LINCOLN-LANCASTER COUNTY HEALTH DEPARTMENT

3140 "N" STREET
NON TRANSFERABLE

ENVIRONMENTAL HEALTH DIVISION
Lincoln, NE 68510-1514
PERMIT

(402) 441-8000

Permit

SEWAGE INSTALLATION
SEPTIC SYSTEM

No. 97380168901

Issued 11/21/97
Expires 05/21/98
Revenue Code 3157

Establishment

JOHN KRUML
T7N R7E SEC 2
HOLLAND ACRES BLK 2 LOT 1
8800 LIGHTNER CIRCLE-HOLLAND

FEES: $150.00

PAID

TOTAL $150.00

Permittee

JOHN KRUML
7541 BOONE TRAIL
LINCOLN NE 68516

Gregg Wright MD.
Issued By ~~M. Jane Ford~~
Health Director

5493

THIS LICENSE OR PERMIT IS ISSUED SUBJECT TO REVOCATION AS PROVIDED BY LAW
"POST IN A PROMINENT PLACE"

Lincoln-Lancaster County Health Department
Environmental Health Division
3140 "N" Street • Lincoln, NE 68510-1514
Phone: 402-441-8022

A

Permit Number:

Sewage Disposal System

Request for Site Clearance and Permit

Include Form B, Form C and Applicable Fees with this Application.

☒ Septic System ☐ Lagoon ☐ Other (Refer to Form C)

The undersigned hereby requests site clearance and permit to construct a Sewage Disposal System in conformance with appropriate resolution or ordinance, as described herein:

PLEASE PRINT OR TYPE

A. System Location (Indicate correct number and street)

Address 8800 Lightner CIRCLE (no rural route) City Holland NE, Zip 68372

Legal Description Lot 1 Block 2 Holland Acres T7N R7E HOLLAND ACRES 2 1
1/4 1/4 Section Township Range Subdivision Addition Block Lot

Geographical Location (if known): Longitude _____ Latitude _____

☐ Check if system mail address is not the same as the owner's address

B. Owner

Name John Krumm Signature John Krumm

Address 7541 Boone TRAIL City/State/Zip Lincoln NE 68516

☐ Check if owner designed system Home Phone 421-7073 Work Phone 450-3483

C. Contractor

Name Schwark Trenching Company Name _____

Address 8200 old cheney Rd. City/State/Zip Lincoln NE 68516

☐ Check if contractor designed system Work Phone 489-7294

D. Engineer/Installer ☒ Check and complete if engineer designed system

Designer Name Lyle R. Christensen, P.E. Firm Home Work Phone (402) 441-7967 (Office) (402) 489-7054 (Home)

E. This System Will Serve a

☒ Residential Dwelling Number of Bedrooms 4 Is there a Whirlpool Bathtub YES NO

☐ Commercial Establishment/Other Facility Specify _____

Design flow in gallons per day_____ Type of Wastewater: ☒ Domestic ☐ Non-Domestic.

DO NOT WRITE BELOW THIS LINE

Approval Process ☐ Municipal Code 24.38 ☒ County Resolution No. 2832

1. **Health Department** Date rec'd 11/19/97 Date frwd 11/19/97 **ACTION** ☒ Approved ☐ Disapproved Signature Jerrold C. Hood
2. **Supt. Bldg. Insp. or Village Clerk** Date rec'd 11-19-97 Date frwd 11-19-97 **ACTION** ☒ Approved ☐ Disapproved Signature _____
3. **City or County Engineer** Date rec'd 11/19/97 Date frwd 11/19/97 **ACTION** ☒ Approved ☐ Disapproved Signature _____

J.C.H. Need final drawing.

Installation Final Written Approval *

By Jerrold C. Hood

Date DECEMBER 19, 1997

* PROVISIONAL APPROVAL EXPERIMENTAL SYSTEM.

Business Office Use Only 3161

Date Rec'd 11/19/97

Amt Paid 150.00

Rec'd By _____ Cash/Check No. 236919

FORM 23-100 10-96 White - Health Dept. Yellow - Engineer Pink - Bldg. Inspector

DEC 1 1997

D

Lincoln-Lancaster County Health Department
Environmental Health Division
3140 "N" Street • Lincoln, NE 68510-1514
Phone: 402-441-8022

Permit Number:

Sewage Disposal System

As Built Plans & Specifications

Date 11-20-97

System Location (Indicate correct number and street)

Address 8800 Lightner Ln. (no rural route) City Holland NE, Zip

A. Building Sewer

1. Material: Class 160
   Diameter: 4 in.
2. Distance above basement floor: _____ in.
   or distance below basement floor: _____ in.
3. Distance between dwelling and septic tank: 75 ft.
4. Number of clean-outs: 1
5. Distances to: well or suction line _____ ft.
   stream _____ ft.
   pressure line _____ ft.
   property line _____ ft.

