HAL WEN & ASSOCIATES, C.

SOIL & ENVIRONMENTAL SCIENTISTS

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28 October 2004

Mr. Bobby Byrd
8654 US 421 South
Erwin, NC 28339-8822

Reference: Lot 5/6, Myrtlewood Subdivision (PIN 0598-14-5021)
Comprehensive Soil Investigation,
Hydraulic Assessment,
And Septic System Design

Dear Mr. Byrd,

A site investigation was conducted for the above referenced property in October 2004. The site is located on the northern side of Green Forest Circle, Grove Township, Harnett County, North Carolina. The purpose of the investigation was to determine the ability of this lot to support a subsurface sewage waste disposal system and 100% repair area for a five-bedroom home. It is our understanding that individual septic systems and public water supplies will be utilized at this site. All ratings and determinations were made in accordance with "Laws and Rules for Sanitary Sewage Collection, Treatment and Disposal, 15A NCAC 18A .1900" and Harnett County Sewage Regulations. This report represents our professional opinion but does not guarantee or represent permit approval for this lot by the local Health Department.

COMPREHENSIVE SOIL INVESTIGATION

A soil investigation was conducted and an area of provisionally suitable soils for subsurface sewage waste disposal was observed on the left and rear portions of the lot (see attached map). These provisionally suitable subsoils were observed to be friable clay loams to firm clays and typically extended greater than 30 inches below ground surface. These provisionally suitable soils appear adequate to support long-term acceptance rates of 0.3 to 0.4 gal/day/sqft for conventional drainlines. Some observations were made in this area of soils that are limited in soil depth to the extent that systems that can be installed ultra shallow will likely be required.

The soil area indicated as provisionally suitable for experimental or innovative subsurface sewage waste disposal systems is so rated due to mechanical disturbance. It appears that the soil has been removed to the parent material in order to fill in a gully on the front of the lot. The parent material was observed to have a sandy loam texture that extended to greater than 42 inches below the present ground surface.

The unsuitable soil area is so rated due to excessive soil wetness, inadequate soil depth, and/or the presence of fill material. The ability to utilize alternative systems or make modifications to this area to allow for septic systems is minimal. Some of this area will likely support building foundations and homes could be sited in this area.

HYDRAULIC CONDUCTIVITY ASSESSMENT

The Harnett County Environmental Health Department has stated that it will allow drainlines of the repair septic system to be installed in the soil parent material provided that a pretreatment filter precedes the system and that hydraulic conductivity data supports this use.

Hydraulic conductivity tests were conducted at the site using a Compact Constant Head Permeameter (CCHP), also known as an Amoozemeter, by using the shallow well pump-in technique as detailed in the user's manual. Hydraulic conductivity results can vary, even within similar soils, depending on the temperature and composition of the water used, climatic conditions, and/or proximity of the test layer to the water table. Therefore, the results from one observation may not be indicative of the entire area.

A set of hydraulic conductivity tests was performed at the proposed trench bottom depth (A) and a set was performed approximately two feet below trench bottom (B). Six locations were chosen across the site for the conductivity tests, and a set of observations was conducted at each location. Using bottled drinking water, a constant 16 to 19 cm head of water was established in a 6 cm diameter bore hole. Readings were made of the rate of water level change in the Amoozemeter per unit of time until it appeared that steady state had been reached. Table 1 summarizes the results of the hydraulic conductivity investigation. For detailed information about each test, please refer to the Ksat field datasheets attached.

The hydraulic conductivity results were summarized for the site and used to determine an acceptable range of loading rates for the proposed septic system. First, the site is evaluated to determine if all of the wastewater applied to the drainfield will be able to infiltrate the trenches in a 24-hour period. A range of proposed loading rates based on drainfield area is converted to average infiltration rates based on the trench bottom area (Table 2). This is accomplished by calculating the depth the effluent may stand in the trench per day and the amount of effluent that can infiltrate the trench bottom and sidewalls. These infiltration rates are then compared to the log-averaged Ksat for the trench bottom, which is 1.9910 cm/day. Average Infiltration rates greater than this number are eliminated, leaving an acceptable range of loading rates as 0.30 gal/day or less (see table below).

Log-Averaged Ksat for trench bottoms = 1.9910 cm/day

Proposed Range of LTARs (gal/day/sqft)	Average Infiltration Rate at Trench Bottom (cm/day)	*Select Avg. Infiltration Rates less than the log-averaged Ksat value for the trenches*	Acceptable Range of LTARs (gal/day/sqft)
0.10	0.66	*0.66*	0.10
0.15	0.98	*0.98*	0.15
0.20	1.29	*1.29*	0.2
0.25	1.60	*1.60*	0.25
0.30	1.90	*1.90*	0.3
0.35	2.19	*too high*	-

Second, the zone below the trenches is evaluated to determine if the wastewater will be able to vertically pass through it and sustain a one-foot unsaturated zone below the trenches. The range of proposed loading rates based on drainfield area are expressed in cm/day and compared to the log-averaged Ksat for the zone below the trenches, which is 1.4747 cm/day. Proposed loading rates greater than this number are eliminated, leaving an acceptable range of loading rates as 0.35 gal/day or less (see table below).

Log-Averaged Ksat for the Zone Below the Trenches = 1.4747 cm/day

Proposed Range of LTARs (gal/day/sqft)	LTAR expressed in (cm/day)	*Select LTARs in cm/day less than the log-averaged Ksat value in the zone below the trenches*	Acceptable Range of LTARs (gal/day/sqft)
0.10	0.41	*0.41*	0.10
0.15	0.61	*0.61*	0.15
0.20	0.81	*0.81*	0.2
0.25	1.02	*1.02*	0.25
0.30	1.22	*1.22*	0.3
0.35	1.43	*1.43*	0.35

The LTAR used to design the repair septic system at the site is 0.20 gal/day/sqft. This loading rate was chosen because space was available to utilize more drainline and to provide a margin of safety due to variability in observed Ksat readings across the repair area. The design loading rate falls within the acceptable range of loading rates as established above; therefore it is reasonable to assume that all of the wastewater applied to the drainfield will be able to infiltrate the trenches and vertically pass through the soil.

SEPTIC SYSTEM DESIGN

The initial septic system is proposed as a pressure manifold to uneven length innovative drainlines. The system should be installed on contour with shallow 12 to 18-inch trench depths. The repair system is proposed as a pressure manifold to uneven length conventional drainlines utilizing a pretreatment filter. Substituting an innovative product for the conventional gravel trenches on a one to one basis is recommended for the repair system but not required. Attached is the septic system design and supporting information that you will need to submit to the Harnett County Environmental Health Department for review and the permitting process. The Harnett County Environmental Health Department will make the final decision on whether or not a permit is issued for this lot. The information contained in this report is simply data collected from the site from which we have drawn our professional opinion. There are no guarantees nor are we responsible as to the functionality of the proposed septic systems. Measures can be taken to prolong the life of a septic system, such as utilizing water saving fixtures in the home, establishing a regular maintenance schedule for septic system components, and avoiding damage to the system from disposal of fats/oils/grease down the drain. Although, the proposed septic system designs are conservative, it is recommended that you adhere to these additional measures to protect and prolong the life of your septic system.

