pit, located just outside the community, contains a good quality gravel which may be used in construction of the individual systems and the area will also serve ideally for the location of the community type soil absorption system.

Two (2) holes were dug for the community system design.

SURVEY

Survey work performed consisted of referencing houses and wells to previously established B.L.M. property lines. This should not be construed to mean a complete survey of the community, but rather spot verification of locations referenced to monuments found in the field.

A plan and profile base line survey for the community type system was also performed to establish design and construction elevations.

COMMUNITY SYSTEM DESIGN

Several alternatives were investigated which included the following:

1. A small soil absorption bed located near the seven homes to be connected (this system was not desired by the community).

2. A community lagoon of various sizes located in various locations.

3. A soil absorption system for service to 16 homes located near the abandoned gravel pit.

After preparation of cost estimates and coordination with V.S.W. and the Village of Ekwok, Alternative No. 3 above was selected as the most acceptable, practical, and economic alternative.

Design data and details are indicated on Sheets 3, 4, 5, and 6 of the project plan set.

kjh

INDIVIDUAL SEWAGE SYSTEM DESIGNS

For overall community map-See Sheets 1 and 2 of the plan set

* Each individual sewage system has been indicated on the site plans which follow and the appropriate soil absorption bed design appears on the back of each site plan. For ready reference, each site plan and bed have been numbered as follows:

	Resident Name	Site Plan	Bed Design
1.	Robert Brown	1	1
2.	Juanita Kazimirowic	2	1
3.	Pat Chiklak	3	1
4.	Pete Walcott	4	1
5.	Paul Romie	5	2
6.	Jeff Romie	6	2
7.	Mary Larson	7	2
8.	Mary Macleod	8	2
9.	Thomas Nelson	9	3
10.	Fred Hurley	10	3
11.	Mary Yukluk	11	3
12.	Alex Nelson	12	3
13.	Philip Akelkok & Council Building	13	4
14.	Masa Acey & Julia Brown	14	4
15.	Poncho	15	4
16.	Wass Nickolai	16	4

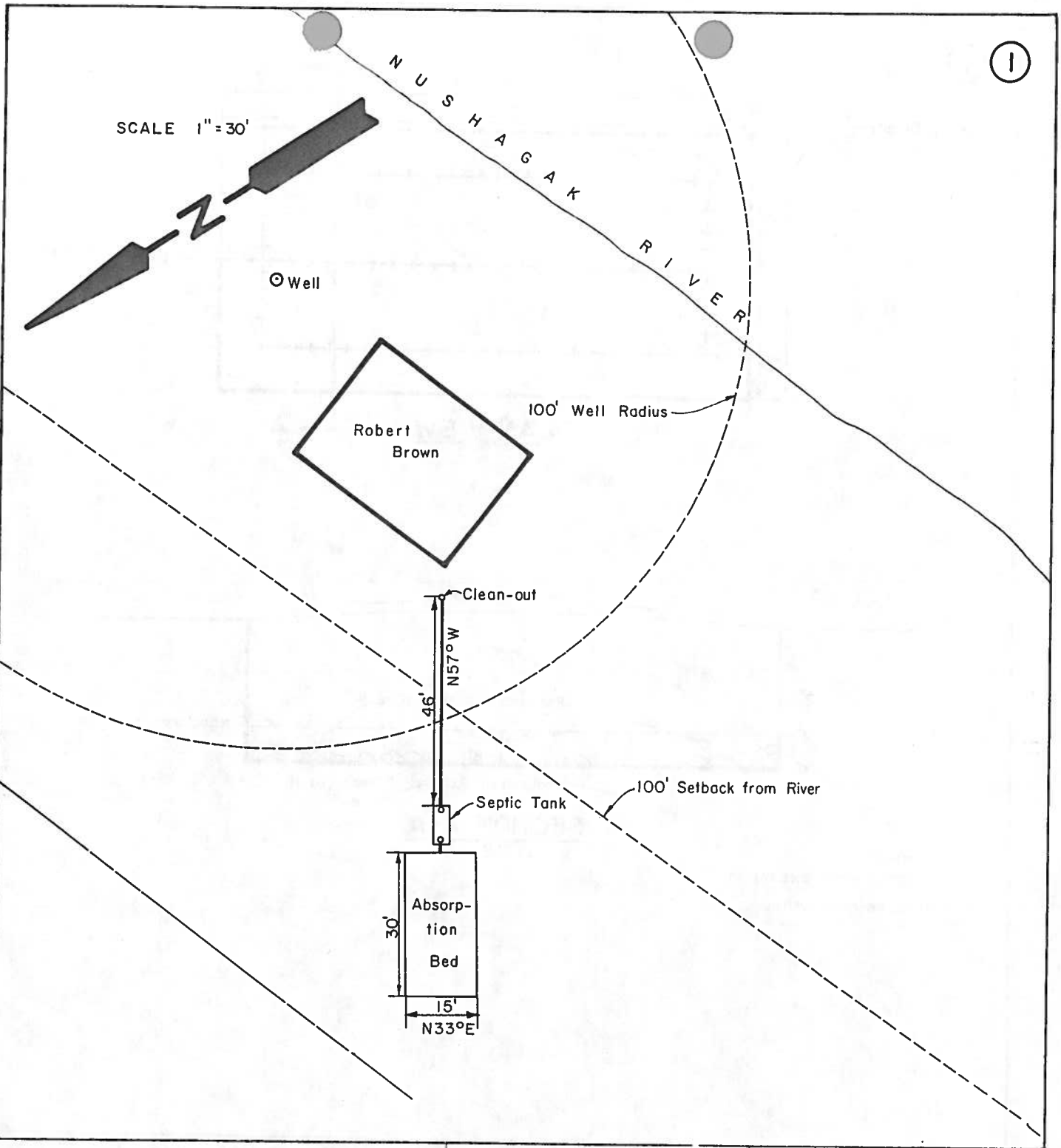
The remainder of the homes will be connected to the community system.

Total homes receiving individual on-site systems is 18 with a total of 16 bed systems.

The community system is shown separately on Sheets 3, 4, 5, and 6 of the plan set. There are 16 homes connected to the system.

A total of 34 homes are receiving sewage systems.

*Septic tank and miscellaneous details for individual sewage systems are shown on Sheet 6 of the plan set.

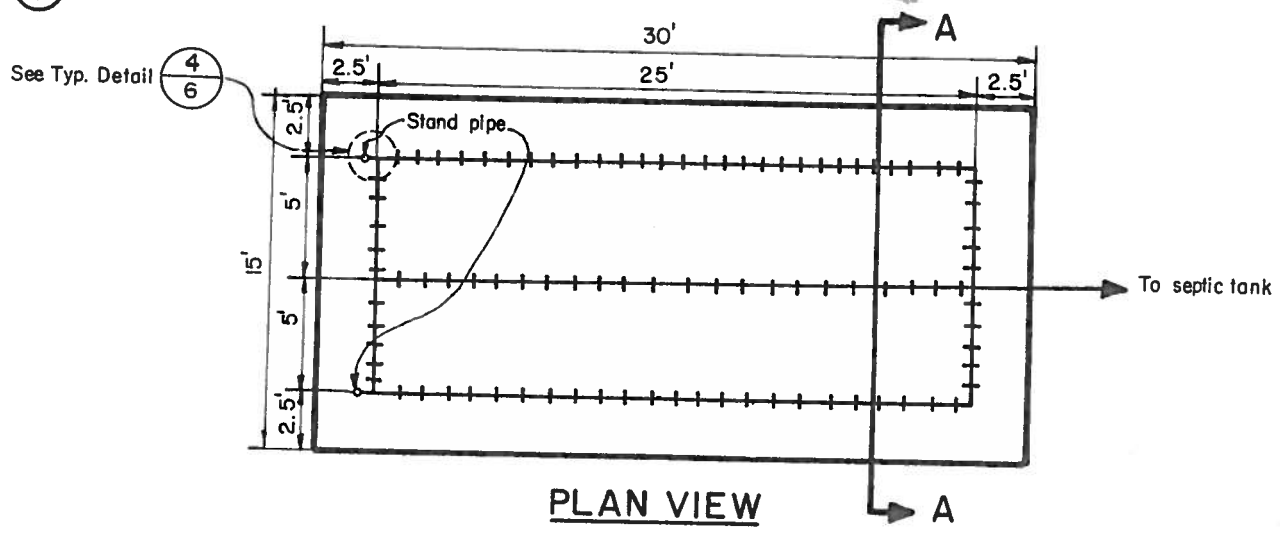


VILLAGE OF EKWOK SEPTIC SYSTEM SITE PLAN

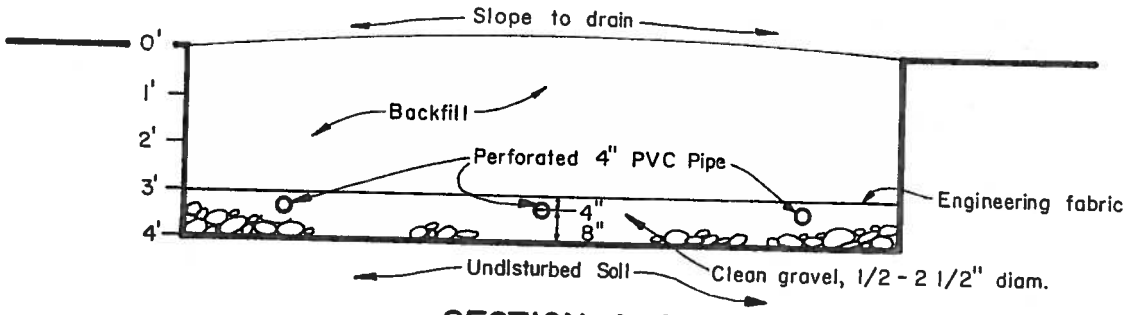
Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T H. II	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Robert Brown	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151

(1)



PLAN VIEW



SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H 10, 11	
Three bedroom system with 450 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
1512 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
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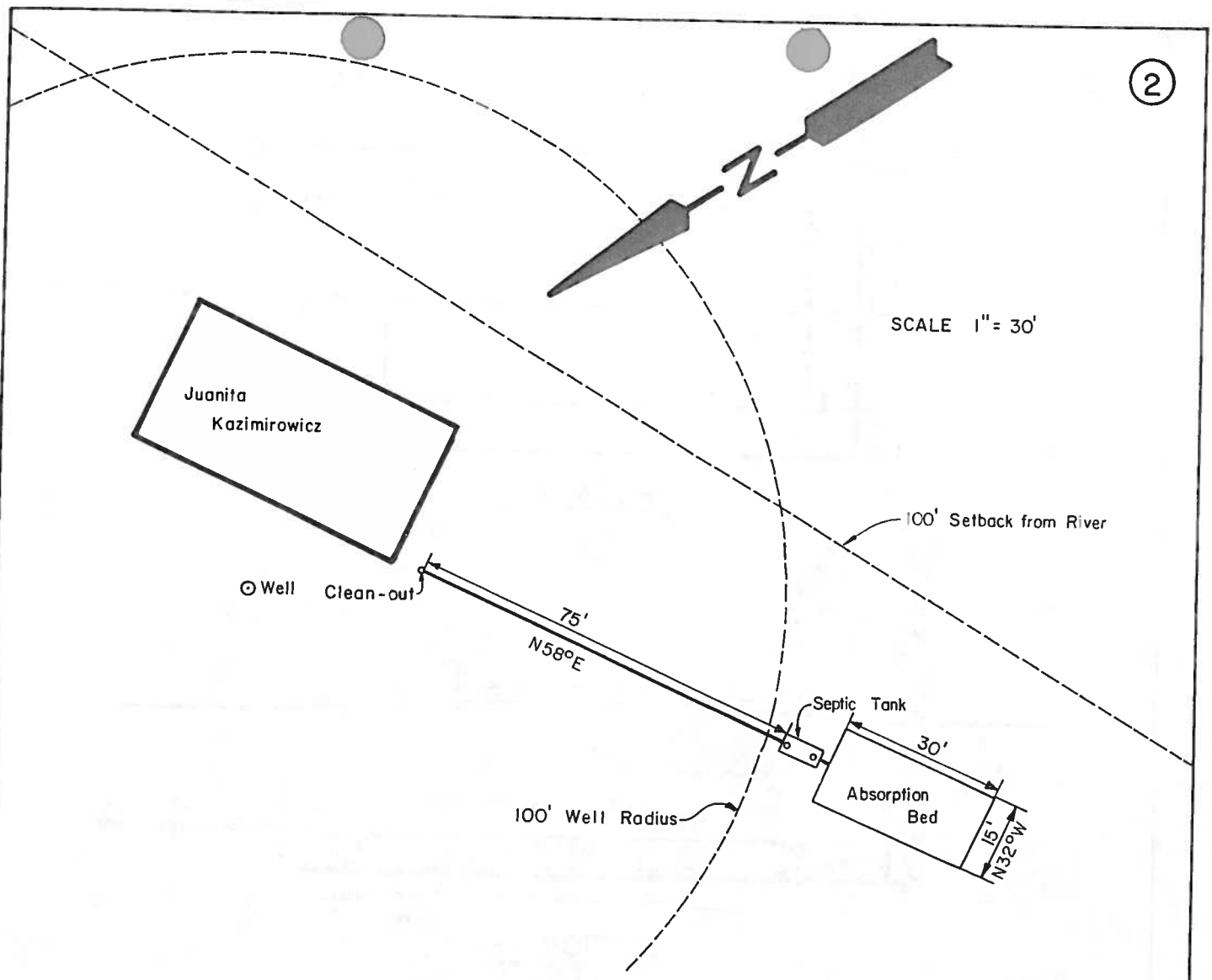
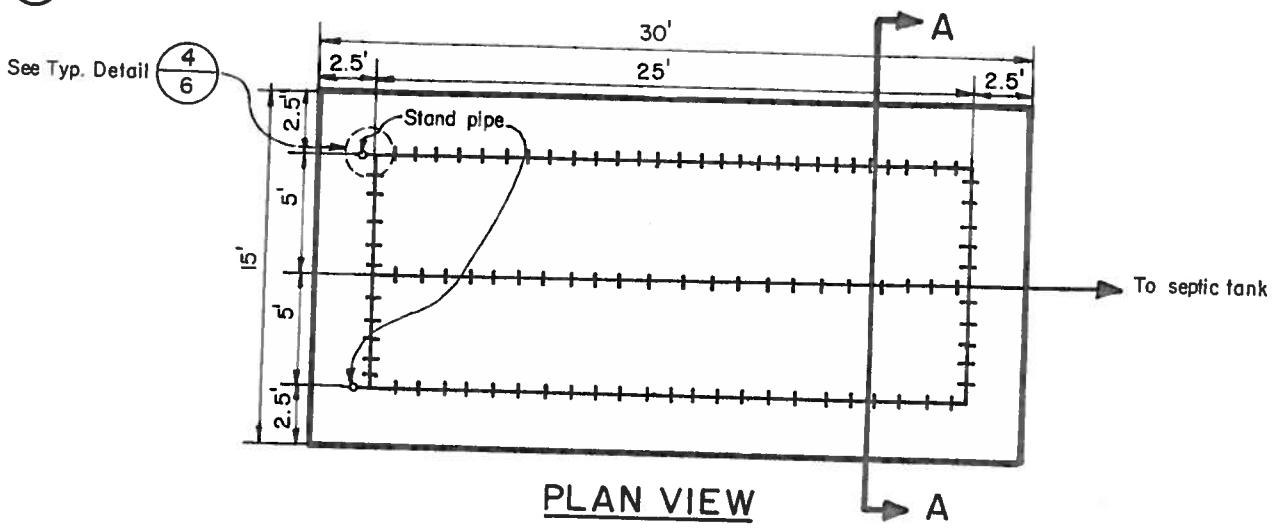


VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

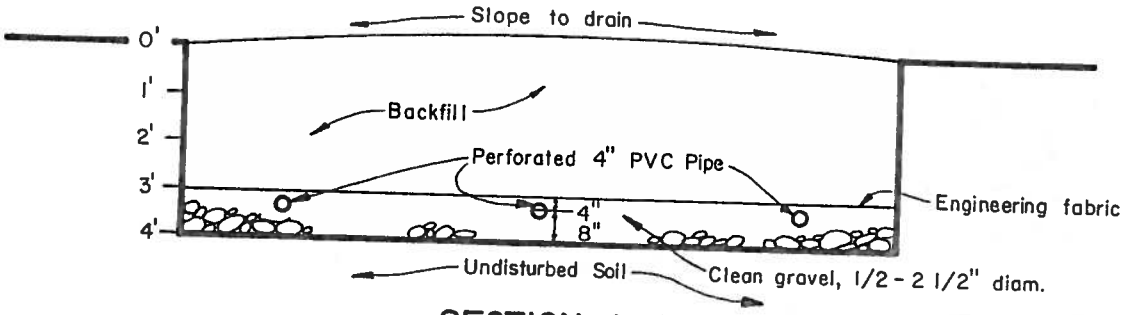
Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H. 11	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Juanita Kazimirowicz	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-5151

(1)



PLAN VIEW



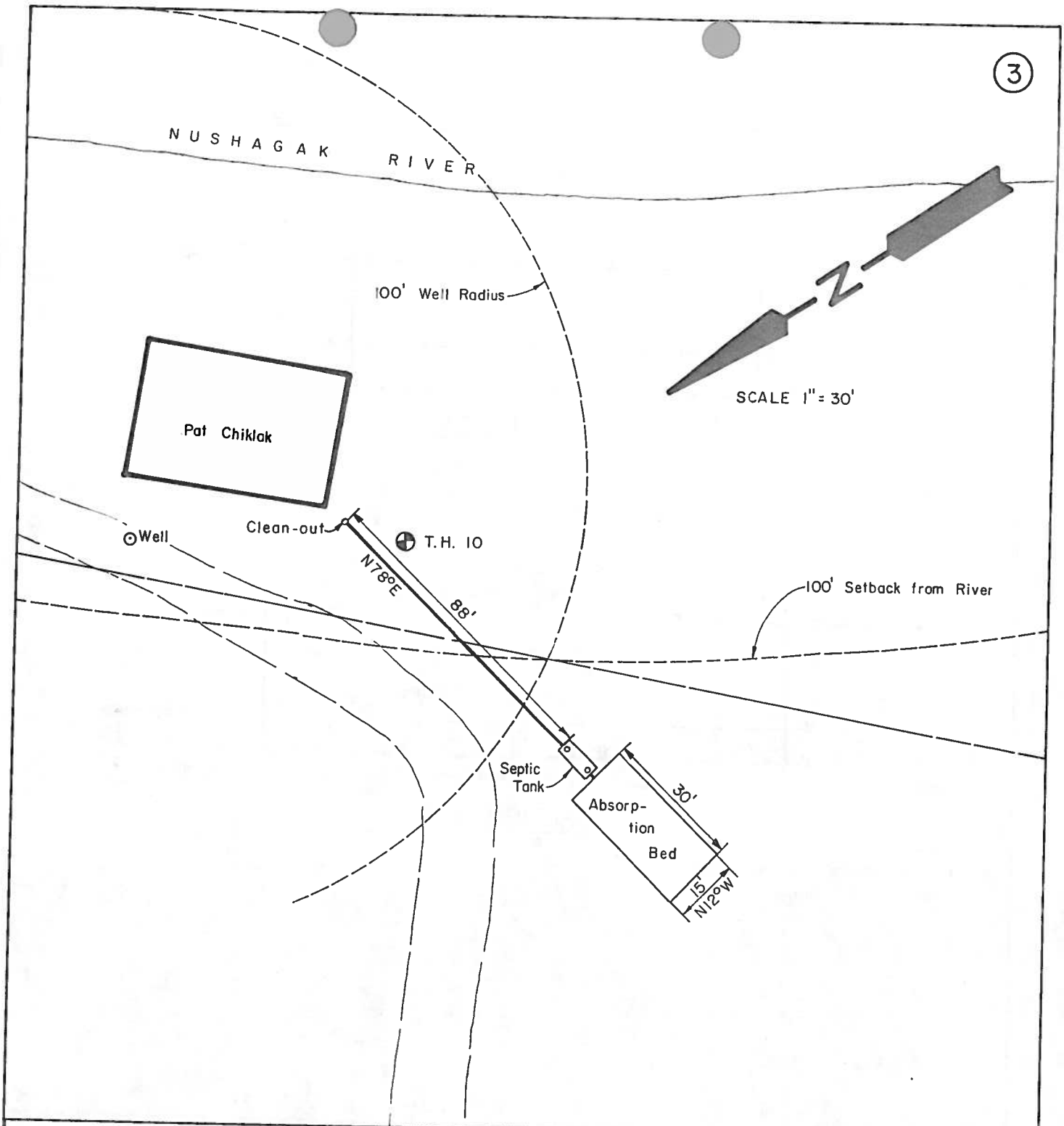
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H 10, 11	
Three bedroom system with 450 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
15 E TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK SEPTIC SYSTEM SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H. 10	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Pat Chiklak	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
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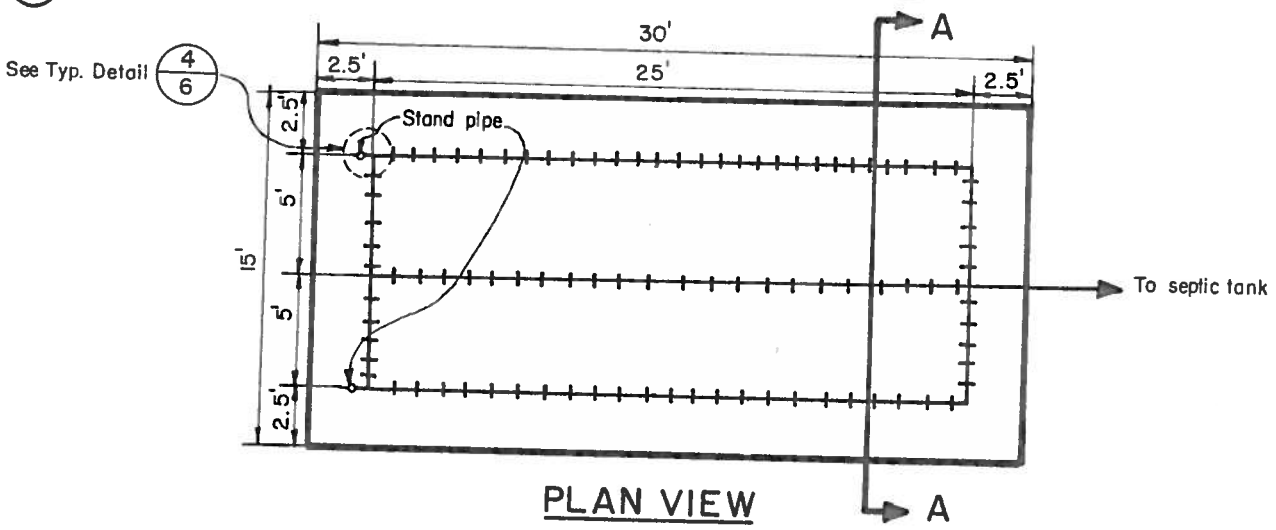
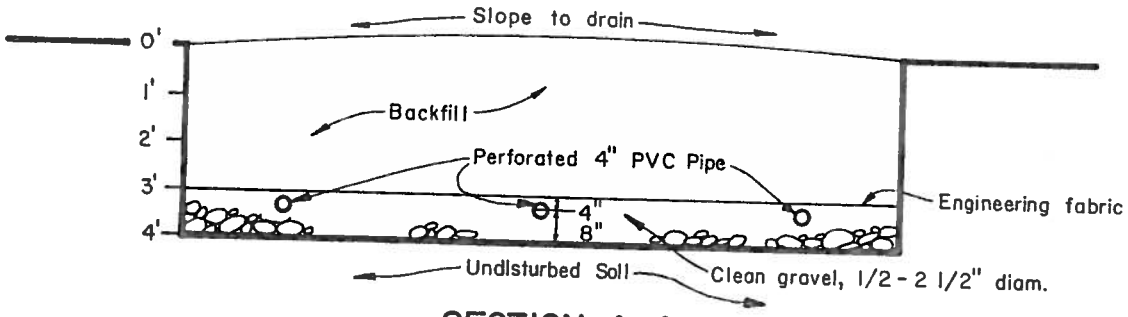
(907) 561-6151

(1)



PLAN VIEW



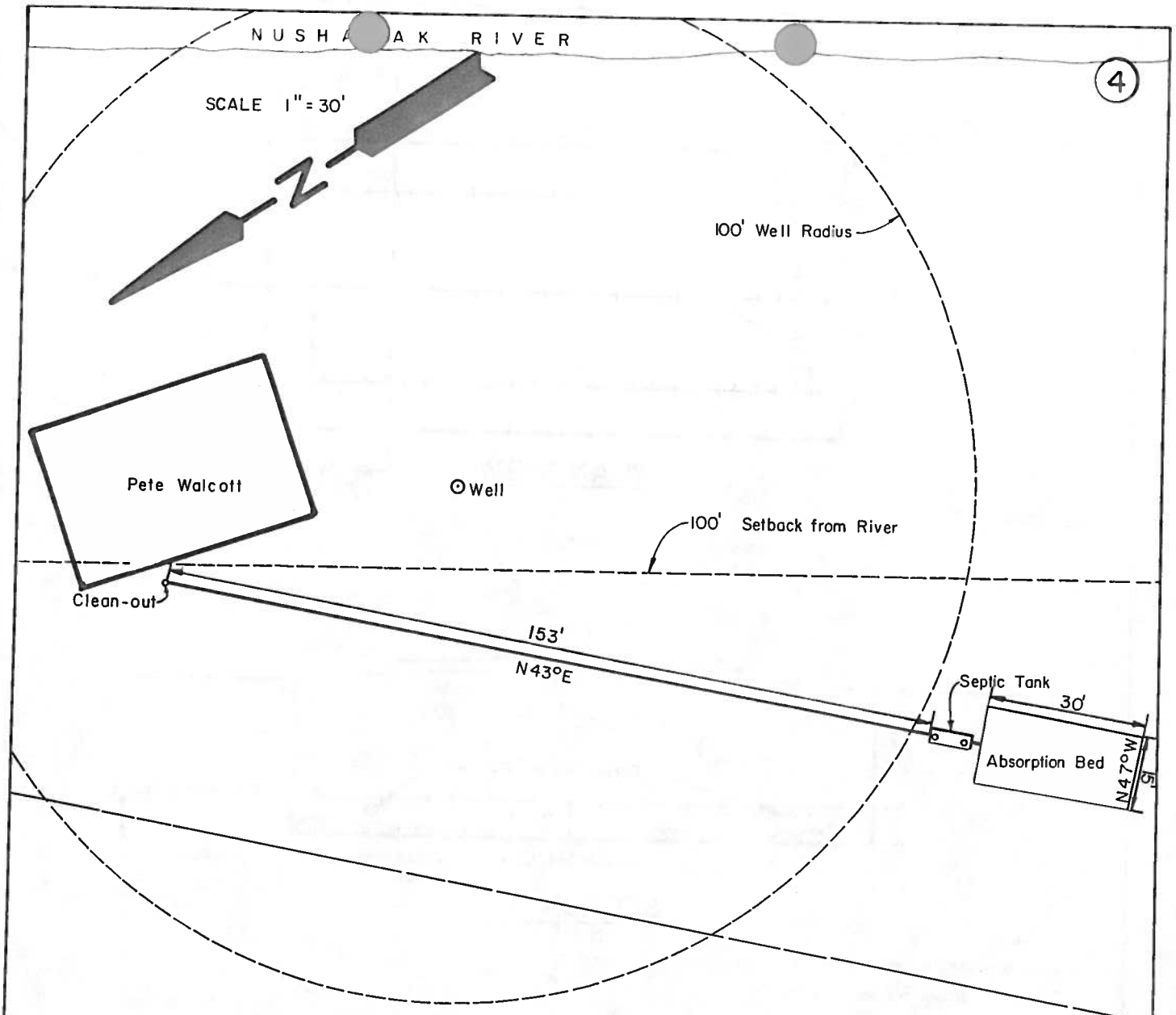
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H 10, 11	
Three bedroom system with 450 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
15 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H. 10	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Pete Walcott	

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Corwin & associates, inc.
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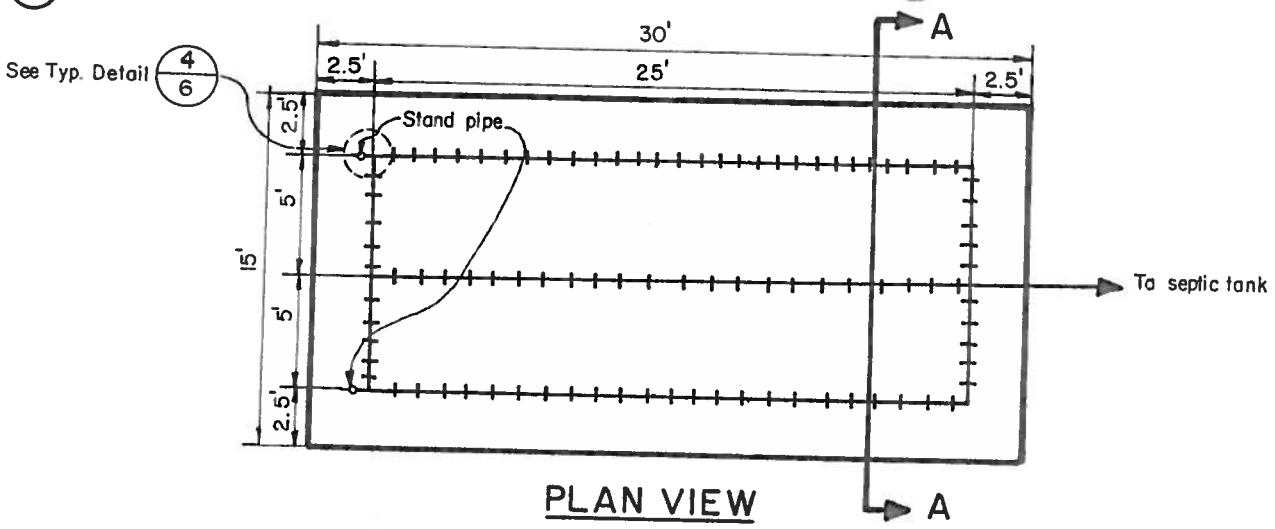
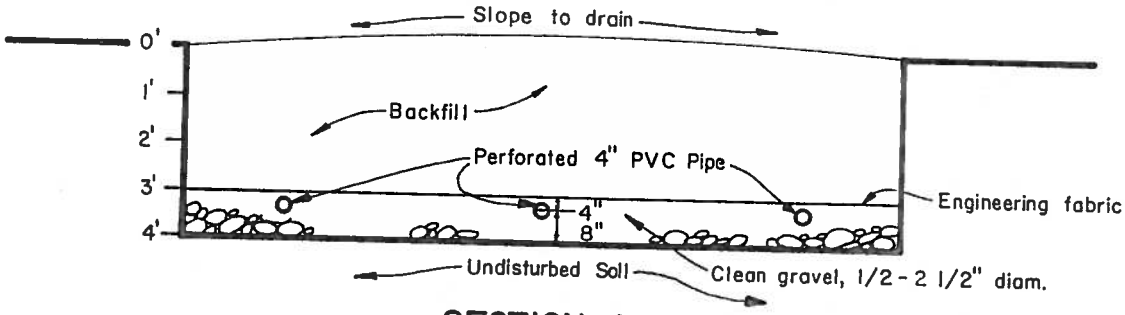
(1)