B. Septic Tank

1. Material: Precast
   Number of compartments: _____
2. Capacity: 1850 gal.
3. Factory built: ☒ Yes ☐ No
4. Manholes: Over inlet, diameter _____ in.
   Over outlet, diameter _____ in.
   Riser: ☐ above ☐ below grade 20" in.
5. Inlet: ☐ baffle ☐ tee
6. Outlet: ☐ baffle ☐ tee
7. Depth to top of tank, below unfinished grade: 20 in.
8. Distances to: Well or suction line _____ ft.
   Stream _____ ft.
   Pressure line _____ ft.
   Property line _____ ft.

C. Distribution Box

1. Material: Precast
   Number available outlets: _____
2. Factory built: ☒ Yes ☐ No
3. Distance from septic tank: 49' ft.

D. Absorption Field

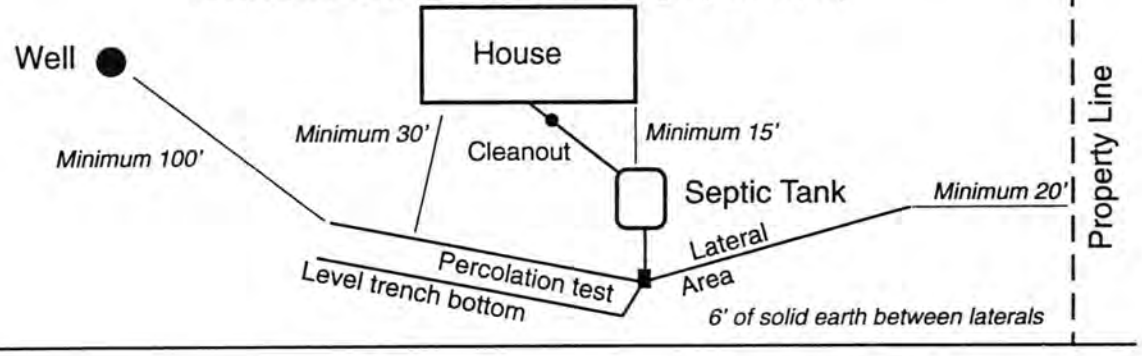
(Provide as-built drawings on back of this form)

1. Type: ☐ Half rounds ☐ Perforated pipe
   Diameter of half round: _____
   or perforated pipe: _____
   Material: ☐ fiberglass ☐ plastic ☐ concrete
   ☐ other _____
2. Lateral lines: Number 6
   Length of each line: 80 ft. 80 ft.
   80 ft. 80 ft., 80 ft. 80'
3. Trench dimensions: Width 1.5 ft.
   Slope — in/100 ft.
   Average depth 4' – 2½ in
4. Filter material: Road Gravel
   Depth of material 24 in.
5. Distances to: Well or suction line _____ ft.
   Stream _____ ft.
   Pressure line _____ ft.
   Property line _____ ft.

Complete "As Built" drawing on back of this form.

Indicate North with Arrow

Individual Sewage System Design (Example)



FORM 23-103 10-96

Design Memorandum
Experimental Septage Seepage Beds
for
John Kruml Property
8800 Lightner Circle
Lot 1, Block 2 of Holland Acres

Prepared by
Lyle R. Christensen, P.E.
(Revised November 16, 1997)

Lyle R. Christensen P.E.

This Design Memorandum has been prepared in four (4) counterparts; with one (1) copy retained by the Engineer and remaining distribution intended to be among the property owner, the Nebraska Dept. of Environmental Quality (NDEQ), the Lincoln Lancaster County Health Dept. (LLCHD) in the review and approval of the Experimental Septage Seepage Bed design provided herewith. It is the intent of this Memorandum to provide the both the basis and statement of limitations of the said design. Four (4) attachments are included with this Memorandum as follows:

1. Initial Experimental Septage Percolation Field Tests, dated November 16, 1997.

2. Follow-up Experimental Septage Percolation Field Tests, dated September 28, 1997.

3. General Site Plan & Percolation Test Hole Locations.

4. Section A-A, Experimental Septage Seepage Beds, Construction Details.

Initial Percolation Tests

Reference Attachment 1 of 4 for percolation test results and Attachment 3 of 4 for the location of the test holes. Test hole locations were selected by the property owner, and the hole drilling, bottom gravel placement, and pre-soaking work were done by him as well. The final percolation rate testing and subsequent calculations were accomplished by the Engineer in accordance with LLCHD guidelines and NDEQ Title 124 - Rules and Regulations for the Design, Operation and Maintenance of Septic Tanks. Testing was completed on April 19, 1997. The general soil conditions were very damp from a heavy snow that had occurred the week prior. The snow had completely melted before testing was initiated, and the soil had no presence of residual frost or ice.

All but Hole No. 1 of six test holes had water remaining in the holes following a 24-hour pre-soak period, and the resultant percolation rates were very low. No obvious site evidence could be found for the much higher percolation rate of Hole No. 1. Because of its proximity to other test holes with dramatically lower percolation rates, one can only conclude that the underlying soil properties for Hole No. 1 are very localized, are not representative of the area, and should not be used for design.