The septic system has been demonstrated with various colored pin flags that are located on the lots. It is recommended you take extra care when construction occurs on the lots. **It is important that you do not disturb the septic system areas. It may be necessary to place a protective fence or staked line around the systems to eliminate any potential damage to the soil or the layout of the systems.**

We trust that this report provides the information that you require at this time. If you have any questions or need additional information, please contact us at your convenience.

Sincerely,

Krissina B. Newcomb
Krissina B. Newcomb
Hydraulic Conductivity Specialist

Laura J. Fortner
Laura J. Fortner
Licensed Soil Scientist

Hal Owen
Hal Owen
Senior Consultant

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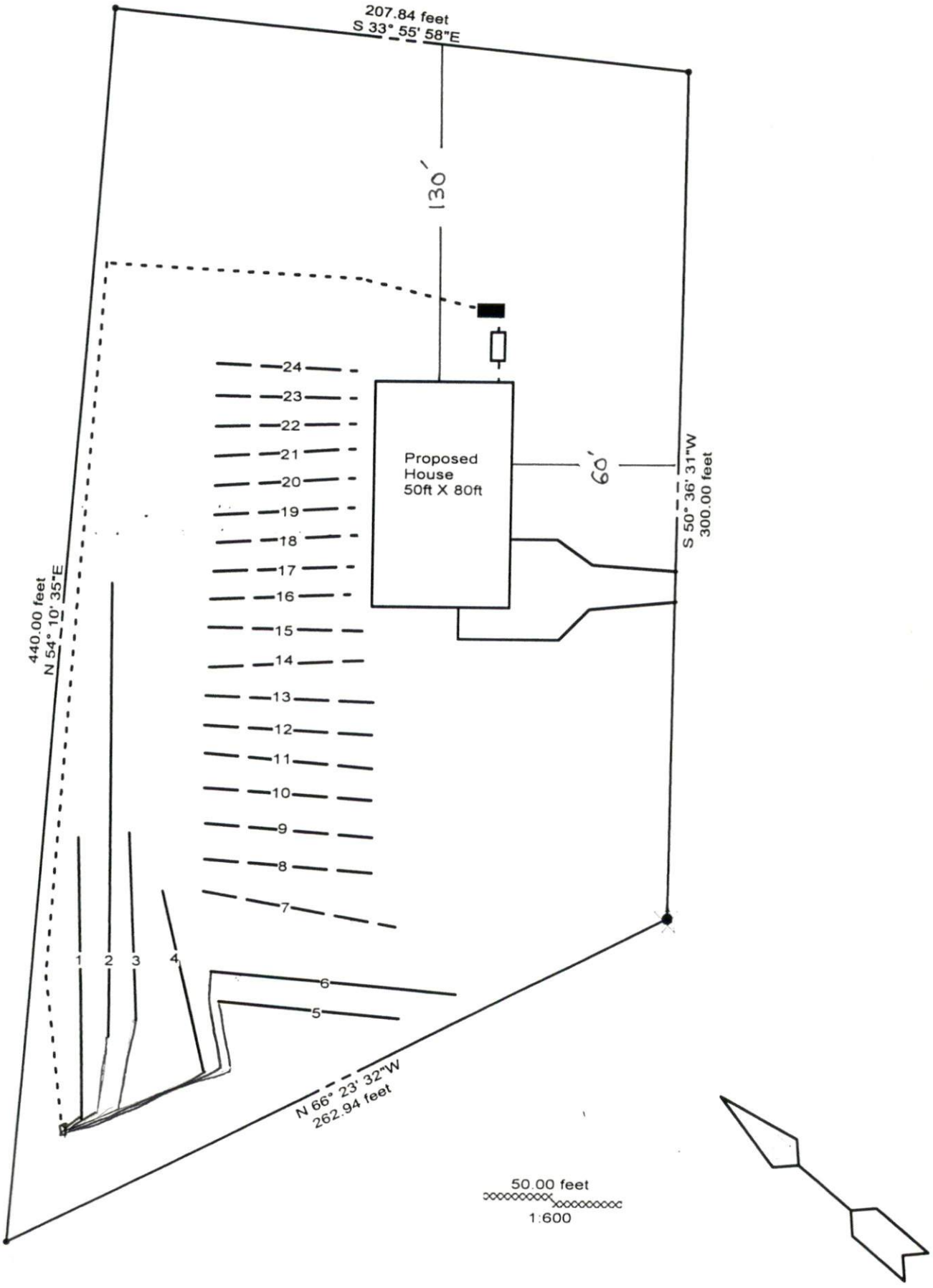
Lot 5/6, Myrtlewood Subdivision



Lot 5/6, Myrtlewood Subdivision

Onsite Wastewater Design Specifications
Bedrooms: 5 (600 gpd flow)

Initial System:

Pressure Manifold to Innovative Drainlines (540-ft)
installed on contour at 12 to 18 inches
LTAR 0.3 gpd/sf (innovative effective LTAR 0.37 gpd/sf)

Repair System:

Pressure Manifold to Conventional Drainlines (1000-ft)
installed on contour at 18 to 24 inches
LTAR 0.2 gpd/sf

Lines flagged at site on 9-ft centers.

Initial/ Repair	Line #	Color	Drainline Length(ft)	Measured Field Line Length (ft)	Relative Elevation (ft)
Initial	1	B	100	123	104.45
Initial	2	Y	160	161	103.98
Initial	3	W	65	66	102.88
Initial	4	R	65	77	101.26
Initial	5	Y	65	64	100.48
Initial	6	B	85	88	100.24
Repair	7	Y	70	72	99.95
Repair	8	W	65	68	99.71
Repair	9	R	65	65	99.52
Repair	10	B	60	61	99.32
Repair	11	Y	60	61	99.21
Repair	12	W	60	61	98.98
Repair	13	R	60	60	98.71
Repair	14	B	55	57	98.45
Repair	15	Y	55	57	98.06
Repair	16	W	50	51	97.83
Repair	17	R	50	51	97.55
Repair	18	B	50	51	97.27
Repair	19	Y	50	51	96.91
Repair	20	W	50	51	96.69
Repair	21	R	50	51	96.38
Repair	22	B	50	50	95.86
Repair	23		50		
Repair	24		50		
		Total:	**1540**	**1497**	**EIP = 100**

Lot 5/6, Myrtlewood Subdivisi

Pressure Manifold Design Criteria

Initial System

Line Number	Line Color	Elevation	Drainline Length(ft)	Tap Size/ Schedule	Flow/tap (gpm)	gpd/ft	LTAR (gpd/sqft)
1	B	104.45	100	1/2"sch 40	7.11	0.988	0.329
2	Y	103.98	160	3/4"sch 40	12.50	1.086	0.362
3	W	102.88	65	1/2"sch 80	5.48	1.172	0.391
4	R	101.26	65	1/2"sch 80	5.48	1.172	0.391
5	Y	100.48	65	1/2"sch 80	5.48	1.172	0.391
6	B	100.24	85	1/2"sch 40	7.11	1.163	0.388