PLAN VIEW



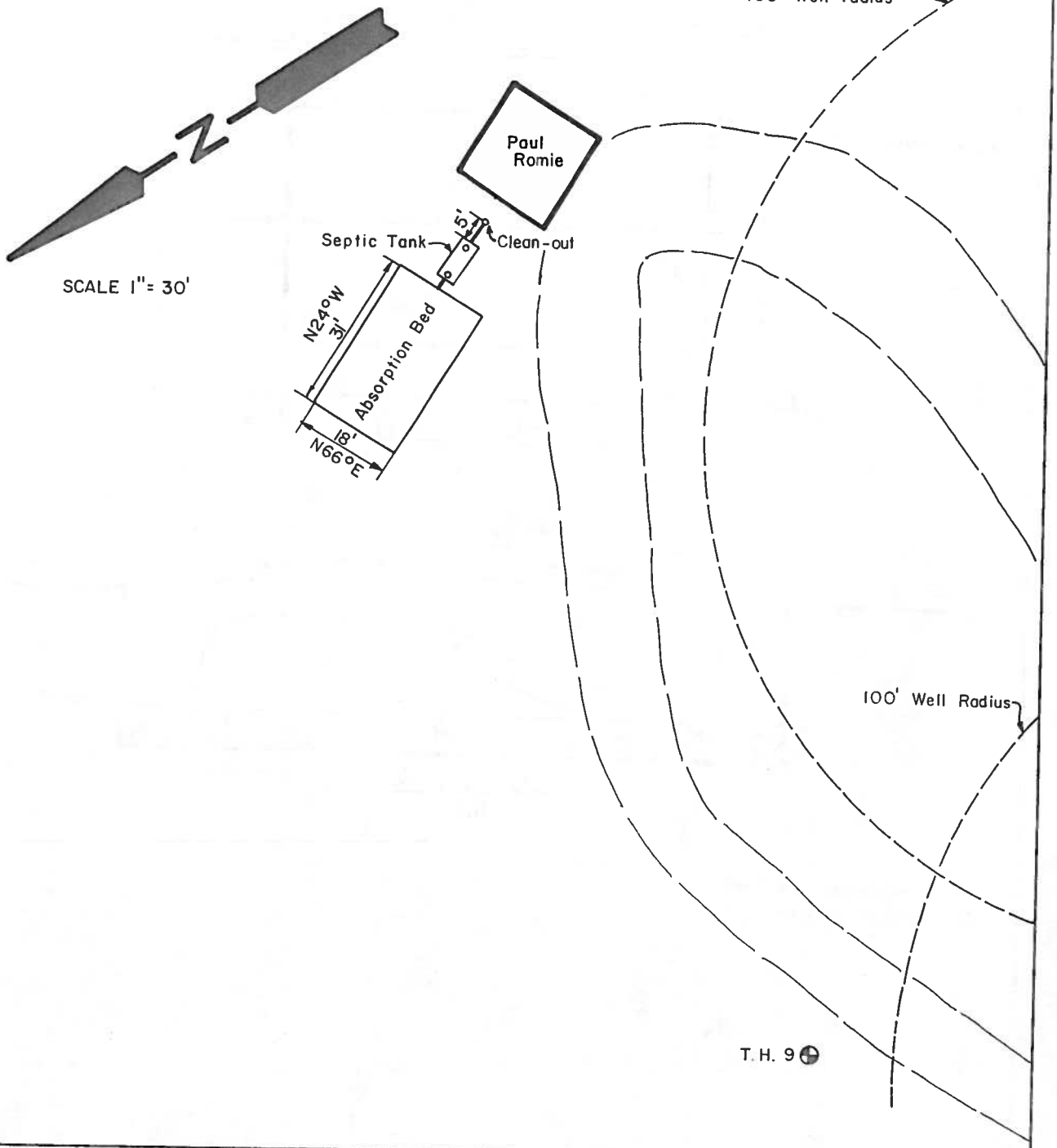
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 150 sf/br based on T.H. 10, 11	
Three bedroom system with 450 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
15[illegible] E TUDOR RD SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK SEPTIC SYSTEM SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Paul Romie	

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Corwin & associates, inc.
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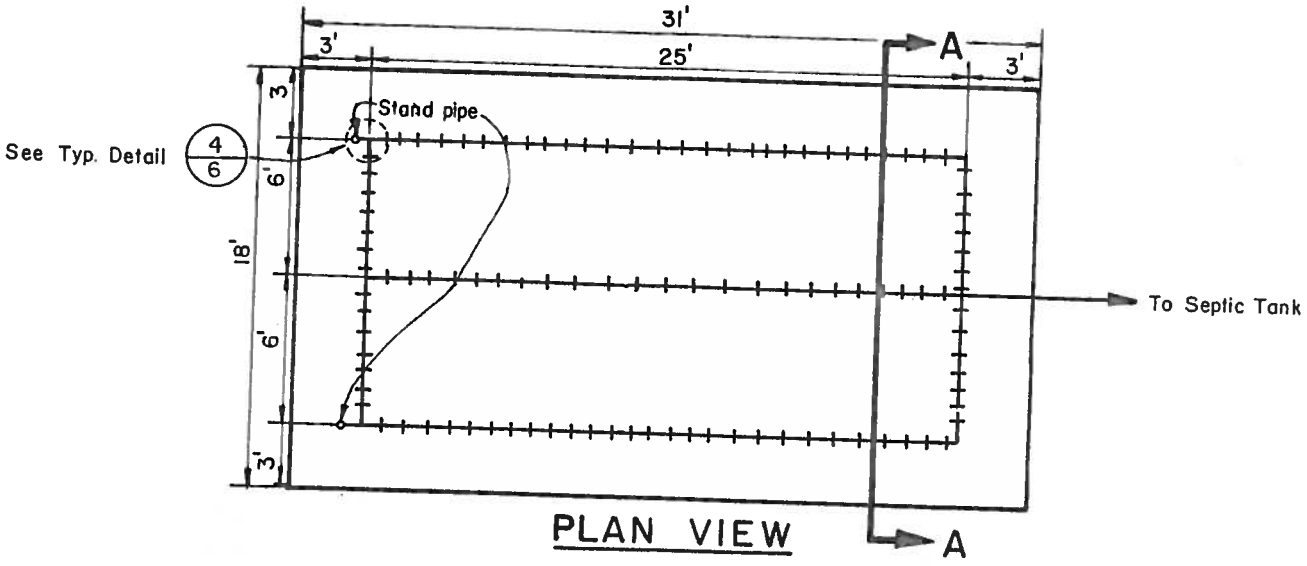
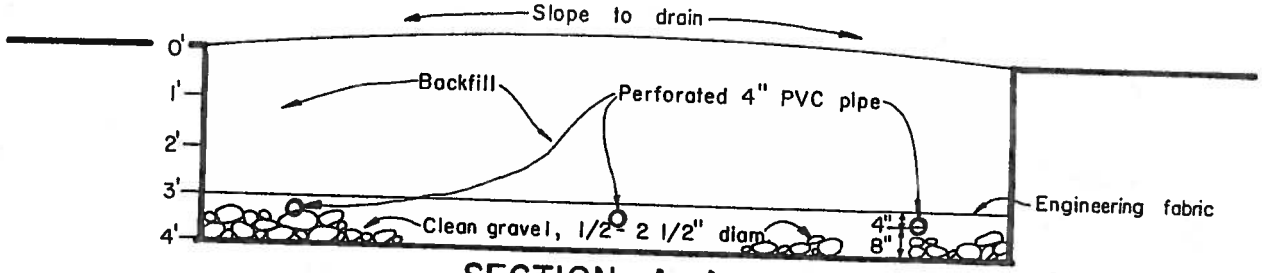
(907) 561-6151

(2)



PLAN VIEW



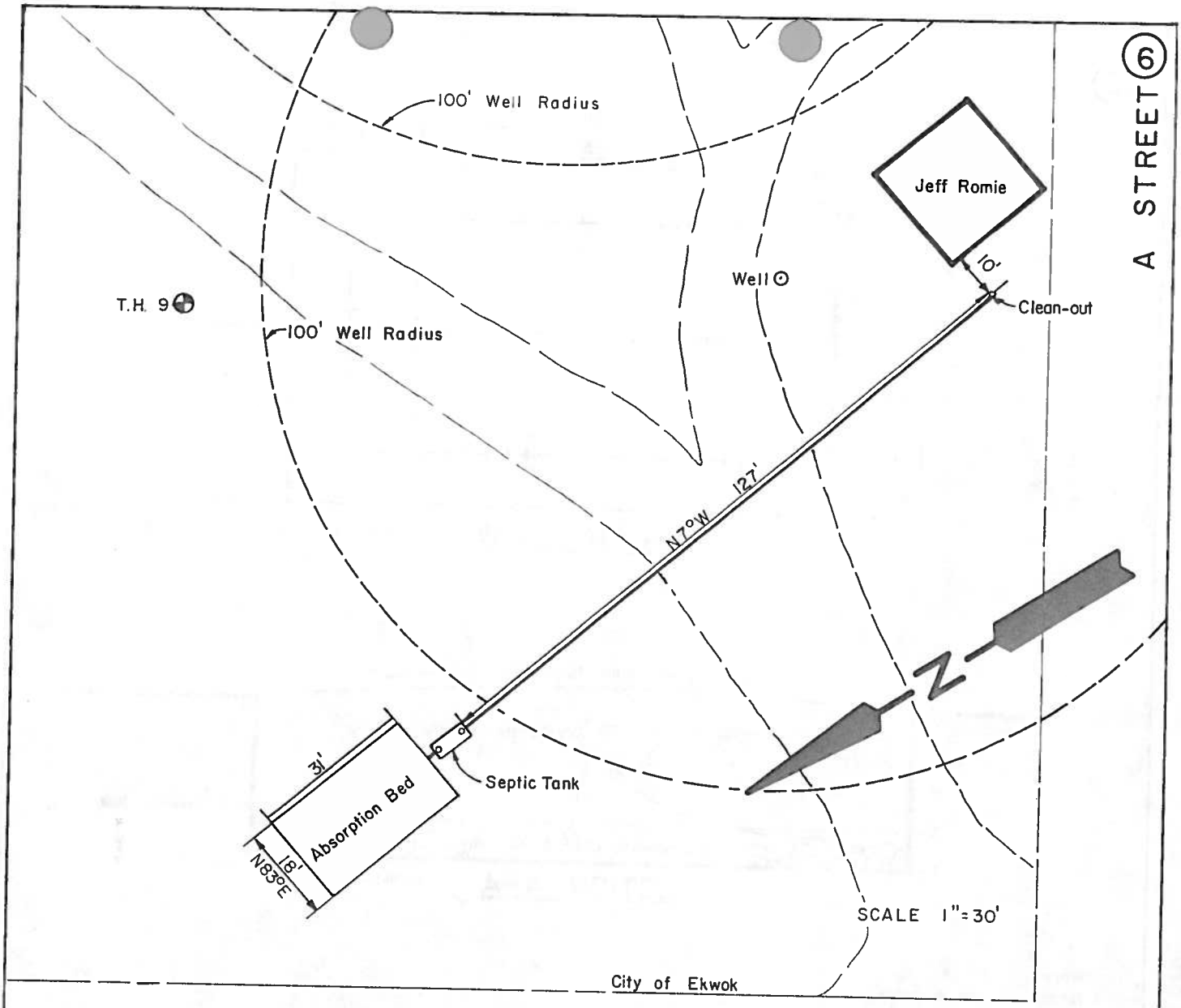
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Three bedroom system with 558 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Jeff Romie	

Prepared by
Corwin & associates, inc.
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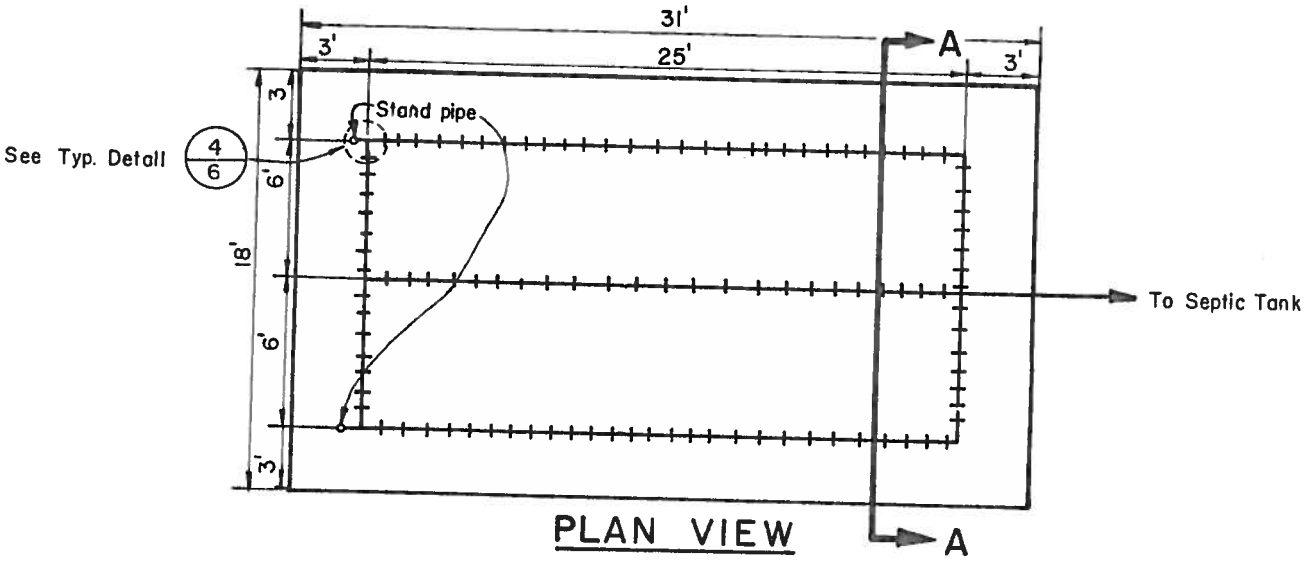
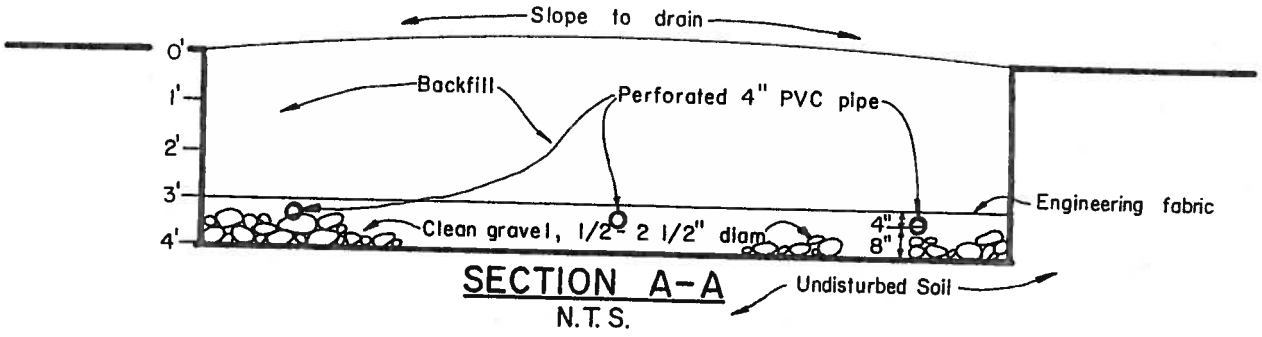
(2)