Because of the very low percolation rates of Holes 2 through 6, which generally lie along the lower, northern extremity of the property, it was decided that follow-up percolation tests would be advisable at some later date. The initial test holes indicated that a conventional septage tile field would not likely function properly if located in the vicinity of these test holes.

Follow-up Percolation Tests

Reference Attachment 2 of 4 for for follow-up percolation testing for six additional holes completed on September 28, 1997. The division of work responsibilities between the property owner and the Engineer remained the same as in the initial testing.

Soils were still quite damp from a 2" rain that had occurred four days prior to testing. Water remained in Hole Nos. 7, 8, 9, and 11 following the 24-hour pre-soak period. In general, percolation rates were higher than in the April 19, 1997 testing and improved as the holes progressed to higher elevations on the property.

Design Considerations and Calculations

From the percolation test results and additional information gathered from LLCHD and NDEQ several recommendations are forthcoming; these being as follows:

1. A conventional septage tile field should not be used on this property, because percolation rates do not indicate favorable design conditions. This finding is further supported by letters addressed to the County-City Planning Dept. by LLCHD in the review of the Holland Acres subdivision dated July 12, 1995 and September 18, 1995, respectively (copies have been furnished to the property owner). The letters also indicate that construction of sewerage lagoons may be warranted on some lots.

2. The Holland Acres subdivision apparently has restrictive covenants concerning the use of sewerage lagoons, except possibly as a last resort to all other waste management efforts. The Engineer has not reviewed such covenants, because there is a desire on the part of the property owner to pursue an "experimental design" rather than a lagoon in order to provide better aesthetics for the property. It should be noted that the adjacent property owner immediately to the

west at the time of this writing also has an "experimental" wastewater disposal system.

3. It is the intent of the Engineer to utilize conservative design parameters for the "experimental design" provided herewith. However, the term "experimental" is just that - it should be noted that the design wastewater application rate cannot be guaranteed over an extended time, since long-term soil compaction and/or biological plugging of the soil voids may occur. Therefore, the property owner, NDEQ, and LLCHD are hereby advised that the "fall-back" position for this property should be to either expand the seepage bed area (see "Reserve" area on Attachment 3 of 4) or convert the system to a lagoon in the future in the event that long-term percolation rates become lower to the point of being problematic.

4. Given the above qualifying remarks, the following items list the key features of the "Experimental" Septage Seepage Bed design (see also Attachments 3 and 4 for details):

   a. Design Flow. An allowance of 100 gallons of wastewater per household occupant was used, or 500 gpd for five people and/or five bedrooms in the household.

   b. Design Seepage Bed Area. The minimum observed percolation rate of 384 min./in. (or 0.16 in/hr) from Hole No. 2 was used as the basis for the design in accordance with LLCHD and NDEQ guidelines. Based on information received from Mr. Steven M. Goans, P.E. of NDEQ on November 12, 1997, a design application rate of 5 SF/gpd was selected as NDEQ's best information for "bad soils." **Therefore, the design total seepage bed area is**:

      500 gpd x 5 SF/gpd = 2,500 square feet.

      Two (2) active beds with dimensions 15' x 83' and 10' separation distance will provide this nominal seepage bed area and meets the bed dimensional limitations under NDEQ's Title 124.

   c. Seepage Bed Location. Refer to Attachment 3 of 4. The experimental seepage beds should be located as high on the property as is practical to take advantage of the apparently higher percolation rates and to shorten the distance for connective piping. The elevation of the cleanouts associated with the percolation field are intended to provide a further "safety valve" against plugging, relative to the finished floor elevation of the basement. It is recommended that the cleanouts be equipped with loose fitting caps that prevent the entrance of water and debris, yet can

provide an emergency outlet for wastewater prior to basement damage. It should be understood, of course, that such operation should not be allowed to continue if there is a hydraulic failure and that proper maintenance of the septic tank and piping is important. The property owner may elect to install a bed observation gauge in each bed as per a standard detail received from NDEQ.

d. Piping. All connective piping from the house to the headers on the seepage beds should be 4" Schedule 40 PVC with solvent weld joints and laid to a minimum slope of 2%. The 4" PVC perforated pipe to be used in the seepage beds should have ½" to 3/4" perforations as per Chapter 13 of NDEQ's Title 124.

e. Seepage Bed Construction. The general sequence of construction for the seepage beds should be as follows:

(1) Excavate the two active beds to the depth and horizontal limits shown preferably using a backhoe. Avoid soil compaction on the bottom of the beds. Scraper blade type equipment should generally not be used for this reason.

(2) Scarify the entire bottom and sides of the beds with the teeth of the backhoe bucket to break up hard spots and to enhance seepage.

(3) Place coarse clean, graded gravel to the limits shown, being careful to properly bed connection header and distribution piping. It is recommended that a uniform gravel gradation of at least 3/4" to 1-1/2" be used to enhance uniform distribution. Avoid gravel fines that may plug the pipe perforations or be prone to biological plugging of the voids.