Total Drainline= 540 Total Flow= 43.16

Pressure Head (ft)= 2

Target LTAR (gpd/sqft)= 0.4

LTAR + 5% 0.42

Daily Flow 600

Total Flow (gpm)= 43.16

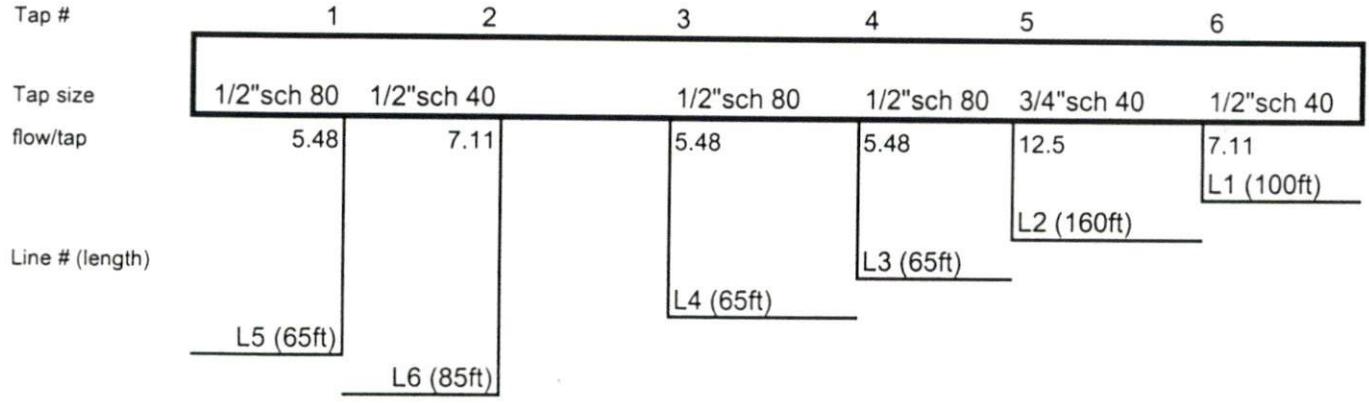
Daily PRT(min)= 13.90

% Pipe Volume = 75

Dose Volume (gal)= 264.47

Dose PRT (min)= 6.13

Manifold Diagram:



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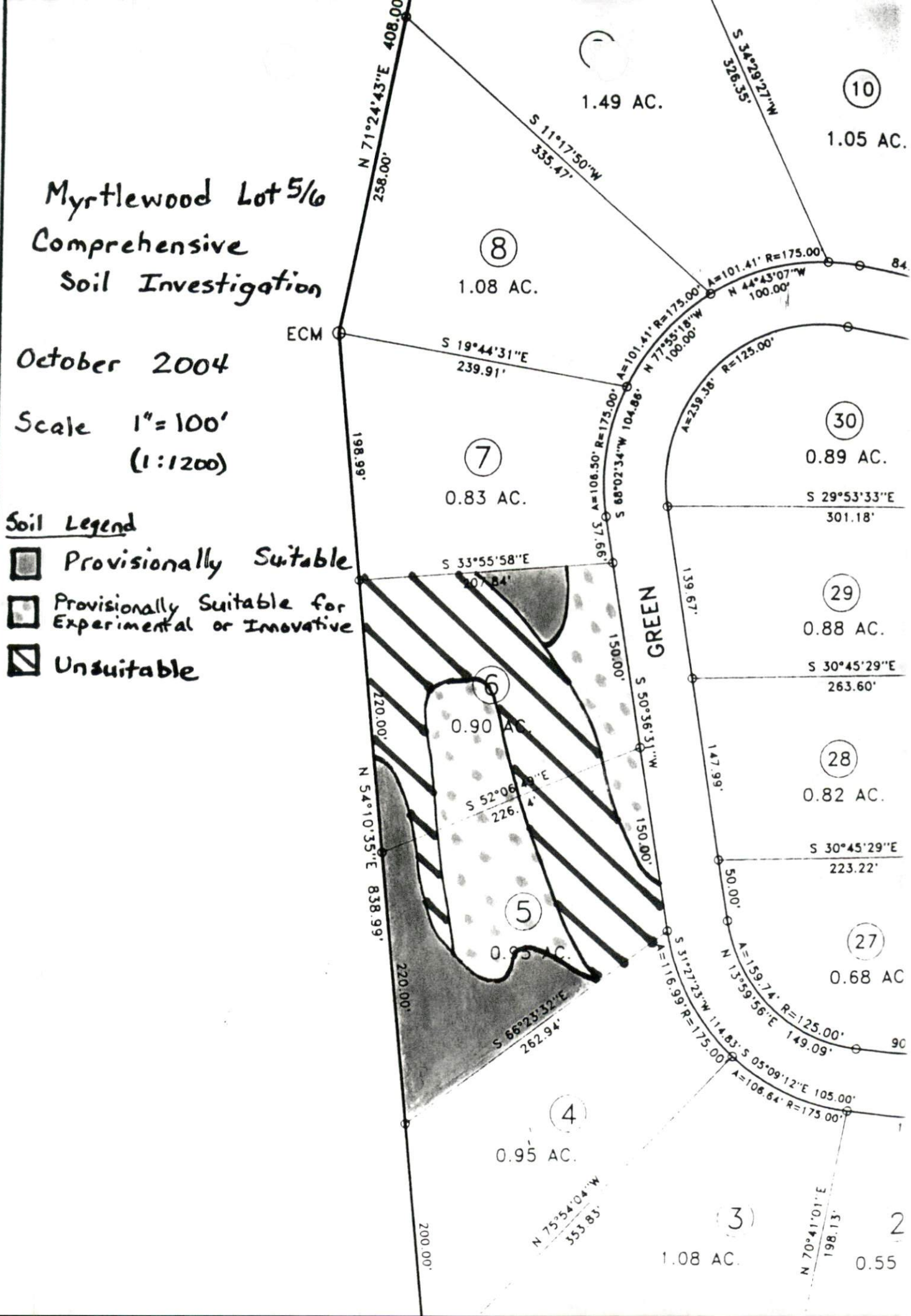
10/19/2004