PLAN VIEW



SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Three bedroom system with 558 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
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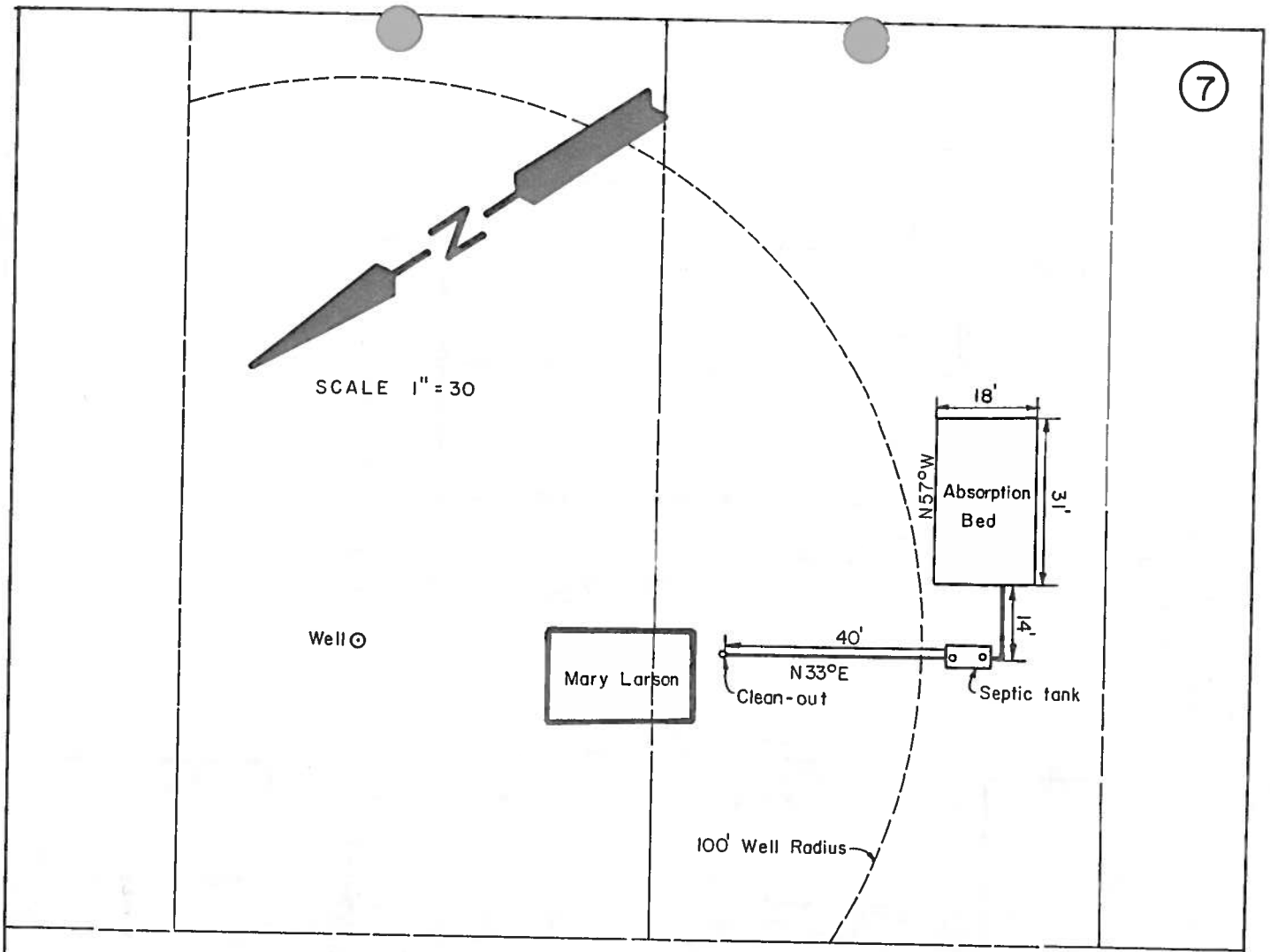
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK SEPTIC SYSTEM SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Mary Larson	

Prepared by
Corwin & associates, inc.
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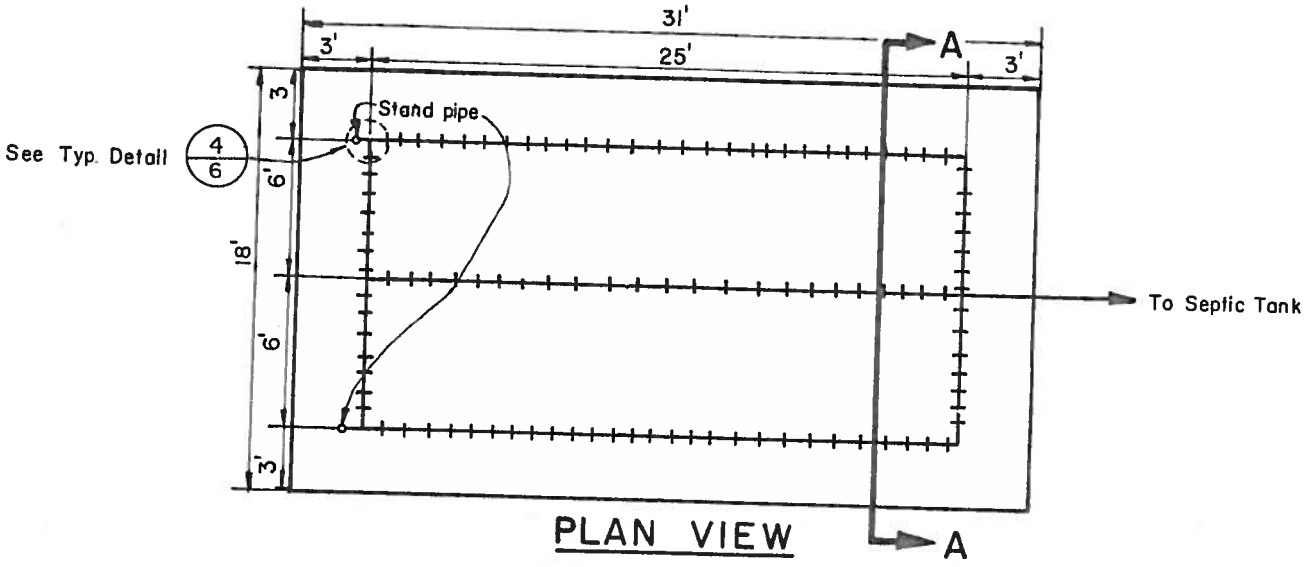
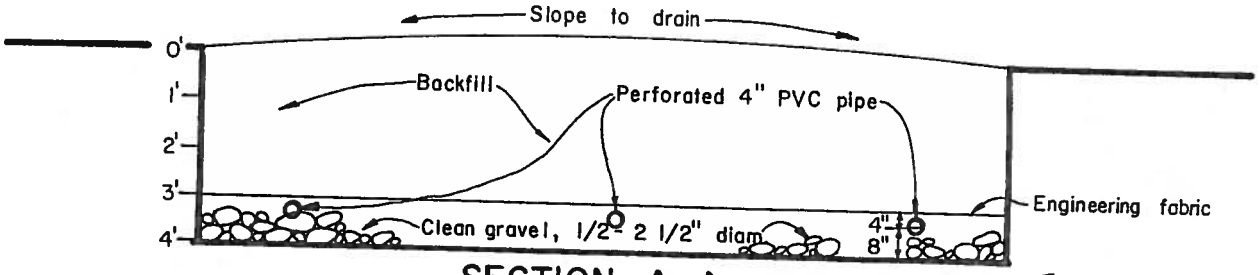
ANCHORAGE, ALASKA 99507
(907) 561-6151

②



PLAN VIEW



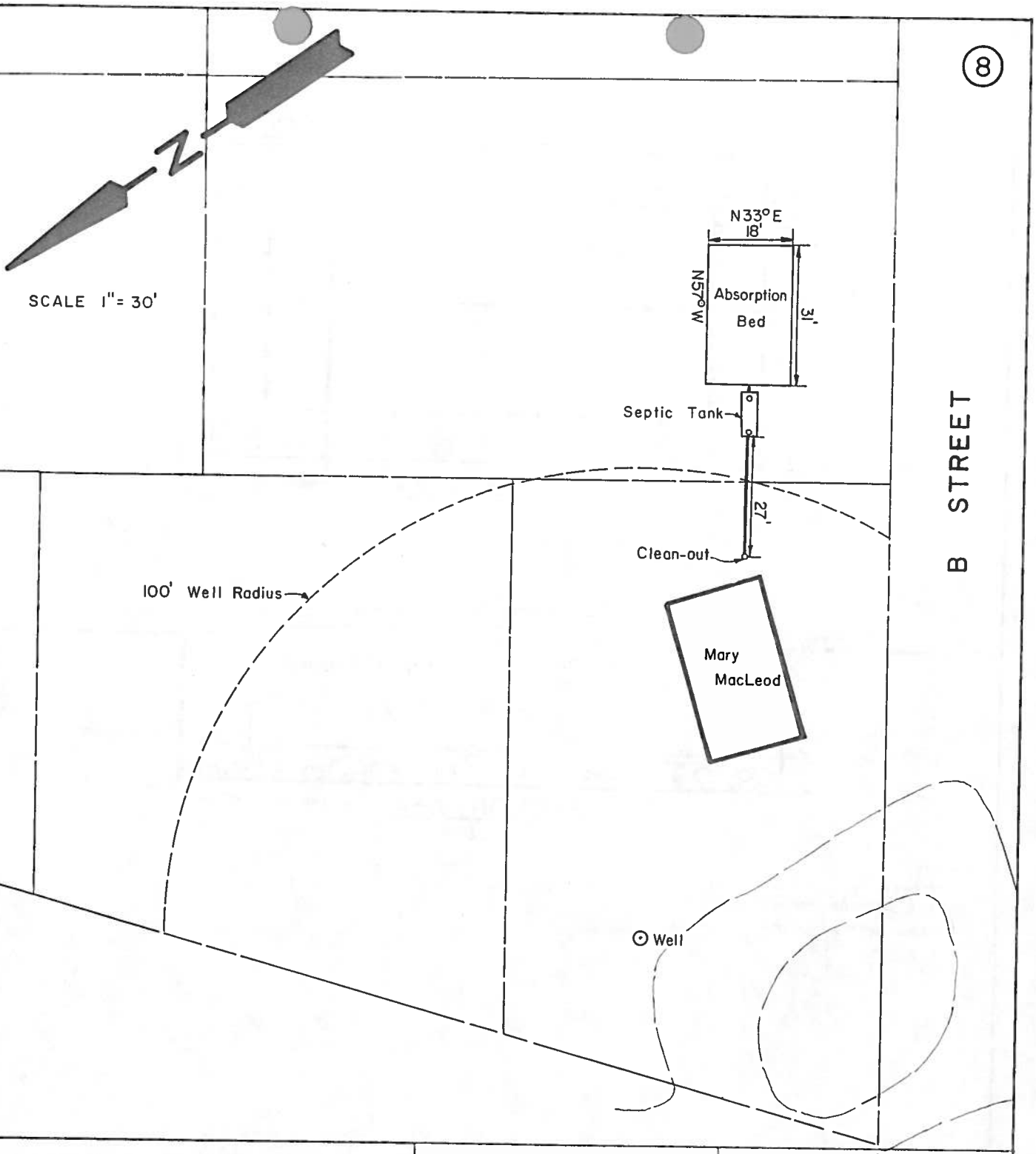
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Three bedroom system with 558 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
1549 E TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151

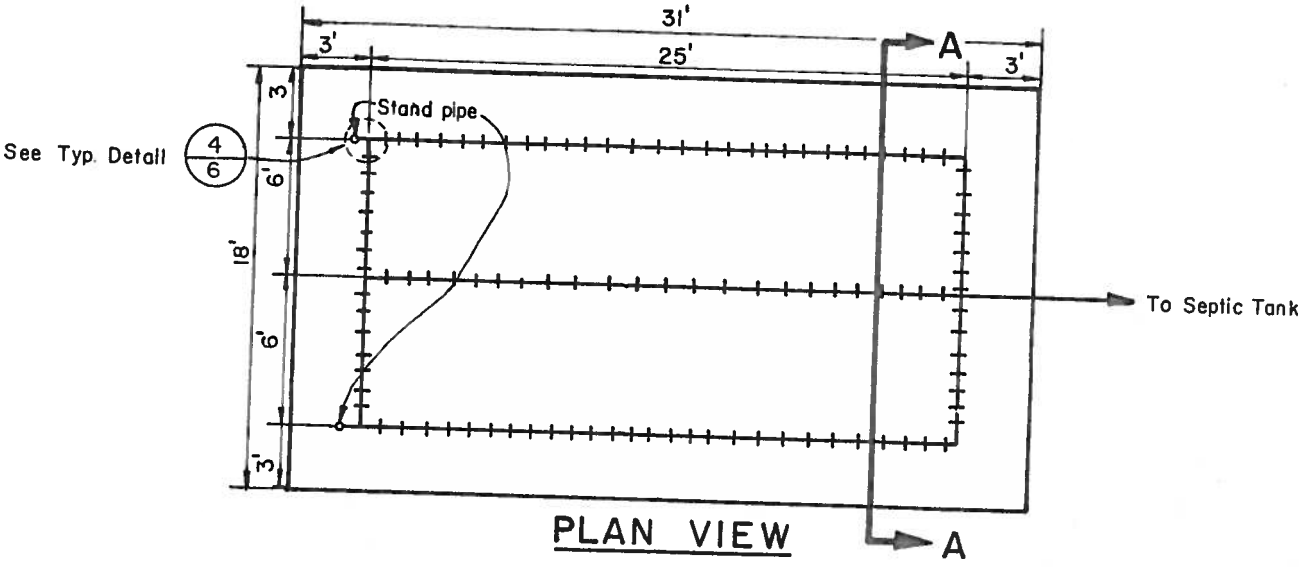


VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

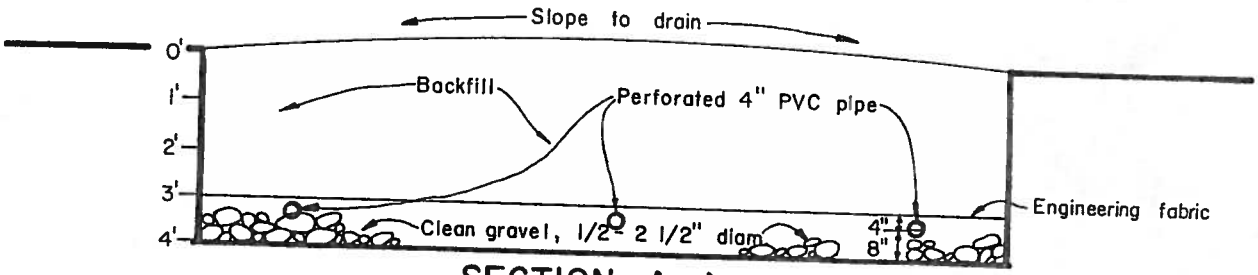
Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Mary MacLeod	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151

(2)