(4) The perforated distribution piping can either be be laid level or at a slope not to exceed 0.25% to assure even distribution of the wastewater. Provide cleanouts at each end of each longitudinal run of the perforated distribution piping using pairs of long sweep 45° bends, being careful to avoid twisting and deformation. The cleanouts from the header end of the outer two distribution pipes of each bed should connect to the "run" of 4" tees. The middle cleanout at the header end of each bed should consist of a vertical wye paired with a long sweep 45° bend located just downstream of the header tee. A small concrete pad should be poured around each cleanout to help prevent mechanical damage. As per above discussion, provide a loose fitting cap for each cleanout.

(5) Place geotextile fabric or 2" of hay over all of the coarse gravel layer to prevent migration of the overlying soil into the voids of the gravel.

(6) Loosely place previously excavated soil or surplus stockpiled topsoil in the next layer; again avoiding soil compaction to the extent possible. The purpose of this layer is to provide some additional capillary (upward wicking) action to the underlying accumulated moisture.

(7) Lightly compact a 6" layer of stockpiled topsoil to complete the top of each seepage bed. Compaction should not exceed that from tire rolling from the backhoe.

(8) Excess topsoil should be mounded by 3" to 6" over each bed as an allowance for settling and to form a suitable root base for grass to be planted later by the owner. Final grading should blend to the fill provided along the north side of the equipment garage and the general slope of the land with an emphasis on providing adequate surface drainage.

e. Septic Tank Design. The 1,500 gallon sizing of the septic tank is as per LLCHD guidelines and NDEQ's Title 124 based on 5 household occupants and/or bedrooms. A precast concrete tank is recommended. Construction details are as follows:

(1) As per standard dimensions from the tank supplier, excavate a hole deep enough to accommodate a 6" layer of gravel or sand rock on the bottom of the hole. This will allow more accurate vertical placement of the tank.

(2) Provide a 3" drop from the tank inlet to the outlet. The inlet and outlet should be via a submerged drop pipe from a tee as per the standard dimensions in the Appendix to said Title 124. to prevent floating solids and grease from entering the horizontal runs of the pipes.

(3) Install neoprene water stop type "boots" around the connective piping and grout in place with non-shrink grout. Thoroughly grout the tank joints or use a heavy mastic joint material commonly used to seal manhole rings (Kent Seal, or equal). The interior exposed surface of the concrete and hatches from 1 foot below the water surface should be coated with coal tar epoxy or bitumastic coating to help prevent deterioration of the concrete and ferrous metals

from acids that will form from the anaerobic conditions within the tank.

(4) Thoroughly mechanically compact soils around the septic tank and provide at least 4" of granular bedding beneath the connective piping to at least 1 foot above the tops of the pipes to well beyond the hole for the septic tank. The purpose of this pipe embedment is to prevent structural damage to the pipe from possible soil shear.

f. Distribution Manhole. The distribution manhole may be constructed with a standard precast concrete upper cone section for a 48" sanitary sewer manhole or with a short section of 24" diameter pipe. The distribution manhole should be provided with a 24" light duty cast iron manhole frame and lid. A 4" thick manhole base should be cast in place with concrete on a bed of gravel to permit accurate leveling. The interior of the concrete distribution manhole should be coated in the manner described above for the septic tank, and the construction of all joints and pipe connections should be similarly constructed. A capped stub out to a possible "reserve" seepage bed should also be provided. The flowline elevations of all outlets should be the same, including the slope of the first 5 feet of the outlet piping downstream of the distribution manhole to provide uniform "splits" in flow.

g. General Trench Excavation and Backfill. Trenches should be excavated to provide a uniform pipe bedding using 2" to 4" of granular material beneath the pipes and continued to at least top of pipe or carefully hand shape the trench bottom to match the curvature of the pipe. Given the stiffness of the native clays in the area, granular bedding would offer much easier placement and better structural support. Trenches should be brought to 6" below grade with thorough mechanical tamping followed by final grading with topsoil to provide a good root base for grass to be planted later by the owner.

h. Clearances. Since this subdivision will be provided with a connection to a rural water system along the street rights-of-way, there will be no conflicting private wells in the area. The other required clearances and minimum setback distances have been met by the proposed design.

Closing Remarks

Since the proposed design is truly experimental in nature, given the limiting soil conditions in the area, preliminary design comments from NDEQ and LLCHD have certainly been appreciated. A "mounded" wastewater disposal system was considered for this project as per the information kindly provided by LLCHD that was obtained from

the State of Minnesota. However, it is believed that such a system would likely be more expensive overall and would not meet the landscaping aesthetics desired by the property owner. Questions concerning this submittal can be directed to the Engineer during business hours at 441-7967 or you may direct correspondence to the property owner, Mr. John Kruml.