Myrtlewood Lot 5/6
Comprehensive
Soil Investigation
October 2004
Scale 1" = 100'
(1:1200)
Soil Legend
Provisionally Suitable
Provisionally Suitable for Experimental or Innovative
Unsuitable
1.49 AC.
1.05 AC.
1.08 AC.
0.83 AC.
0.89 AC.
0.88 AC.
0.90 AC.
0.82 AC.
0.68 AC
0.95 AC.
1.08 AC.
0.55
GREEN
ECM
N 71°24'43"E 408.00'
S 11°17'50"W 335.47'
S 34°29'27"W 326.35'
N 71°24'43"E 258.00'
S 19°44'31"E 239.91'
A=101.41' R=175.00'
N 44°43'07"W 100.00'
A=101.41' R=175.00'
N 77°55'18"W 100.00'
A=106.50' R=175.00'
S 68°02'34"W 104.86'
A=239.38' R=125.00'
S 29°53'33"E 301.18'
S 30°45'29"E 263.60'
S 30°45'29"E 223.22'
A=159.74' R=125.00'
N 13°59'56"E 149.09'
A=116.99' R=175.00'
S 31°27'23"W 114.83'
S 05°09'12"E 105.00'
A=108.64' R=175.00'
198.99'
S 33°55'58"E 207.84'
220.00'
N 54°10'35"E 838.99'
S 52°06'49"E 226.4'
150.00'
S 50°36'31"W
139.67'
147.99'
50.00'
220.00'
S 66°23'32"E 262.94'
200.00'
N 75°54'04"W 353.83'
N 70°41'01"E 198.13'

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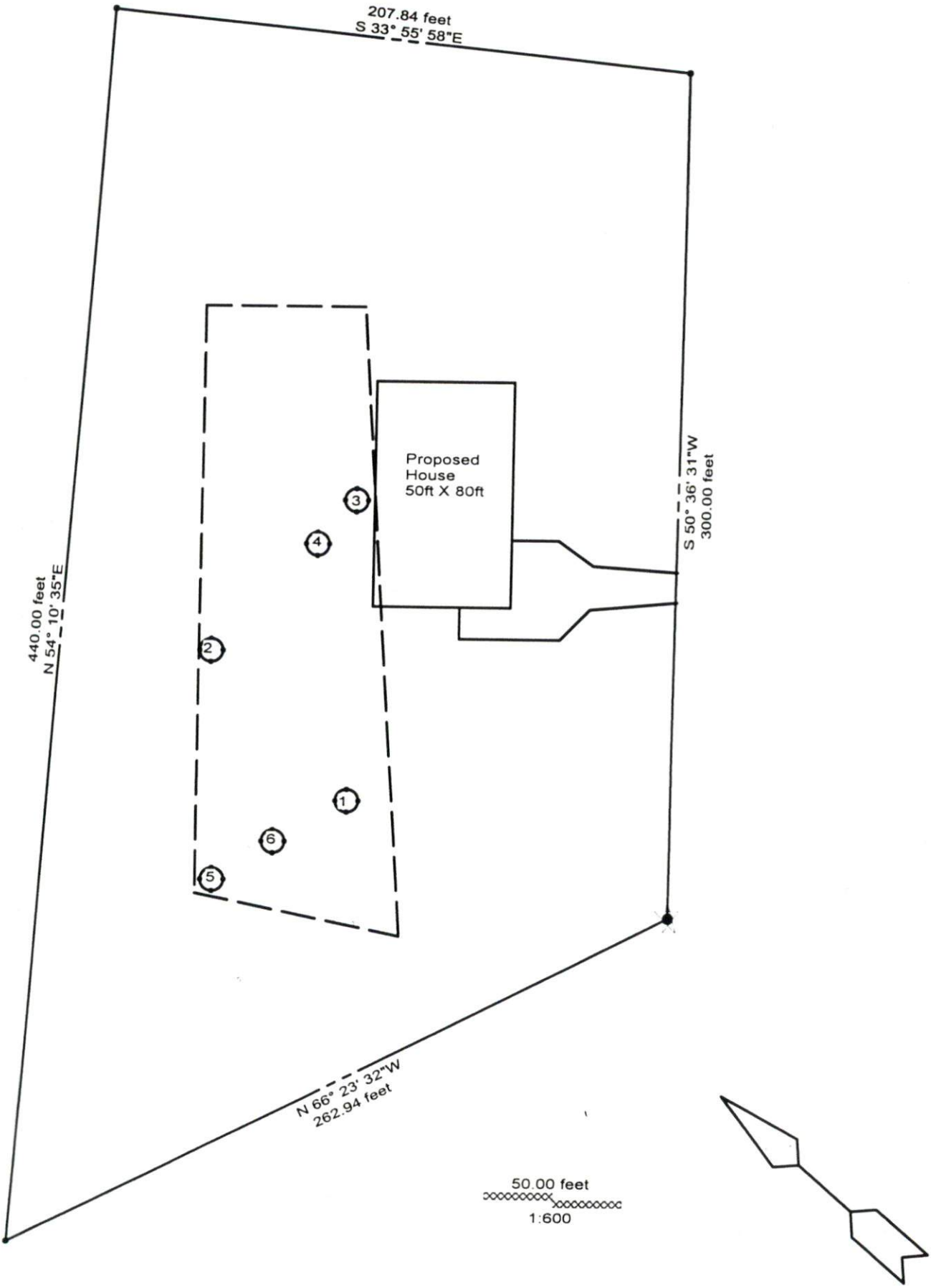
Lot 5/6, Myrtlewood Subdivision

(#) Location of Ksat observation



Lot 5/6, Myrtlewood Subdivision

Table 1. Summary of Hydraulic Conductivity Data

Measure-ment	Location	Observation	Depth of Auger Hole		H	r	A	Q	Ksat	Log Ksat
			in	cm	cm	cm		cm3/day	cm/day	cm/day
1	1	Trench Bottom	25.4	64.5	16	3	0.000961	1728	1.6606	0.2203
2	2	Trench Bottom	23.0	58.5	18.5	3	0.000776	11232	8.7160	0.9403
3	3	Trench Bottom	24.8	63	17	3	0.000879	720	0.6329	-0.1987
4	4	Trench Bottom	23.2	59	18	3	0.000808	36288	29.3207	1.4672
5	1	2ft Below Trench	41.3	105	19	3	0.000745	3456	2.5747	0.4107
6	2	2ft Below Trench	40.9	104	17.5	3	0.000842	576	0.4850	-0.3143
7	4	2ft Below Trench	41.9	106.5	19	3	0.000745	12672	9.4406	0.9750
8	2	2ft Below Trench	39.6	100.5	17.5	3	0.000842	2592	2.1825	0.3389
9	5	Trench Bottom	21.1	53.5	18.5	3	0.000776	720	0.5587	-0.2528
10	5	2ft Below Trench	39.4	100	18	3	0.000808	340	0.2747	-0.5611
11	6	Trench Bottom	22.4	57	16	3	0.000961	432	0.4152	-0.3818
12	6	2ft Below Trench	39.4	100	17.5	3	0.000842	1728	1.4550	0.1629

Hydraulic conductivity of the soil was calculated using the Glover Solution, where:

Ksat = A*Q

$A = \{\sinh^{-1}(H/r) - [(r/H)^2 + 1]^{1/2} + r/H\}/(2\pi H^2)$

Q = steady-state rate of water flow from CCHP into auger hole

H = depth of water in hole

r = radius of hole

Log Averaged Ksat (arithmetic mean) for:

Trench Bottom =	1.9910	cm/day	or Appx. 0.4887 gpd/sf
2ft Below Trench =	1.4747	cm/day	or Appx. 0.362 gpd/sf

Lowest Ksat reading for:

Trench Bottom =	0.4152	cm/day	or Appx. 0.1019 gpd/sf
2ft Below Trench =	0.2747	cm/day	or Appx. 0.0674 gpd/sf

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Table 2. Determine the average infiltration rate at the trench bottom.