PLAN VIEW



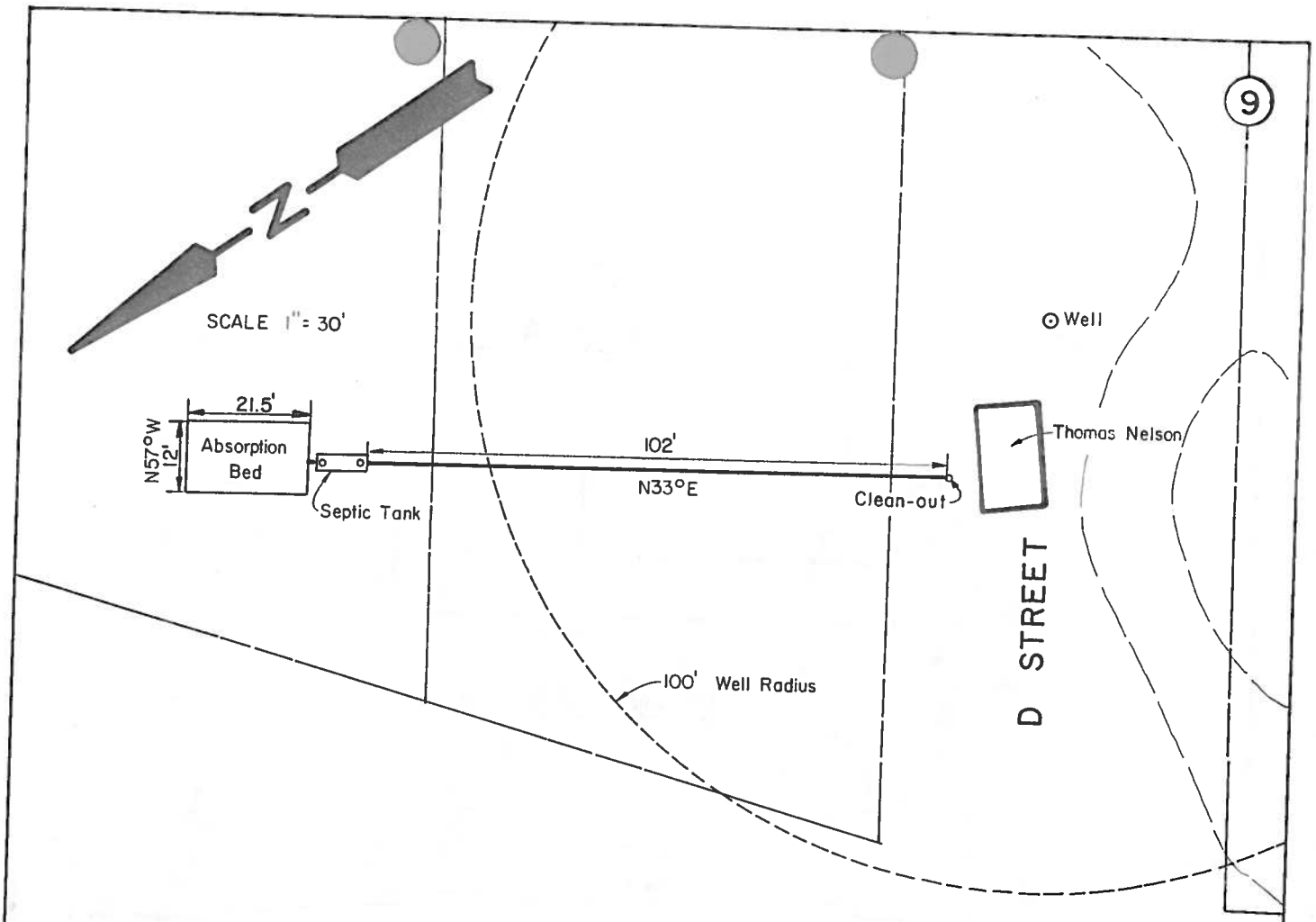
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 185 sf/br based on T.H. 9	
Three bedroom system with 558 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6131

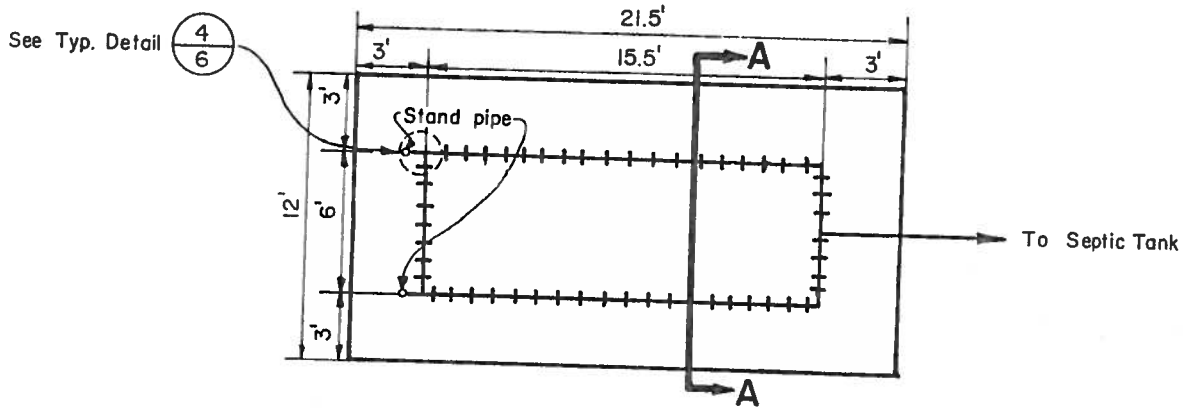


VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

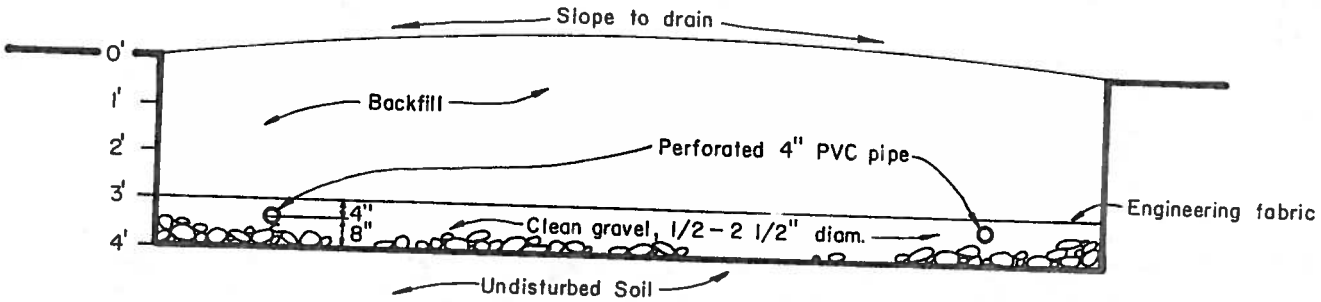
Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 8	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Thomas Nelson	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151

③



PLAN VIEW



SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 8	
Three bedroom system with 258 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
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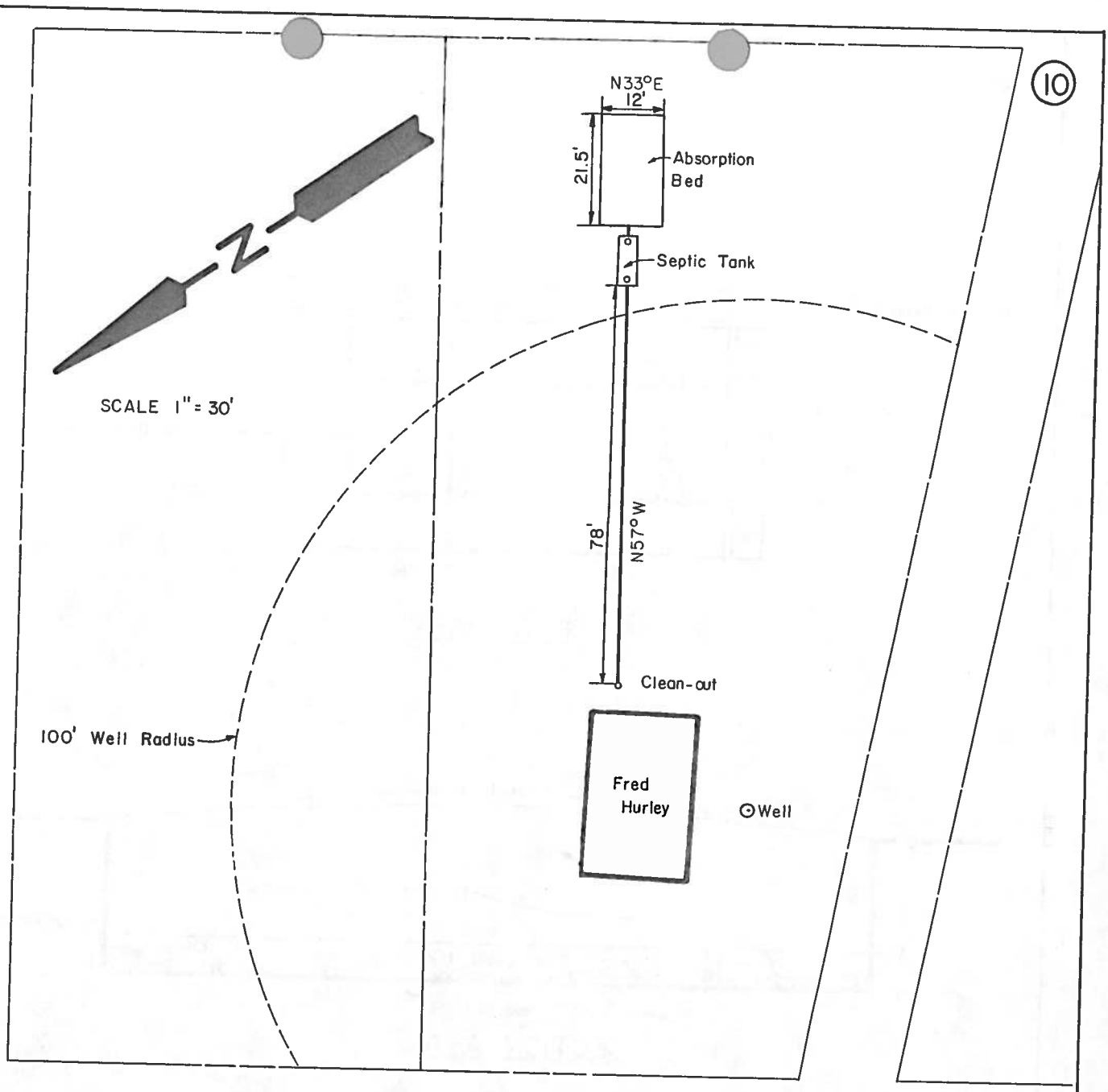
ANCHORAGE, ALASKA 99507
(907) 561-5151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 8	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Fred Hurley	

Prepared by
Corwin & associates, inc.
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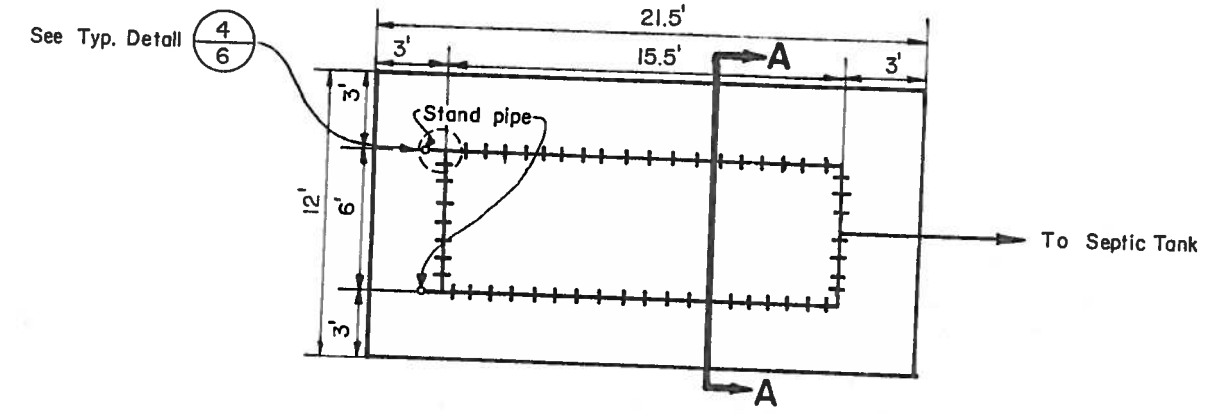
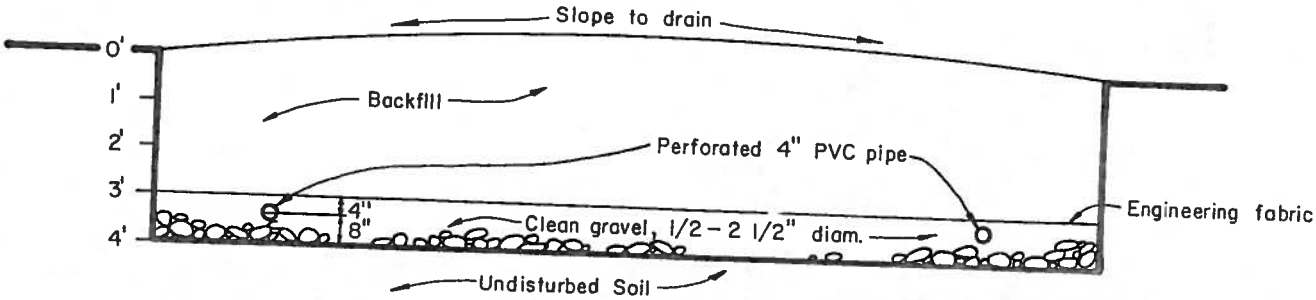
(907) 561-6151

③



PLAN VIEW



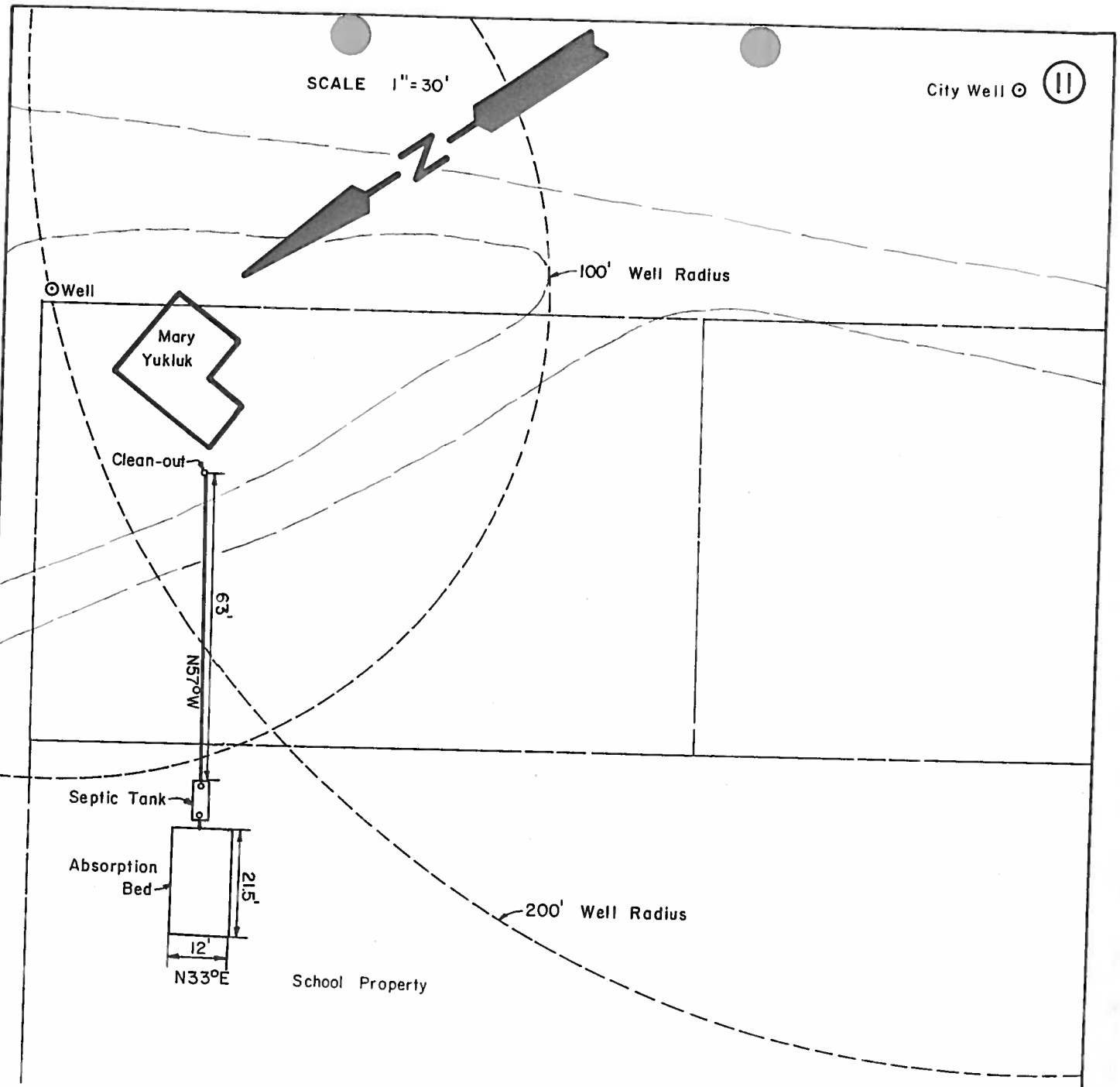
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on TH 8	
Three bedroom system with 258 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 8	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Mary Yukluk	