Initial Experimental Septage Percolation Field Tests
John Kruml Property
8800 Lightner Circle, Lot 1 Block 2 of Holland Acres
Near Holland, Nebraska

Date: 19-Apr-97 **Conducted By: Lyle R. Christensen, P.E.**

Test Conditions: 6" Augered Holes to 3' Deep with 6" Gravel in Bottom
Tests Following 24-Hour Pre-Saturation Period
Mostly Sunny, Mid-60's Air Temperature
Area Soils Very Damp from Heavy Snow the Week Prior

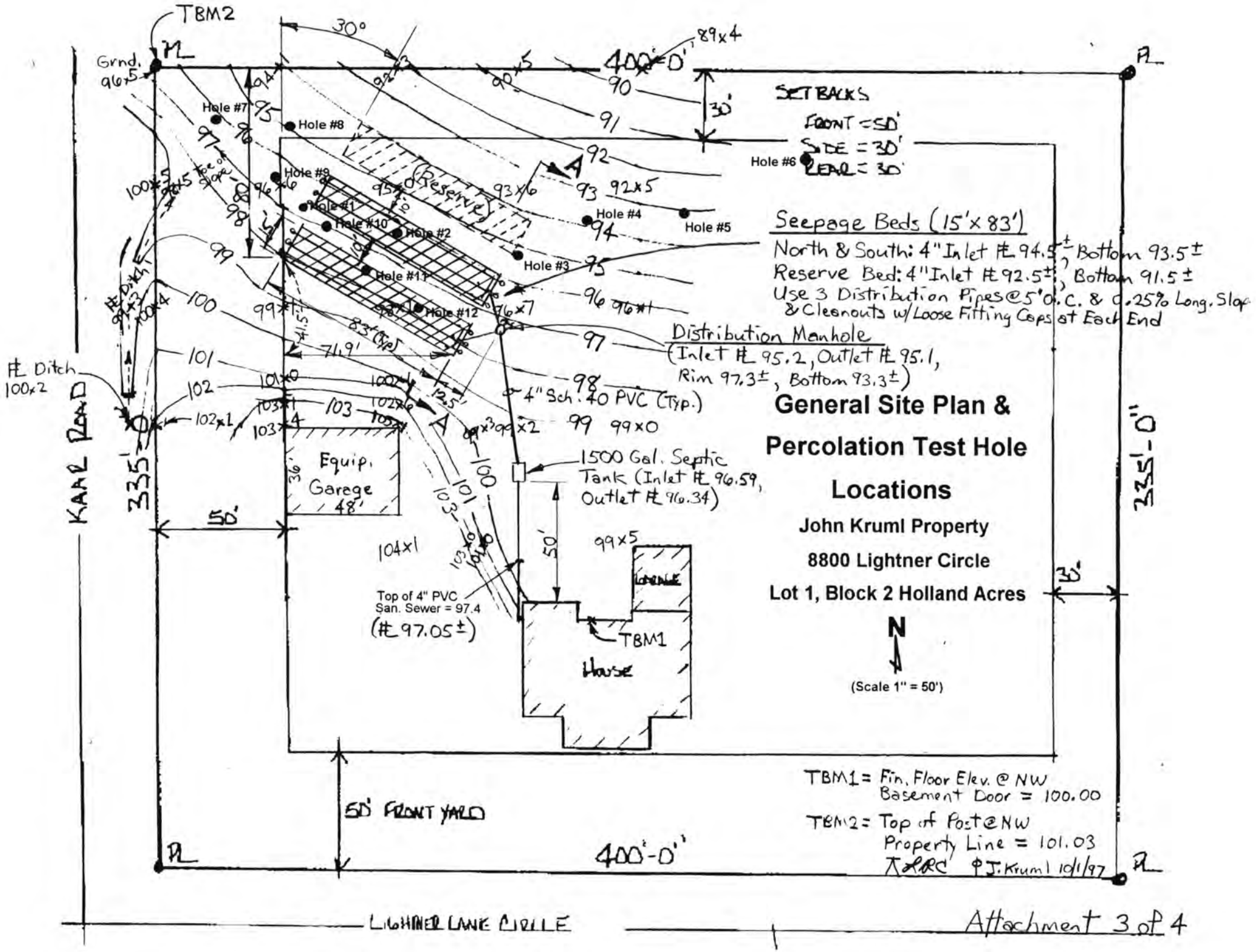
Hole No.	Location Coord's From NW Prop. Cor.	Time	Interval Time (min.)	Elapsed Time (min.)	Initial Water Depth (in.)	Nail Down to Water (in.)	Interval Perc. Rate (in./hr.)	Interval Perc. Rate (min./in.)	Comments
1	61' E	09:00			Dry				Dry Hole from 24-Hour Pre-Saturation Period
	64' S	09:10	0	0	8" +/-	11.375			
		09:40	30	30		17.000	11.25	5.3	
		10:06	26	56					Dry
		10:07	0	57	6" +/-	13.250			Refill
		10:37	30	87		17.750	9.00	6.7	
		10:39	0	89	7.75" +/-	11.500			Refill
		11:09	30	119		16.750	10.50	5.7	
		11:11	0	121	8.5" +/-	11.000			Refill
		11:41	30	151		16.625	11.25	5.3	
		11:42	0	152	8" +/-	11.250			Refill
		12:12	30	182		16.750	11.00	5.5	
		12:14	0	184	8" +/-	11.375			Refill
		12:44	30	214		16.875	11.00	5.5	
		12:45	0	215	8" +/-	11.375			Refill
		13:15	30	245		16.375	**10.00**	**6.0**	
						Averages	**10.57**	**5.7**	
2	102' E	09:12	0	0	6" +/-	10.375			Water in Hole Remaining from 24-Hour Pre-Soak
	69' S	09:42	30	30		10.625	**0.50**	**120**	
		10:12	30	60		10.625	0.00		
		10:42	30	90		10.625	0.00		
		11:12	30	120		10.750	0.25		
		11:42	30	150		10.750	0.00		
		12:12	30	180		10.875	0.25		
		12:42	30	210		10.875	0.00		
		13:12	30	240		11.000	0.25		
						Averages	**0.16**	**384**	
3	148' E	09:14	0	0	7" +/-	8.500			Water in Hole Remaining from 24-Hour Pre-Soak
	75' S	09:44	30	30		8.750	**0.50**	**120**	
		10:14	30	60		8.750	0.00		
		10:44	30	90		8.750	0.00		
		11:14	30	120		8.750	0.00		
		11:44	30	150		8.875	0.25		
		12:14	30	180		8.875	0.00		
		12:44	30	210		8.875	0.00		
		13:14	30	240		8.875	0.00		
						Averages	**0.09**	**640**	
4	181' E	09:14	0	0	7" +/-	8.375			Water in Hole Remaining from 24-Hour Pre-Soak
	65' S	09:44	30	30		8.750	**0.75**	**80**	
		10:14	30	60		8.750	0.00		
		10:44	30	90		8.750	0.00		
		11:14	30	120		8.750	0.00		
		11:44	30	150		8.875	0.25		
		12:14	30	180		8.875	0.00		
		12:44	30	210		8.875	0.00		
		13:14	30	240		8.875	0.00		
						Averages	**0.12**	**480**	
5	219' E	09:15	0	0	7" +/-	9.000			Water in Hole Remaining from 24-Hour Pre-Soak
	60' S	09:45	30	30		9.250	**0.50**	**120**	
		10:15	30	60		9.250	0.00		
		10:45	30	90		9.375	0.25		
		11:15	30	120		9.375	0.00		
		11:45	30	150		9.500	0.25		
		12:15	30	180		9.500	0.00		
		12:45	30	210		9.500	0.00		
		13:15	30	240		9.500	0.00		
						Averages	**0.12**	**480**	
6	272' E	09:17	0	0	7" +/-	9.875			Water in Hole Remaining from 24-Hour Pre-Soak
	59' S	09:47	30	30		10.250	**0.75**	**80**	
		10:17	30	60		10.250	0.00		
		10:47	30	90		10.500	0.50		
		11:17	30	120		10.625	0.25		
		11:47	30	150		10.625	0.00		
		12:17	30	180		10.750	0.25		
		12:47	30	210		10.875	0.25		
		13:17	30	240		11.000	0.25		
						Averages	**0.28**	**213**	