Trench Width= 36 inches or 91.44 cm
(conventional)

Proposed LTAR			Depth of Water in Trench Bottom	Depth of Water w/ Gravel in Trench	Avg. Infiltration Area	Avg. Infiltration Rate
gpd/sqft	cm/day	cm^3/linear ft	cm/day	cm/day	cm^2/day	cm/day
0.1	0.41	1892.5	0.68	2.26	2856.08	0.66
0.15	0.61	2838.8	1.02	3.40	2890.57	0.98
0.2	0.81	3785.0	1.36	4.53	2925.07	1.29
0.25	1.02	4731.3	1.70	5.66	2959.56	1.60
0.3	1.22	5677.5	2.04	6.79	2994.06	1.90
0.35	1.43	6623.8	2.38	7.92	3028.55	2.19
0.4	1.63	7570.0	2.72	9.05	3063.05	2.47
0.45	1.83	8516.3	3.06	10.19	3097.54	2.75
0.5	2.04	9462.5	3.40	11.32	3132.04	3.02
0.55	2.24	10408.8	3.73	12.45	3166.53	3.29
0.6	2.44	11355.0	4.07	13.58	3201.02	3.55
0.65	2.65	12301.3	4.41	14.71	3235.52	3.80
0.7	2.85	13247.5	4.75	15.84	3270.01	4.05
see calculation	(a)	(b)	(c)	(d)	(e)	(f)

Convert proposed loading rate to cm/day and cm^3/linear ft.

(a) cm/day = gpd/sqft * ft^3/7.48gal * 30.48cm/ft

(b) cm^3/linear ft = gpd/sqft * gal/linear ft/(0.2 gpd/sqft) * 3785cm^3/gal

Determine the depth that the proposed water will stand in the trench bottom?

(c) depth of water = cm^3/linear ft divided by trench bottom area (trench width(ft) X 1 linear ft X $(2.54cm/ft)^2$)

Account for the gravel in the trench assuming a 30% porosity.

(d) Depth of Water w/ Gravel in Trench = Depth of water in trench /0.30

Determine the Average infiltration area per day.

(e) Avg. Infiltration Area cm^2/day = (Depth of water in gravelled trench + trench width) * 1 linear ft

Determine the Average infiltration rate (depth of water to pass through the infiltration area).

(f) Avg. Infiltration Rate cm/day = cm^3/linear ft divided by Avg. Infiltration area/day

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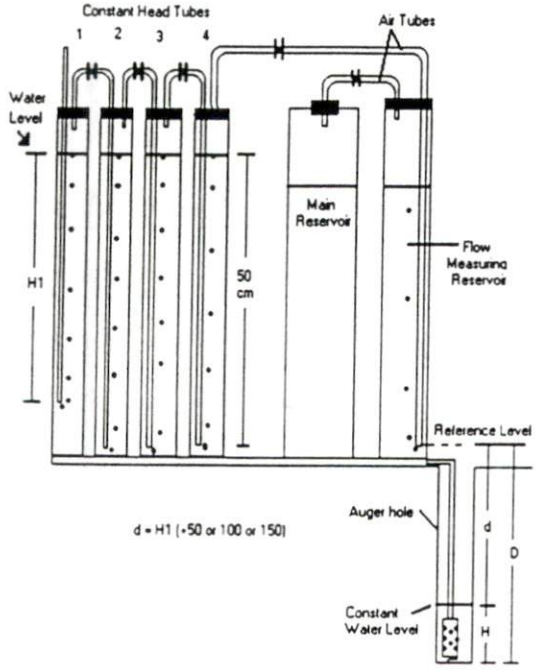
Project: Myrtle wood Lot 5/6
Ksat ID: 1A

Ksat DATA SHEET

Measurement #: 1 Date: 11 Oct 04 Investigator: Krissina B. Newcomb
System Type: conventional Trench Depth: 18-24"
Location: #1
Weather -- Condition: Partly Cloudy Temp: 65°F
Water – Source: Walmart "Drinking Water" Temp: 72°F
Soil Horizon: C1 Slope: 3% Layer Depth and Thickness: 0-42
Center of Layer: 21"



		cm	inches
Hole Depth		64.5	25"
Distance b/w reference level and ground [10 cm or 4 in]	+	10.0	
Distance from hole bottom to reference level (D)	=	74.5	
Desired depth of water (H) > 15 cm or 6 in	-	18.5	
Constant-head tube setting (H1)	=	56.0	

Measured (Actual) water level in hole
Initial: 16.5
Final: 16.0
Hole radius (r): 3 cm
Start Saturation: 9:18 a.m.
Steady State Reading: _____

QUICK REFERENCE

Hole depth: 64.5
Water Level: 16.5
Depth to Water: 46.0

64.5
- 49.0
15.5

Ksat = A X Q

Conversion Factor (C.F.) (1-ON = 20 cm^2) 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000961 cm^{-2}

Q from other side = 1728 cm^3/day

Ksat= 1.6606 cm/day

LTAR ~ 0.4076 gpd/sf

Project: N Hewood Lot 5/6

Ksat ID: 1A

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=___cm²	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
16.5	9:19	43.7					
16.0	10:19	42.0	60	1.7	(×105) 178.5	2.975	4284
16.0	10:29	41.1	10	0.9	(×20) 18	1.8	2592
16.0	10:39	40.2	10	0.9	18	1.8	2592
16.0	10:49	39.5	10	0.7	14	1.4	2016
16.0	10:59	38.6	10	0.9	18	1.8	2592
16.0	11:09	38.0	10	0.6	12	1.2	1728
16.0	11:19	37.2	10	0.8	16	1.6	2304
16.0	11:29	36.8	10	0.4	8	0.8	1152
16.0	11:39	35.9	10	0.9	18	1.8	2592
16.0	11:49	35.2	10	0.7	14	1.4	2016
16.0	11:59	34.7	10	0.5	10	1.0	1440
16.0	12.09	34.1	10	0.6	12	1.2	1728
16.0	12:19	33.6	10	0.5	10	1.0	1440
16.0	12:29	32.9	10	0.7	14	1.4	2016

Average of last few measurements: 1728 cm^3/d ~~Ksat=~~

Comments:

Project: Myrtwood Lot 5/6
Ksat ID: 2A

Ksat DATA SHEET

Measurement #: 2 Date: 11 Oct 04 Investigator: K. B. Newcomb

System Type: Conventional Trench Depth: 18 - 24"