Prepared by
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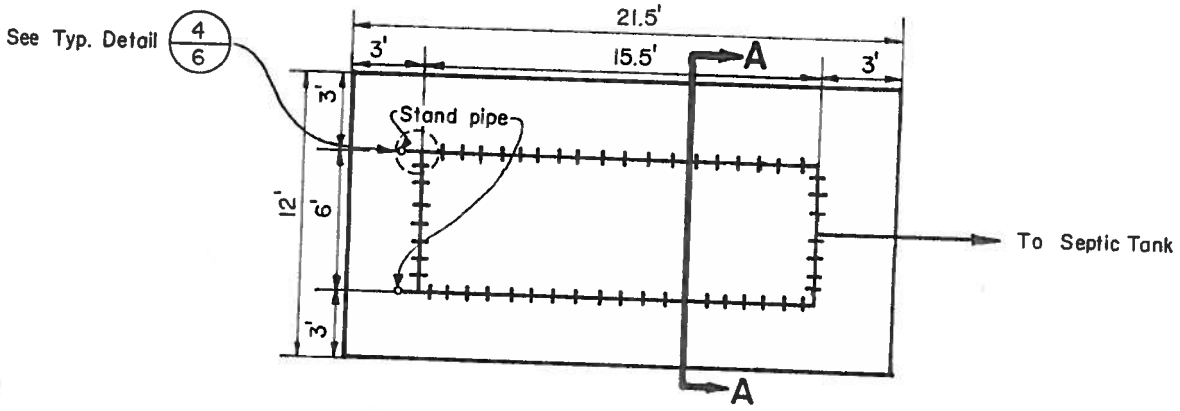
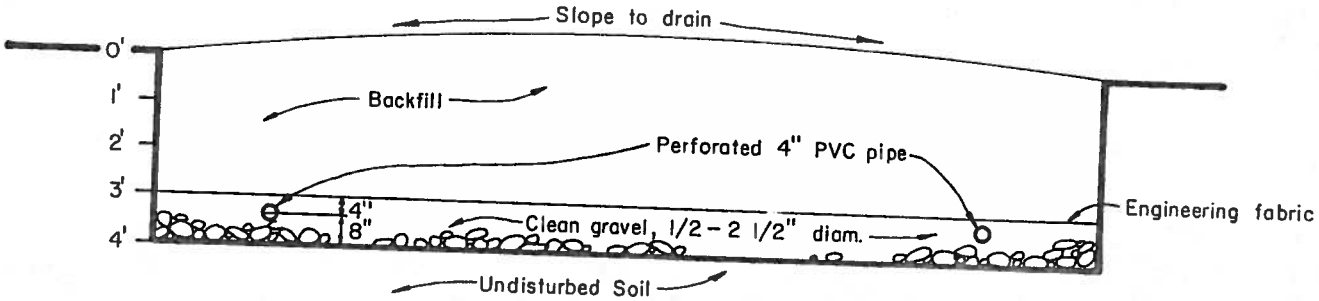
(907) 561-6151

(3)



PLAN VIEW



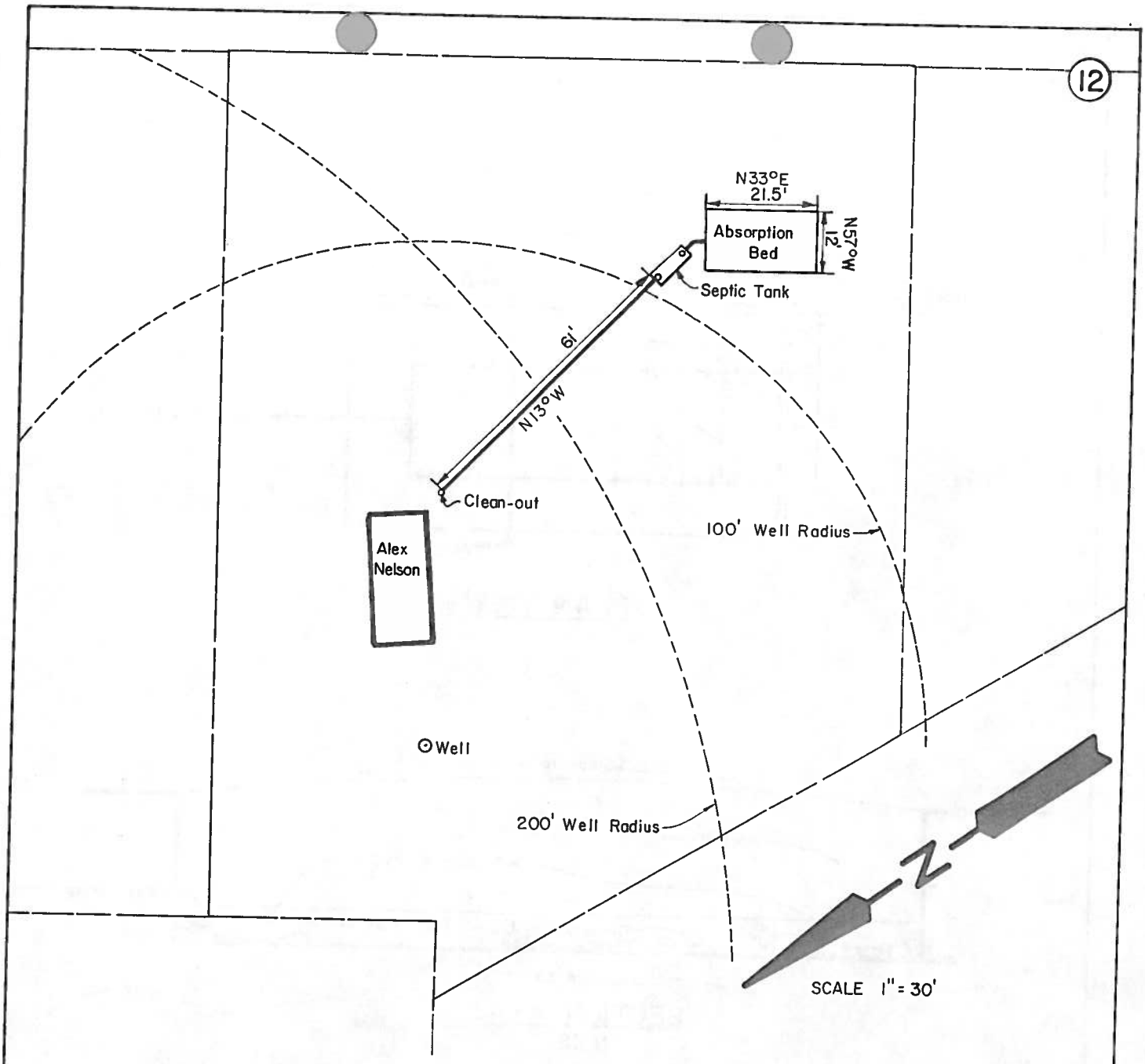
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on TH 8	
Three bedroom system with 258 sq. ft. absorption area	

Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 8	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Alex Nelson	

Prepared by
Corwin & associates, inc.
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ANCHORAGE, ALASKA 99507
(907) 561-6151

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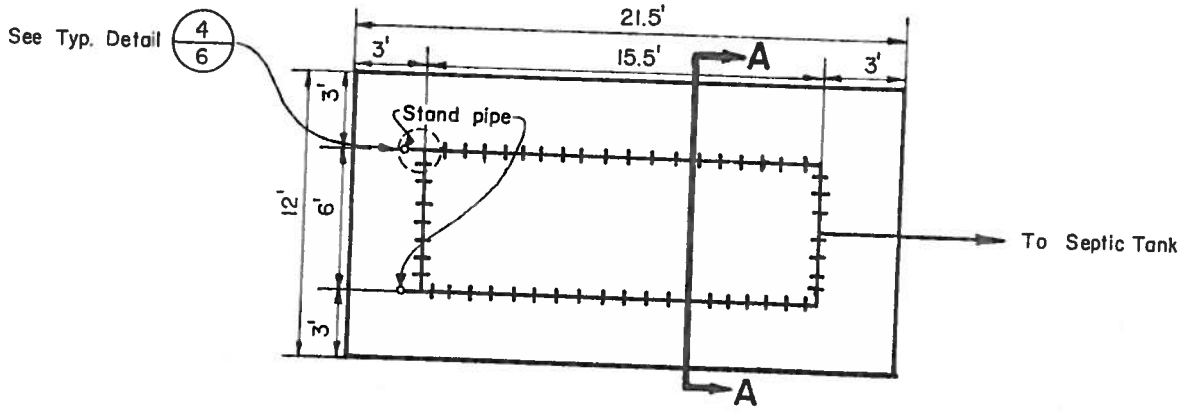
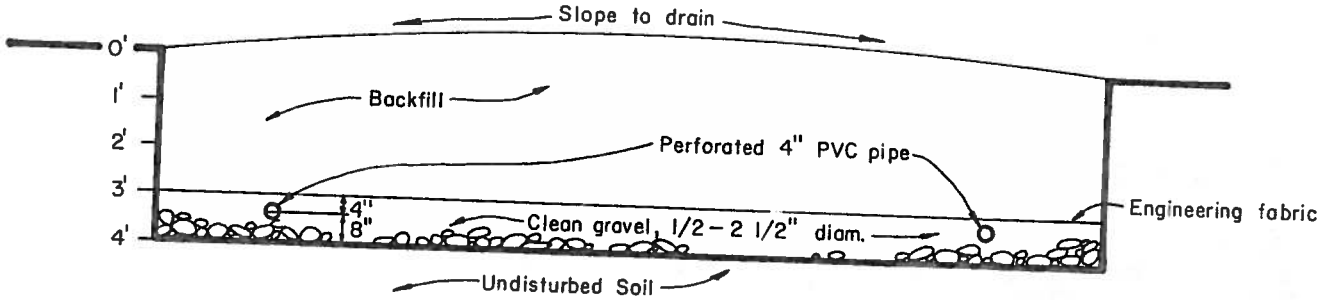


PLAN VIEW



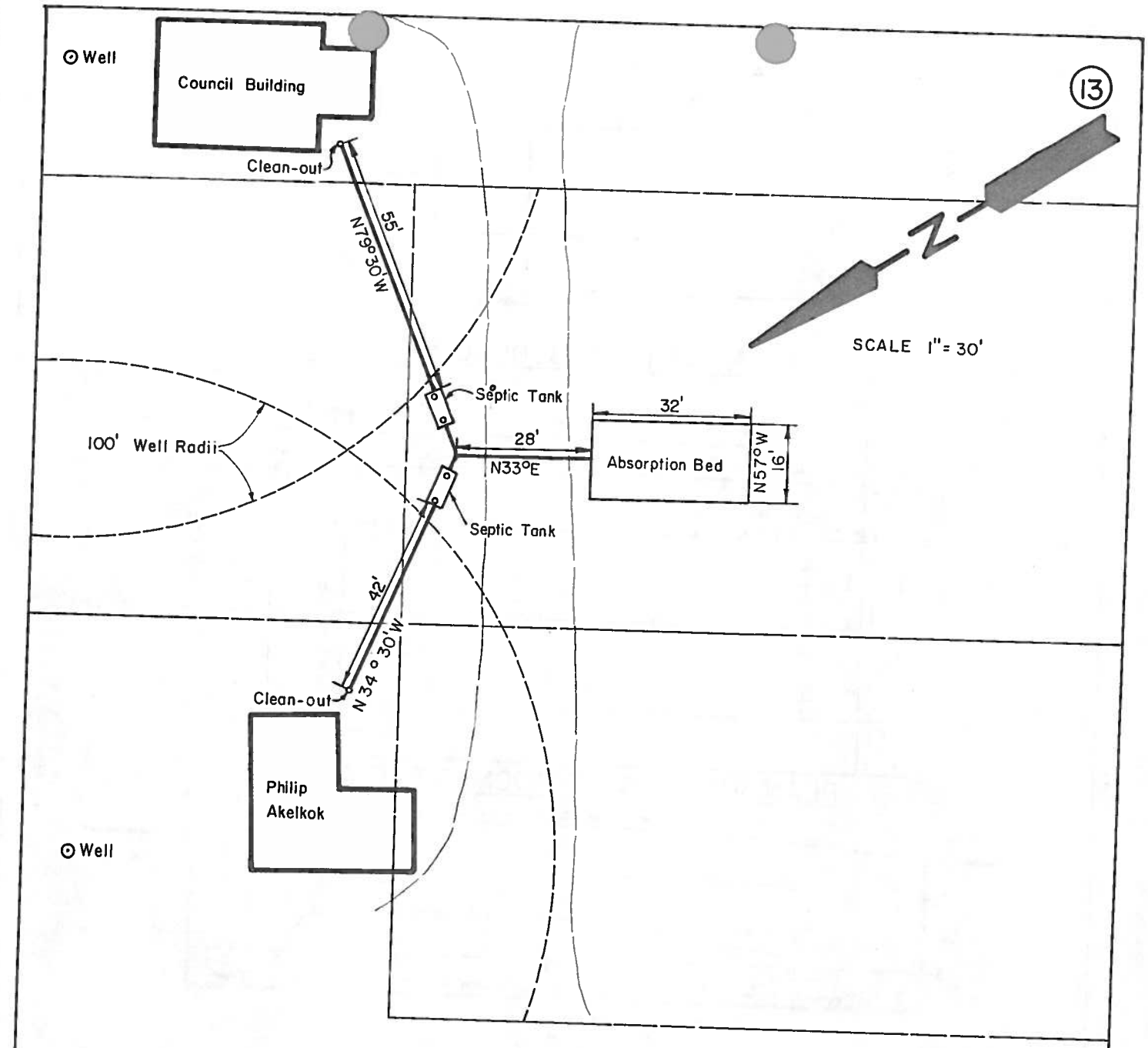
SECTION A-A
N.T.S.

Notes:
1. No groundwater encountered.
2. Three bedroom system.