Follow-up Experimental Septage Percolation Field Tests
John Kruml Property
8800 Lightner Circle, Lot 1 Block 2 of Holland Acres
Near Holland, Nebraska

Date: 28-Sep-97 **Conducted By: Lyle R. Christensen, P.E.**

Test Conditions: 6" Augered Holes to 3' Deep with 6" Gravel in Bottom
Tests Following 24-Hour Pre-Saturation Period
Sunny, Cool
Area Soils Damp from 2" Rain 4 Days Prior

Hole No.	Location Coord's From NW Prop. Cor.	Time	Interval Time (min.)	Elapsed Time (min.)	Initial Water Depth (in.)	Nail Down to Water (in.)	Interval Perc. Rate (in./hr.)	Interval Perc. Rate (min./in.)	Comments
7	27' E	10:04	0		4" +/-	13.500			Water in Hole from 24-Hour Pre-Saturation Period
	19' S	10:34	30	30		13.625	0.25	240	
		11:04	30	60		13.688	0.13	476	
						Averages	**0.19**	**358**	
8	54' E	10:07	0	0	5" +/-	10.250			Water in Hole Remaining from 24-Hour Pre-Soak
	27' S	10:37	30	30		10.375	0.25	240	
		11:07	30	60		10.625	0.50	120	
						Averages	**0.37**	**180**	
9	48' E	10:08	0	0	2" +/-	10.000			Water in Hole Remaining from 24-Hour Pre-Soak
	45' S	10:38	30	30		10.250	0.50	120	
		11:08	30	60		10.375	0.25	240	
						Averages	**0.38**	**180**	
10	69' E	10:09	0	0	6" +/-	11.250			Dry Hole from 24-Hour Pre-Saturation Period
	69'S	10:39	30	30		11.375	0.25	240	
		11:09	30	60		11.625	0.50	120	
						Averages	**0.37**	**180**	
11	87' E	10:10	0	0	2" +/-	13.000			Water in Hole Remaining from 24-Hour Pre-Soak
	87' S	10:40	30	30		13.375	0.75	80	
		11:10	30	60		13.500	0.25	240	
						Averages	**0.50**	**160**	
12	108' E	10:12	0	0	8" +/-	11.750			Dry Hole from 24-Hour Pre-Saturation Period
	100' S	10:42	30	30		12.125	0.75	80	
		11:12	30	60		12.625	1.00	60	
						Averages	**0.87**	**70**	