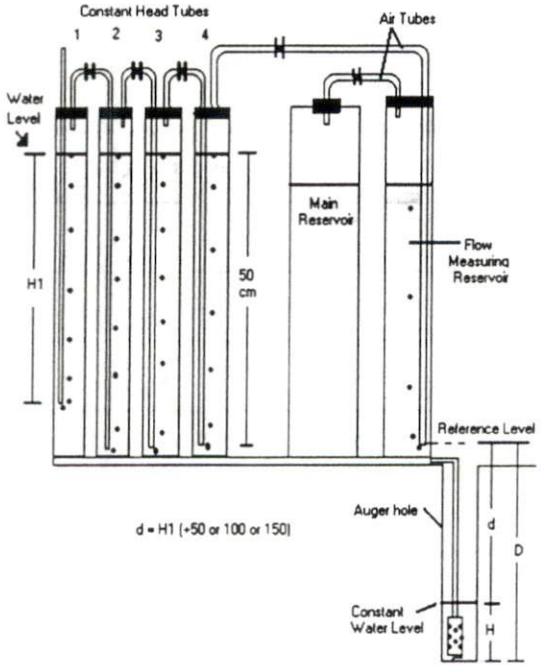
Location: 2

Weather -- Condition: partly cloudy Temp: 72°F

Water – Source: Walmart "drinking water" Temp: 72° F

Soil Horizon: C1 Slope: 3 % Layer Depth and Thickness: 0 - 44"

Center of Layer: 22"



		cm	inches
Hole Depth		58.5	23
Distance b/w reference level ~~and ground [10 cm or 4 in]~~ top of hole	+	12	
Distance from hole bottom to reference level (D)	=	70.5	
Desired depth of water (H) > 15 cm or 6 in	-	18.5	
Constant-head tube setting (H1)	=	52.0	

Measured (Actual) water level in hole

Initial: 18.0

Final: 18.5

Hole radius (r): 3cm

Start Saturation: 12:41

Steady State Reading: 3:16

QUICK REFERENCE

Hole depth: 58.5

Water Level: 18.0

Depth to Water: 40.5

58.5

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000776 cm^{-2}

Q from other side = 11232 cm^3/day

Ksat= 8.7160 cm/day

LTAR ~ 2.1394 gpd/sf

Project: 1 Hewood Lot 5/6

Ksat ID: ZA

3:53

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF= 20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
18.0	1:35	36.2					
18.0	1:40	33.8	5	2.4	48	9.6	13824
	1:46	30.5	6	3.3	66	11	15840
18.5	1:56	25.5	10	5.0	100	10	14400
	2:06	21.2	10	4.3	86	8.6	12384
18.0	2:16	16.5	10	4.7	94	9.4	13536
	2:26	12.2	10	4.3	86	8.6	12384
18.5	2:36	7.8	10	4.4	88	8.8	12672
18.5	2:46	3.7	10	4.1	82	8.2	11808
18.5	2:56	26.4	-	-			
	3:06	22.3	10	4.1	82	8.2	11808
	3:16	18.6	10	3.7	74	7.4	10656
	3:26	14.6	10	4.0	80	8.0	11520
18.5	3:36	10.7	10	3.9	78	7.8	11232
18.5	3:46	6.7	10	4.0	80	8.0	11520

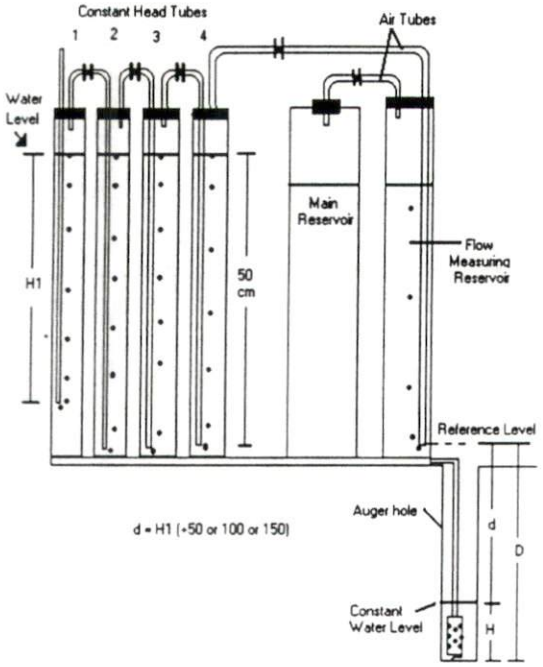
Average of last few measurements: 11232 cm^3/d Ksat =

Comments:

Project: Myrtle 2d Lot 56
Ksat ID: 3A

Ksat DATA SHEET

Measurement #: 3 Date: 11 Oct 04 Investigator: K B Newcomb
System Type: Conventional Trench Depth: 18-24 inch
Location: 3 - Right Rear house corner - back 20ft
Weather -- Condition: Partly Cloudy Temp: 72°F
Water – Source: Walmart "drinking water" Temp: 72°F
Soil Horizon: C1 Slope: 3 % Layer Depth and Thickness: 0-44
Center of Layer: 22



		cm	inches
Hole Depth		63	25
Distance b/w reference level and ground [10 cm or 4 in]	+	12	
Distance from hole bottom to reference level (D)	=	75	
Desired depth of water (H) > 15 cm or 6 in	-	18	
Constant-head tube setting (H1)	=	57	

Measured (Actual) water level in hole
Initial: 17.0 cm
Final: _____
Hole radius (r): 3 cm
Start Saturation: 3:35
Steady State Reading: _____

QUICK REFERENCE

Hole depth: 63
Water Level: 17
Depth to Water: 46

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000879 cm^{-2}

Q from other side = 720 cm^3/day

Ksat= 0.6329 cm/day

LTAR ~ 0.1553 gpd/sf

Project: Y -tlewood Lot 5/6
Ksat ID: 3A

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
17.0	4:22	44.9	—	—			
	4:32	44.4	10	0.5	10	1.0	1440
17.0	4:42	44.2	10	0.2	4	0.4	576
	4:52	43.8	10	0.4	8	0.8	1152
	5:02	43.5	10	0.3	6	0.6	864
	5:12	43.3	10	0.2	4	0.4	576
	5:22	43.0	10	0.3	6	0.6	864
	5:32	42.8	10	0.2	4	0.4	576
	5:42	42.5	10	0.3	6	0.6	864

Average of last few measurements: 720 Ksat =

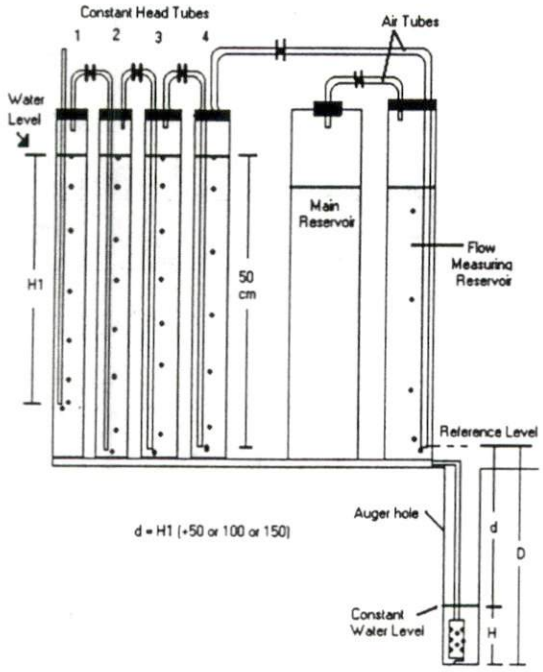
Comments:

Project: Myrtle Wood Lot 5/6
Ksat ID: 4A

Ksat DATA SHEET

Measurement #: 4 Date: 11 Oct 04 Investigator: K B Newcomb
System Type: conventional Trench Depth: 18-24 inches
Location: 4

Weather -- Condition: mostly cloudy Temp: 58°F
Water – Source: Walmart "drinking water" Temp: 65° F
Soil Horizon: C1 Slope: 3% Layer Depth and Thickness: 0-44
Center of Layer: 22"



		cm	inches
Hole Depth		59	23
Distance b/w reference level and ground [10 cm or 4 in]	+	12	
Distance from hole bottom to reference level (D)	=	71	
Desired depth of water (H) > 15 cm or 6 in	-	18	
Constant-head tube setting (H1)	=	53	

Measured (Actual) water level in hole
Initial: 18.0
Final: 18.0
Hole radius (r): 3cm
Start Saturation: 8:22
Steady State Reading: _____

QUICK REFERENCE

Hole depth: 59
Water Level: 41
Depth to Water: 18

Ksat = A X Q

Conversion Factor (C.F.) (1-ON = 20 cm^2) 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000 808 cm^{-2}

Q from other side = 36288 cm^3/day

Ksat= 29.3207 cm/day

LTAR ~ 7.1968 gpd/sf

Project: 1 rtlewood Lot 5/6
Ksat ID: 4n

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=10.5 cm²	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
18.0	9:12	45.6					
	9:17	44.2	5	1.4	147	29.4	42336
	9:23	42.5	6	1.7	178.5	29.75	42840
	9:27	41.4	4	1.1	115.5	28.875	41580
18.0	9:33	39.7	6	1.7	178.5	29.75	42840
	9:38	38.4	5	1.3	136.5	27.3	39312
	9:43	37.0	5	1.4	147	29.4	42336
	9:48	35.8	5	1.2	126	25.2	36288
	9:53	34.6	5	1.2	126	25.2	36288
	9:58	33.3	5	1.3	136.5	27.3	39312
18.0	10:03	32.0	5	1.3	136.5	27.3	39312

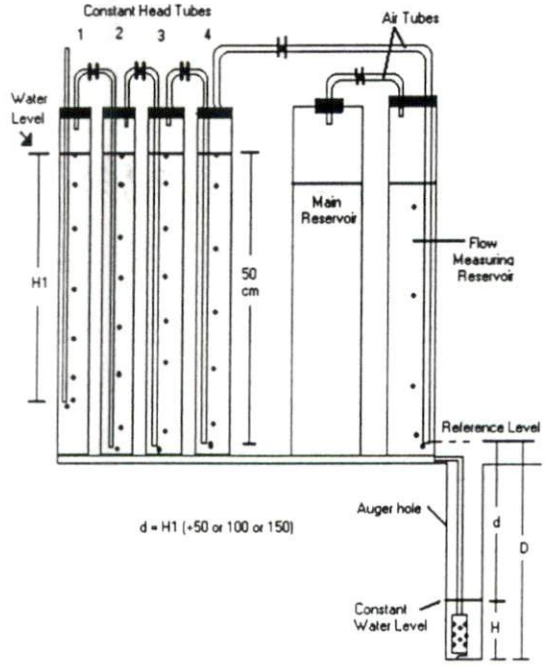
Average of last few measurements: 36288 Ksat =

Comments:

Project: Myr wood Lot 5/6
Ksat ID: 1B

Ksat DATA SHEET

Measurement #: 5 Date: 12 Oct 04 Investigator: K B Newcomb
System Type: conventional Trench Depth: 18-24 in.
Location: 1
Weather -- Condition: Cloudy Temp: 62°F
Water – Source: Walmart "drinking water" Temp: 65° F
Soil Horizon: C1 Slope: 3% Layer Depth and Thickness: _____
Center of Layer: _____



		cm	inches
Hole Depth		105	41
Distance b/w reference level and ground [10 cm or 4 in]	+	10	
Distance from hole bottom to reference level (D)	=	115	
Desired depth of water (H) > 15 cm or 6 in	-	18	
Constant-head tube setting (H1)	=	97	

Measured (Actual) water level in hole
Initial: 19.0
Final: 19.0
Hole radius (r): 3cm
Start Saturation: 10:18 a.m.
Steady State Reading: _____

QUICK REFERENCE

Hole depth: 105
Water Level: 19
Depth to Water: 86

5

Ksat = A X Q

Conversion Factor (C.F.) (1-ON = 20 cm^2) 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000745 cm^{-2}

Q from other side = 3456 cm^3/day

Ksat= 2.5747 cm/day

LTAR = 0.6320 gpd/sf

92
12

Project: N Hewood Lot 56
Ksat ID: 11

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF= 20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
19.0	11:11	39.9					
	11:16	37.8	5	2.1	42	8.4	12096
	11:21	37.0	5	0.8	16	3.2	4608
19.0	11:26	36.1	5	0.9	18	3.6	5184
	11:31	35.5	5	0.6	12	2.4	3456
	11:36	34.9	5	0.6	12	2.4	3456
	11:46	33.4	10	1.5	30	3.0	4320
19.0	11:56	32.1	10	1.3	26	2.6	3744

Average of last few measurements: 3456 Ksat =

Comments:

Project: Myr wood Lot 5/6
Ksat ID: 2B

Ksat DATA SHEET

Measurement #: 6 Date: 12 Oct 04 Investigator: _____

System Type: conventional Trench Depth: 18-24 in.