VILLAGE OF EKWOK SEPTIC SYSTEM BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H 8	
Three bedroom system with 258 sq. ft. absorption area	

Prepared by
Corwin associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-5151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Philip Akelkok	

Prepared by
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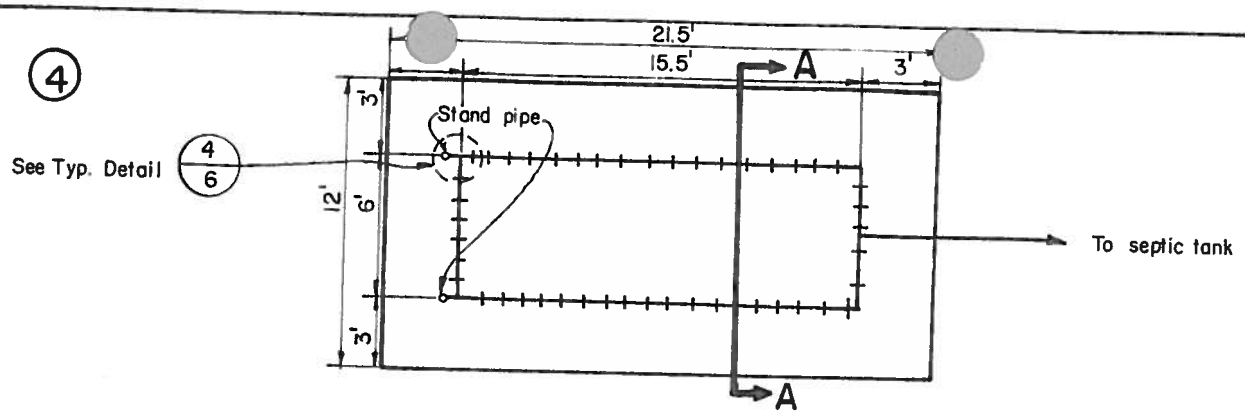
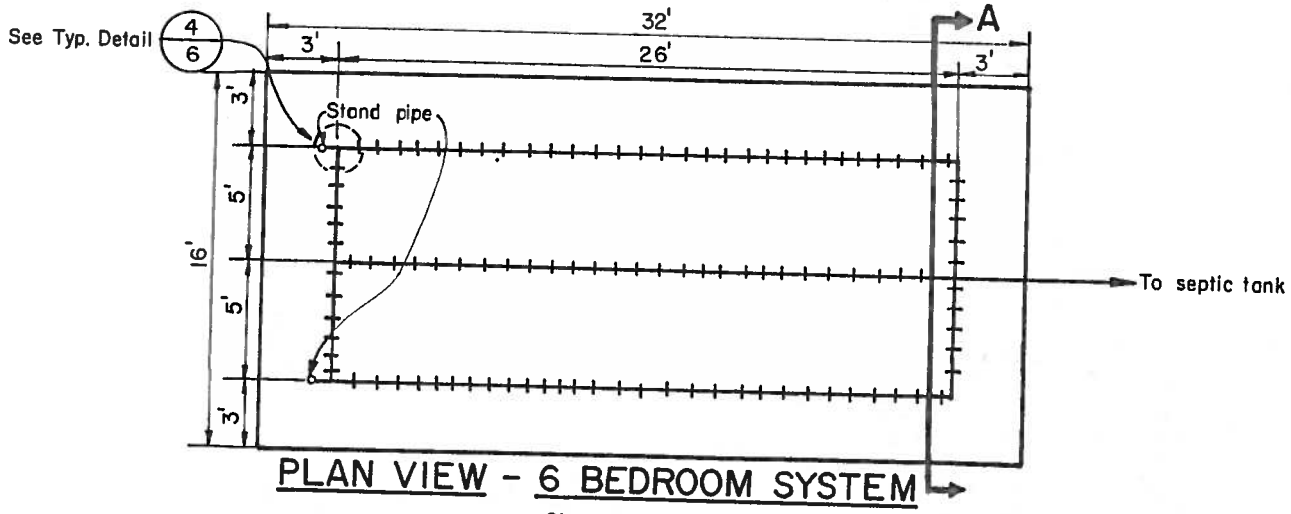
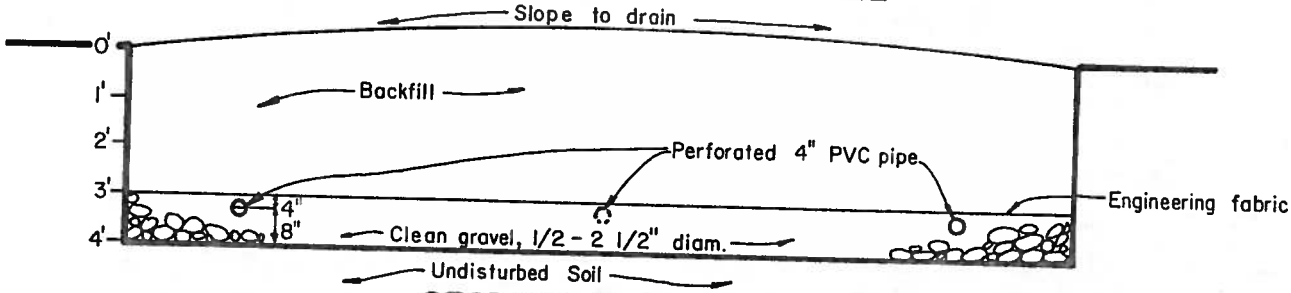
(907) 561-6151



PLAN VIEW - 3 BEDROOM SYSTEM



PLAN VIEW - 6 BEDROOM SYSTEM



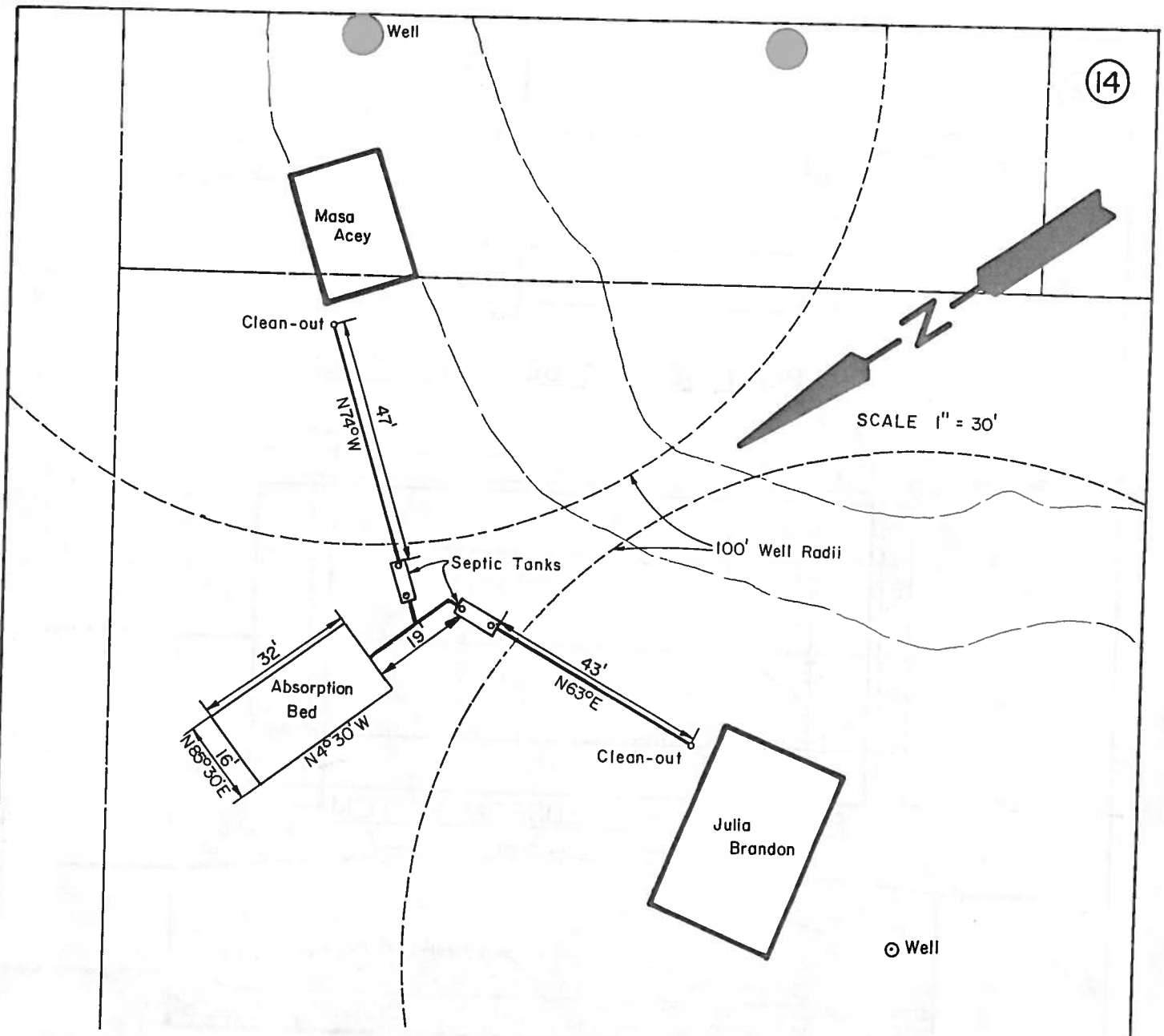
SECTION A-A
N.T.S.

Note:
1. No groundwater encountered.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
Three bedroom system with 258 sq. ft. absorption area	
Six bedroom system with 512 sq. ft. absorption area	

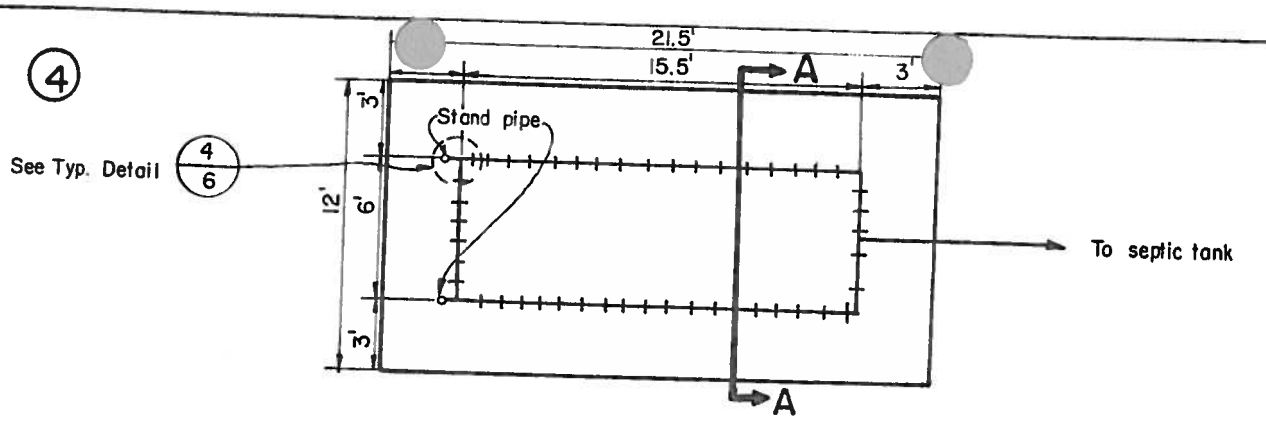
Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



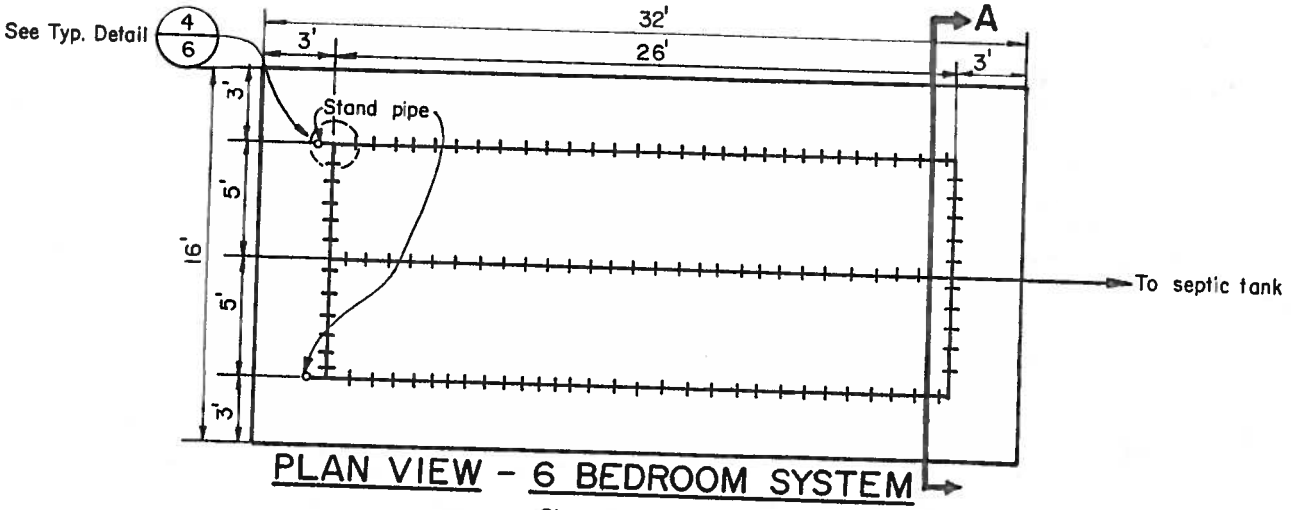
VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of William and Julia Nelson	

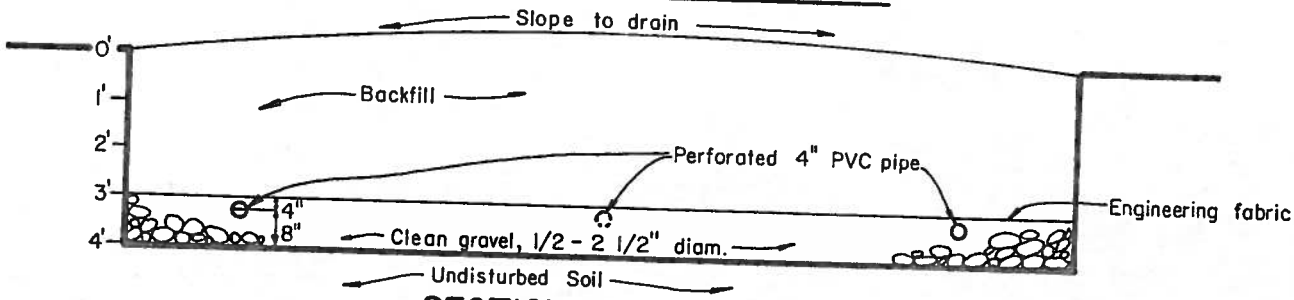
Prepared by
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-615[illegible]



PLAN VIEW - 3 BEDROOM SYSTEM



PLAN VIEW - 6 BEDROOM SYSTEM



SECTION A-A
N.T.S.

Note:
1. No groundwater encountered.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
Three bedroom system with 258 sq. ft. absorption area	
Six bedroom system with 512 sq. ft. absorption area	

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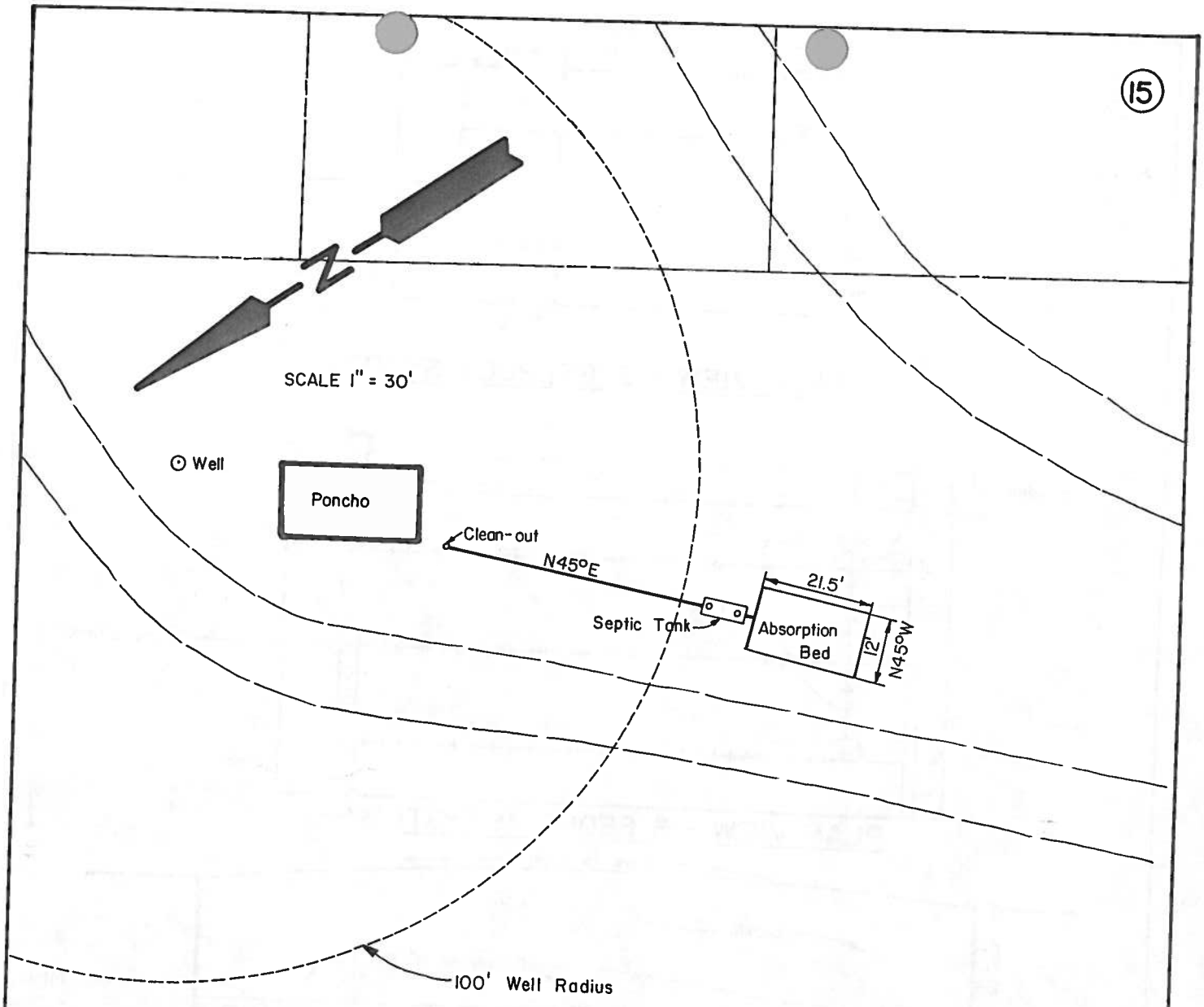
Corwin & associates, inc.
1549 E. TUDOR RD. SUITE 204
ANCHORAGE, ALASKA 99507
(907) 561-6151