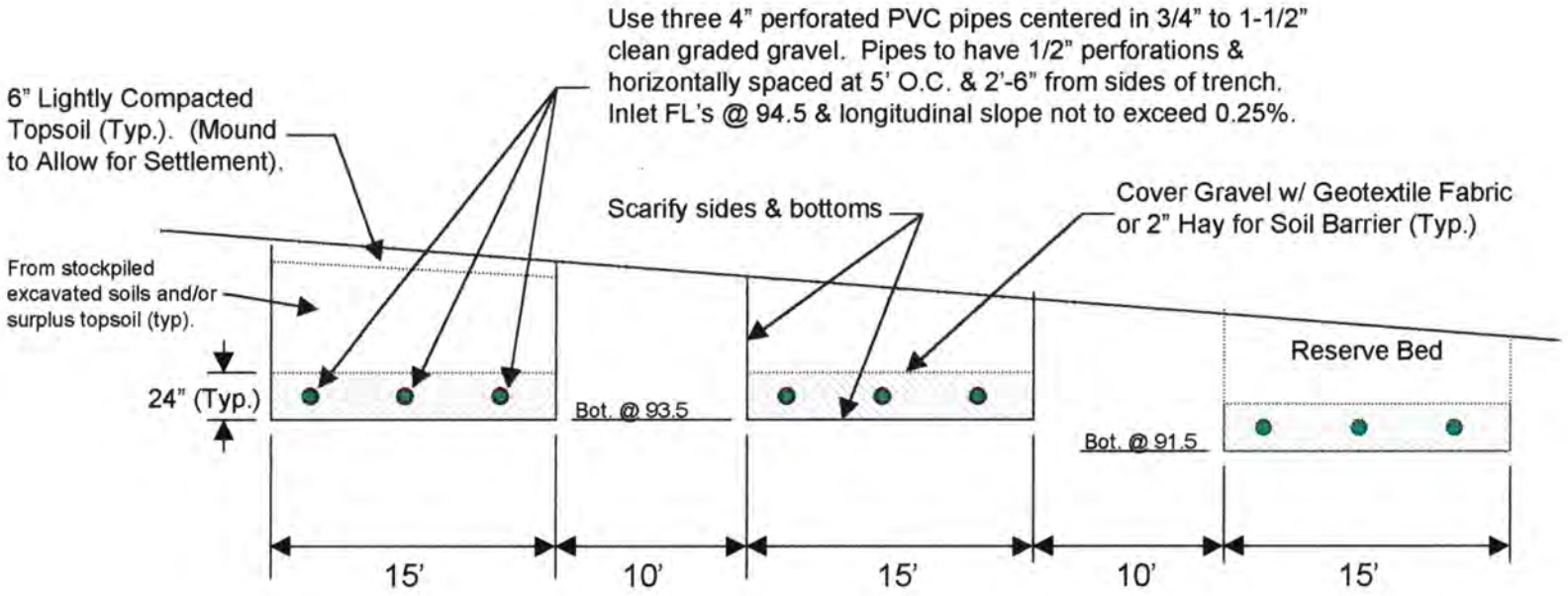
Attachment 3 of 4

Section A-A
Experimental Septage Seepage Beds
Construction Details

John Kruml Property

8800 Lightner Circle, Lot 1 Block 2 of Holland Acres

(Scale Approx. 1" = 10' Horiz. & 1" = 5' Vert.)



Note: Each end of each distribution pipe to be equipped with 4" cleanout with loose fitting cap. Base bends to be formed with pairs of long sweep 45 degree bends to assist in cleaning access and maintenance efforts.

Attachment 4 of 4

November 17, 1997 Addendum to Design Memorandum Experimental Septage Seepage Beds for John Kruml Property 8800 Lightner Circle Lot 1, Block 2 of Holland Acres

To: Jerry Hood, LLCHD and Steve Goans, NDEQ
cc: John Kruml and Larry Schwarck

There have been a few last minute design changes to the 11/16/97 Design Memorandum after the property owner, Mr. John Kruml, consulted with the Contractor, Larry Schwarck:

1. The 3/4" to 1-1/2" graded gravel is not generally available in this area without expensive rail shipment. It has been suggested to substitute clean, washed road gravel, which will be approximately 3/8" in average dimension. The Contractor will carefully place the distribution pipes such that the two rows of perforations are on the bottom of the pipes, so that fines will not enter the pipes as additional gravel is placed over the pipes.