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Poncho	

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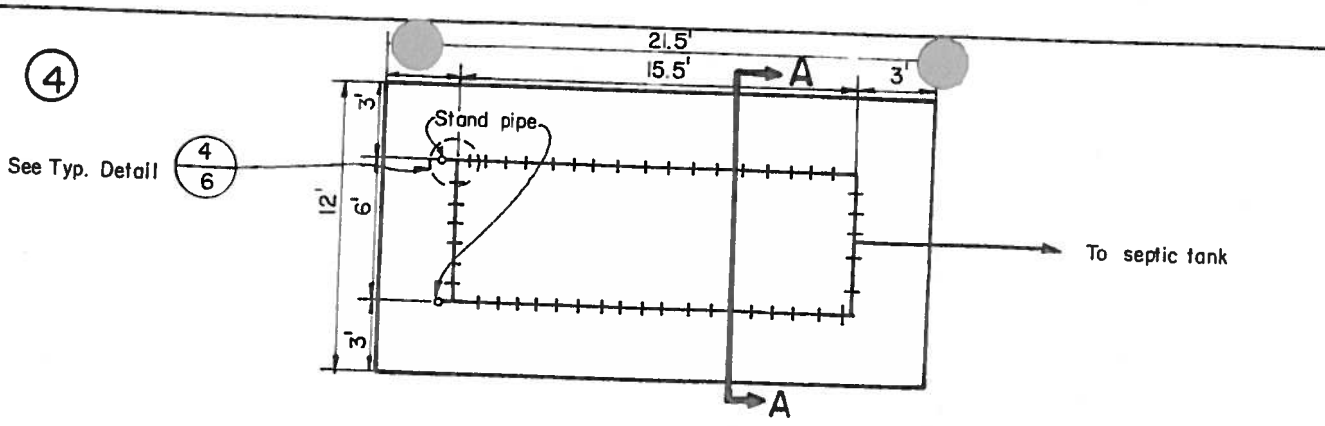
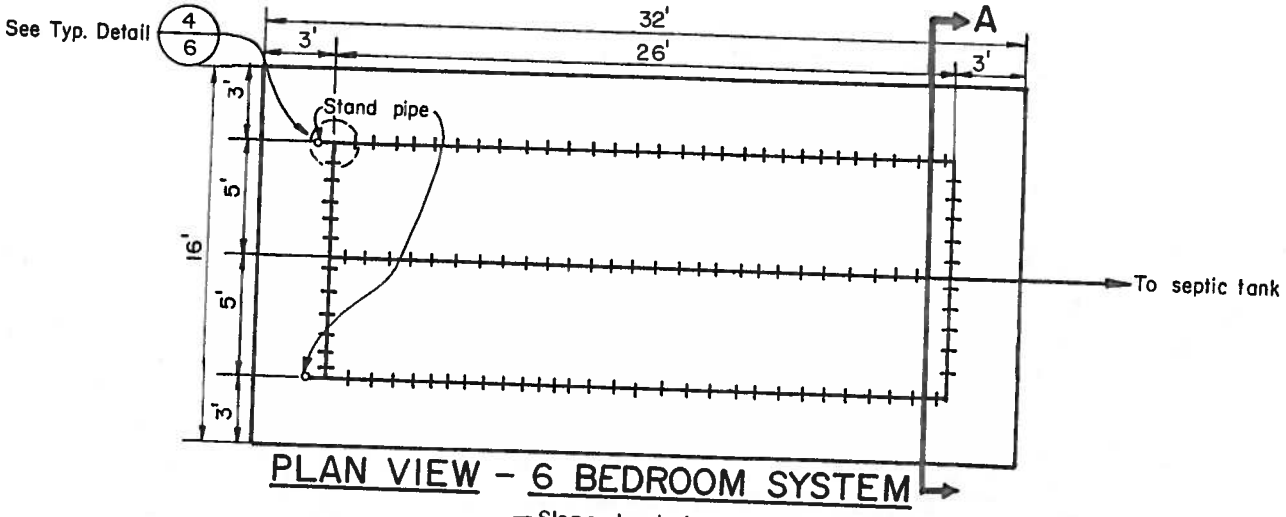
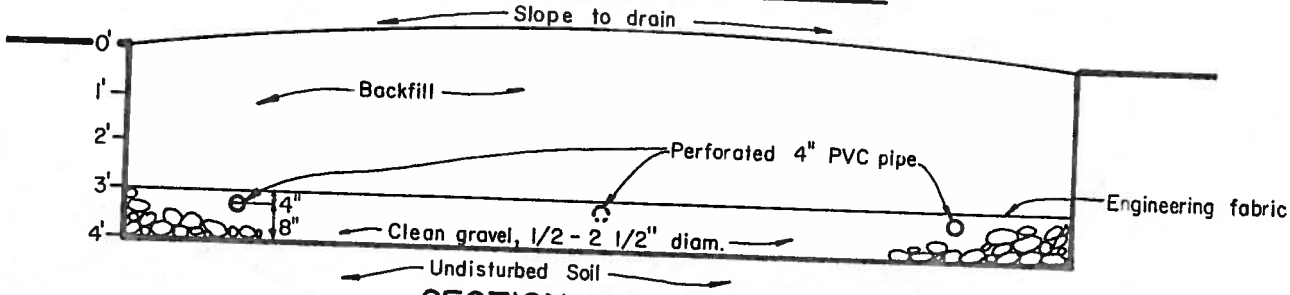


PLAN VIEW - 3 BEDROOM SYSTEM



PLAN VIEW - 6 BEDROOM SYSTEM



SECTION A-A
N.T.S.

Note:
1. No groundwater encountered.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
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Six bedroom system with 512 sq. ft. absorption area	

Prepared by
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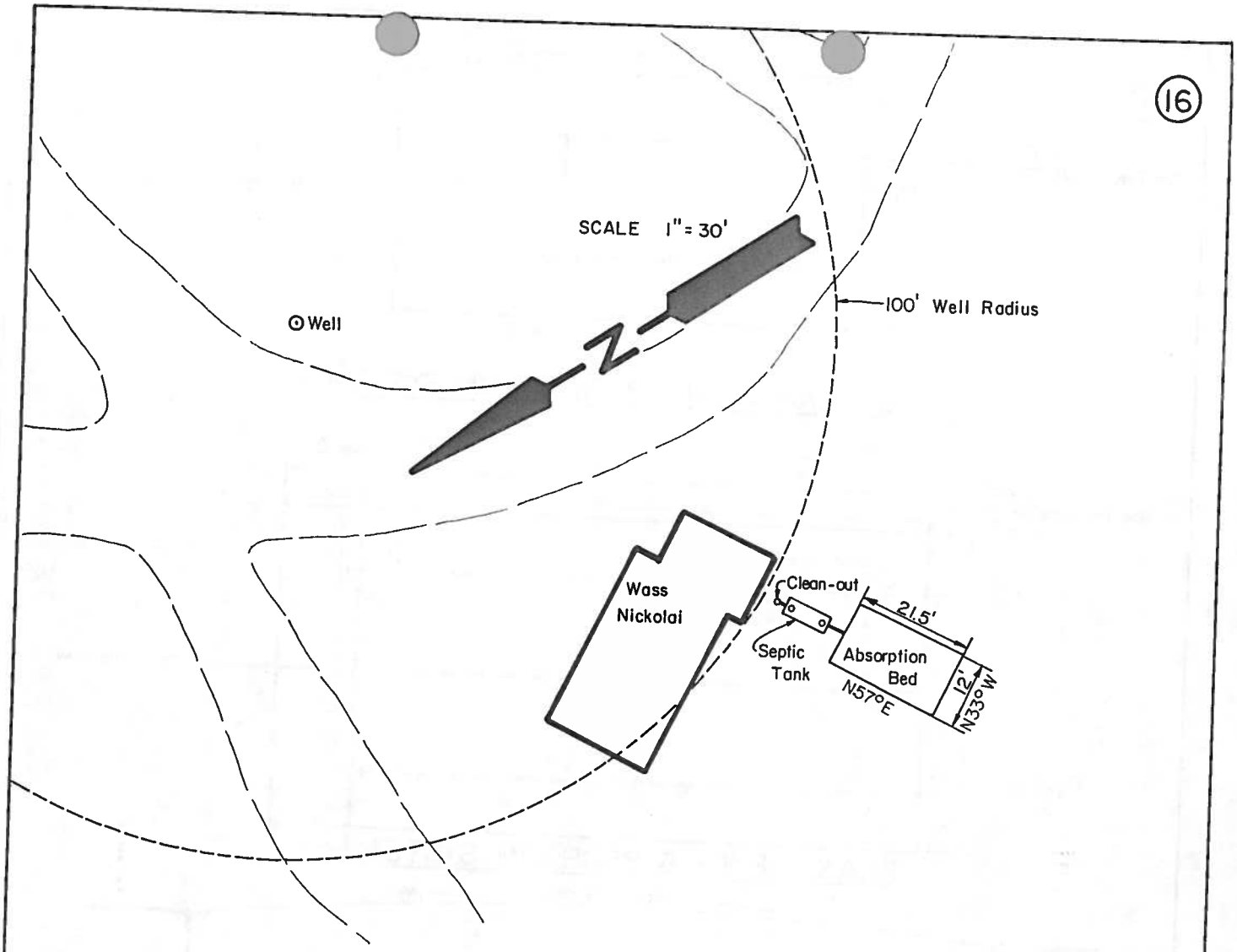
(16)



VILLAGE OF EKWOK
SEPTIC SYSTEM
SITE PLAN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
Date Drawn: 12/5/84	Checked by: B.J. Corwin
Soil rating of 85 sf/br based on T.H. 7	
Point of exit of sewer line from house may be adjusted according to homeowner's preference.	
Property of Wass Nickolai	

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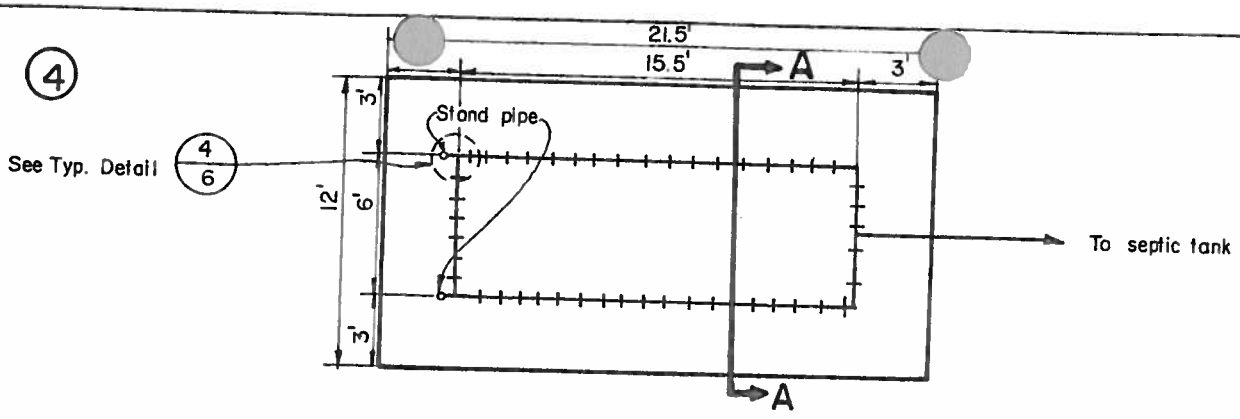
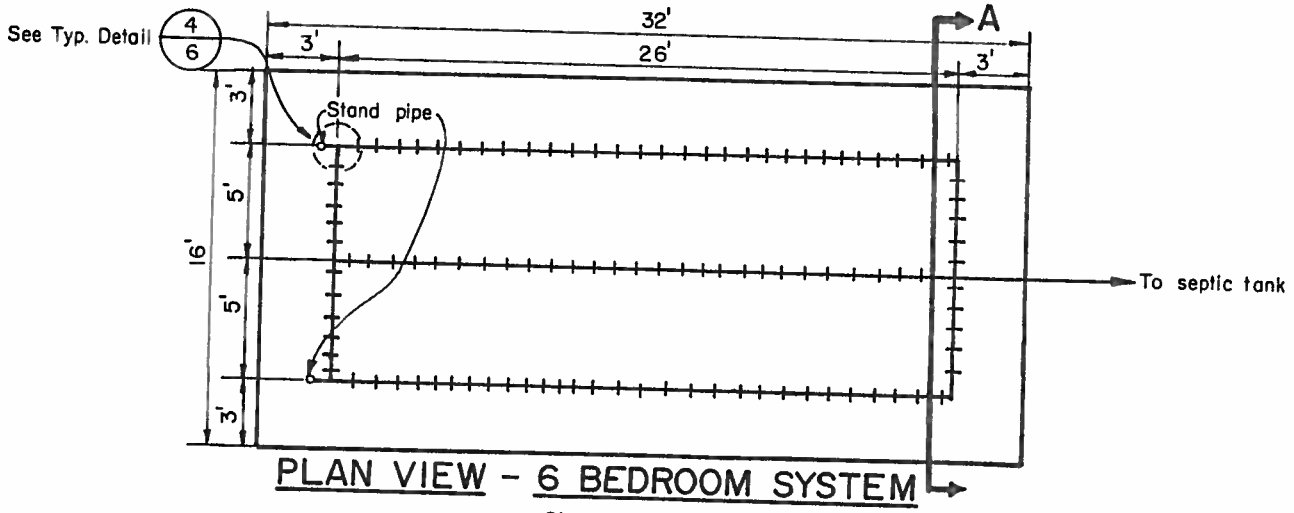
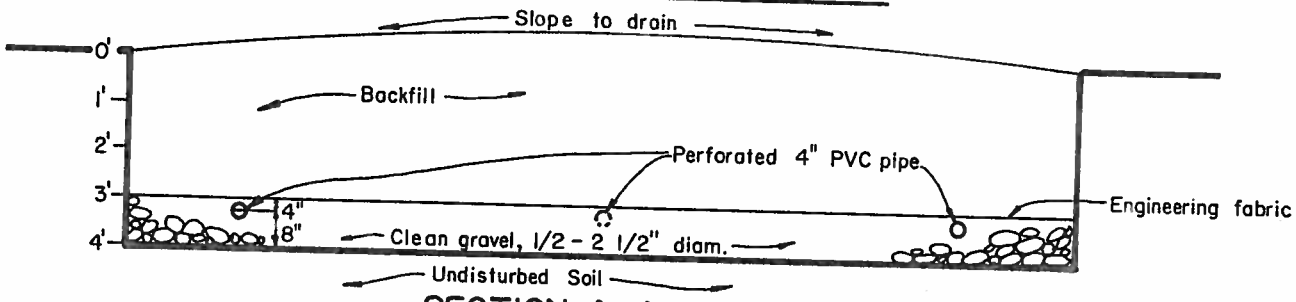


PLAN VIEW - 3 BEDROOM SYSTEM



PLAN VIEW - 6 BEDROOM SYSTEM



SECTION A-A
N.T.S.

Note:
1. No groundwater encountered.

VILLAGE OF EKWOK
SEPTIC SYSTEM
BED DESIGN

Designed by: M. O'Keefe/T. Sherman	Drawn by: M. O'Keefe
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