2. An 1,800 gallon septic tank will be used instead of the 1,500 gallon tank specified because of its better construction and small cost difference.

3. Wood chips will be used in lieu of hay or geotextile fabric for a soil barrier above the gravel layer in the seepage beds due to their recent availability from the storm damage in Lincoln.

4. The septic tank location has been changed to 75' from the house, with no change to the entering and exiting pipe slopes. Therefore, the relative difference in the inlet and outlet flowline elevations will remain the same.

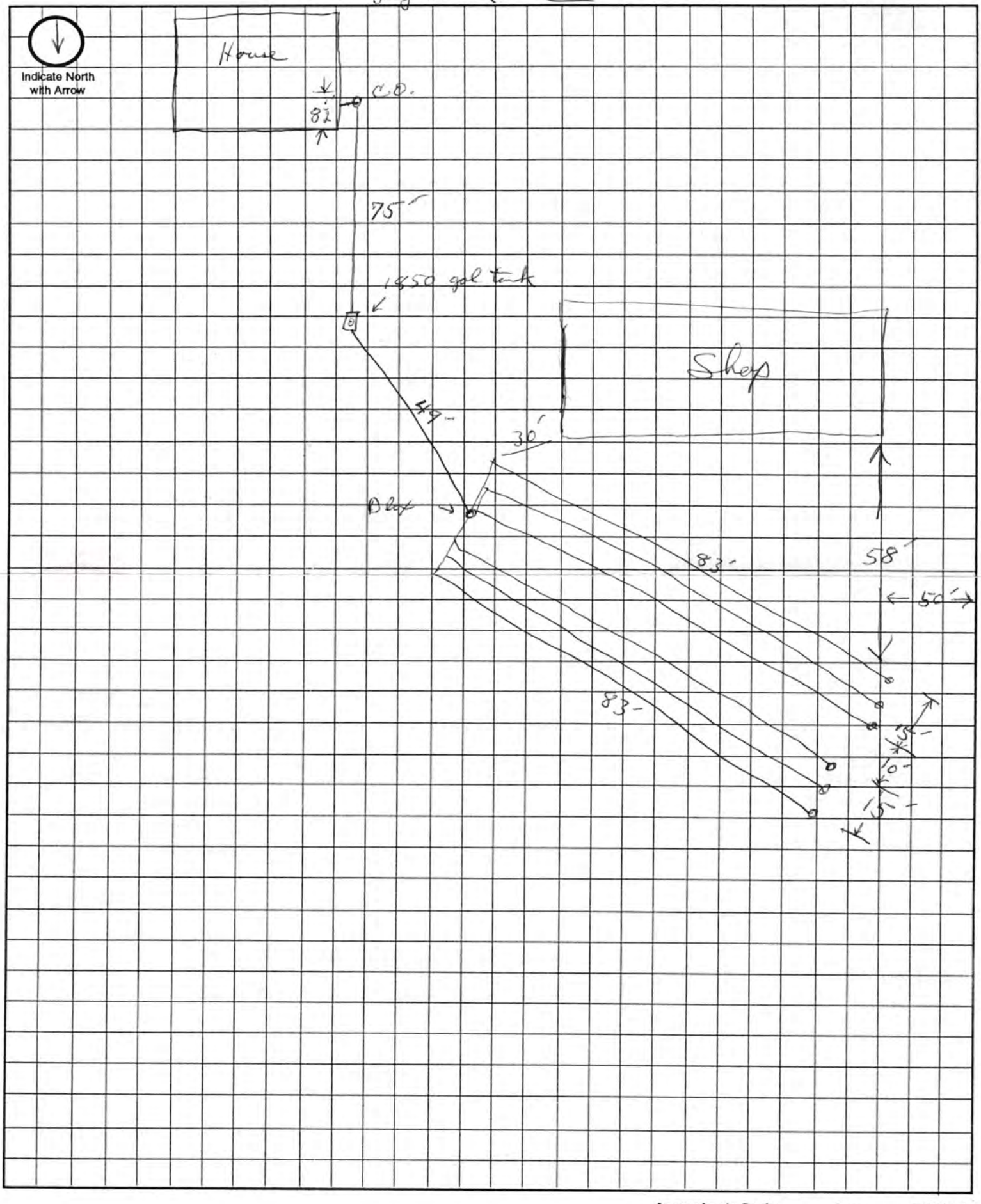
5. The distribution manhole will be constructed from a 24" diameter precast unit specifically manufactured for that use by PreCast Products, Inc. of Lincoln.

6. The seepage beds will be relocated approximately 10' downslope from that originally shown to provide for shallower depths of excavation for the active beds. The piping flowlines and vertical controlling elevations will be adjusted in proportion to this shift.

The above proposed changes meet with my approval and are hereby submitted to LLCHD and NDEQ for final consideration. - LRC

As Built Drawing

Lighthouse Nov 20-97



Approximate Scale: _____ ft. = _____ grid line/s