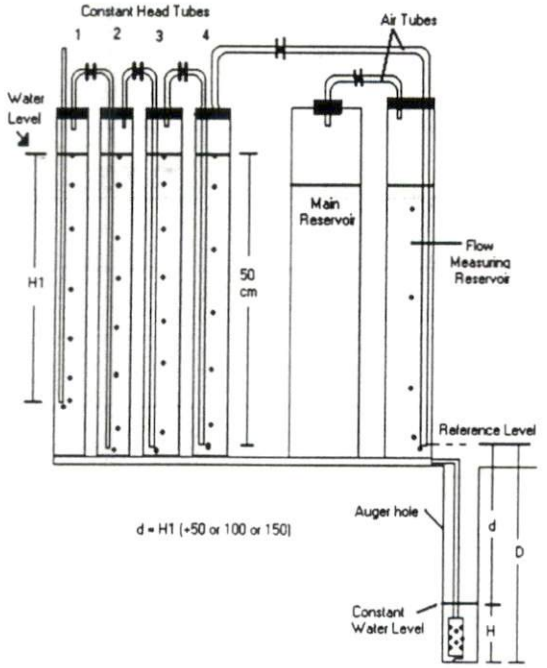
Location: 2

Weather -- Condition: Partly Cloudy Temp: 70°F

Water – Source: Walmart "drinking water" Temp: 67°F

Soil Horizon: C2 Slope: 3% Layer Depth and Thickness: _____

Center of Layer: _____



		cm	inches
Hole Depth		104	
Distance b/w reference level and ground [10 cm or 4 in]	+	10	
Distance from hole bottom to reference level (D)	=	114	
Desired depth of water (H) > 15 cm or 6 in	-	18	
Constant-head tube setting (H1)	=	96	

Measured (Actual) water level in hole

Initial: 17.5

Final: 17.5

Hole radius (r): 3cm

Start Saturation: 12:00

Steady State Reading: _____

QUICK REFERENCE

Hole depth: 104

Water Level: 86.5

Depth to Water: 17.5

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000842 cm^{-2}

Q from other side = 576 cm^3/day

Ksat= 0.4850 cm/day

LTAR = 0.1190 gpd/sf

86.5

Project: n Hewood Lot 5/6
Ksat ID: 20

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF= 20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
	1:12	43.6					
17.5	1:22	43.4	10	0.2	4	0.4	576
	1:32	43.0	10	0.4	8	0.8	1152
	1:42	42.7	10	0.3	6	0.6	864
17.5	1:52	42.6	10	0.1	2	0.2	288

Average of last few measurements: Ksat =

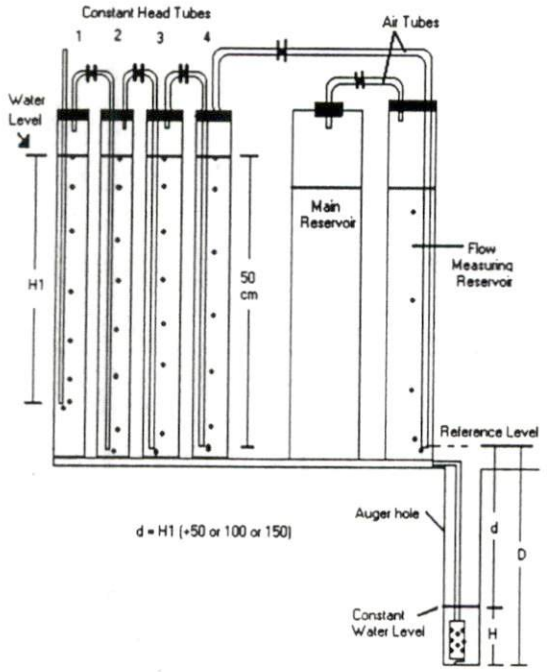
Comments:

Project: Myrtle ood Lot 5/6
Ksat ID: 4B

Ksat DATA SHEET

Measurement #: 7 Date: 12 Oct 04 Investigator: K B Newcomb
System Type: Conventional Trench Depth: 18 - 24 in
Location: 4

Weather -- Condition: Mostly Sunny Temp: 72° F
Water – Source: Walmart "drinking Water Temp: 68° F
Soil Horizon: C Slope: 3 % Layer Depth and Thickness: _____
Center of Layer: _____



		cm	inches
Hole Depth		106.5	
Distance b/w reference level and ground [10 cm or 4 in]	+	10	
Distance from hole bottom to reference level (D)	=	116.5	
Desired depth of water (H) > 15 cm or 6 in	-	18.0	
Constant-head tube setting (H1)	=	98.5	

Measured (Actual) water level in hole
Initial: 19.0
Final: 19.0
Hole radius (r): 3 cm
Start Saturation: 1:55
Steady State Reading: _____

QUICK REFERENCE

Hole depth: 106.5
Water Level: 19.0
Depth to Water: 87.5

Ksat = A X Q

Conversion Factor (C.F.) (1-ON = 20 cm^2) 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000745 cm^{-2}

Q from other side = 12672 cm^3/day

Ksat= 9.4406 cm/day

LTAR ~ 2.3172 gpd/sf

Project: 1 Ctlewood Lot 5/6
Ksat ID: 4B

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
	2:45	46.2					
19.0	2:55	40.7	10	5.5	110	11	15840
19.0	3:00	37.9	5	2.8	56	11.2	16128
	3:05	35.3	5	2.6	52	10.4	14976
	3:10	32.5	5	2.8	56	11.2	16128
19.0	3:15	30.0	5	2.5	50	10	14400
	3:20	27.4	5	2.6	52	10.4	14976
	3:25	24.9	5	2.5	50	10	14400
	3:30	22.4	5	2.5	50	10	14400
	3:35	20.2	5	2.2	44	8.8	12672
	3:40	18.0	5	2.2	44	8.8	12672
	3:45	15.5	5	2.5	50	10	14400
	3:50	13.1	5	2.4	48	9.6	13824

Average of last few measurements: 12672 Ksat =

Comments:

Project: Myr wood Lot 5/6
Ksat ID: 26

Ksat DATA SHEET

Measurement #: 8 Date: 12 Oct 04 Investigator: KB Newcomb

System Type: conventional Trench Depth: _____

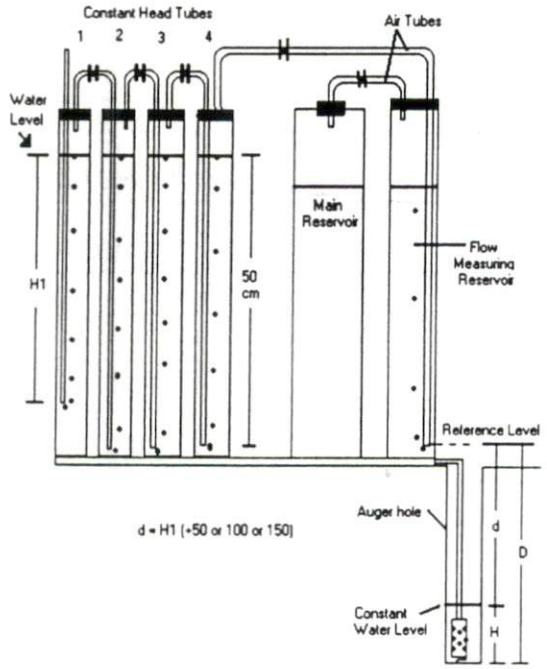
Location: 2

Weather -- Condition: Mostly Sunny Temp: 72° F

Water – Source: Walmart "drinking water" Temp: 69° F

Soil Horizon: C Slope: 3% Layer Depth and Thickness: _____

Center of Layer: _____



		cm	inches
Hole Depth		100.5	
Distance b/w reference level and ground [10 cm or 4 in]	+	10	
Distance from hole bottom to reference level (D)	=	110.5	
Desired depth of water (H) > 15 cm or 6 in	-	18.0	
Constant-head tube setting (H1)	=	92.5	

Measured (Actual) water level in hole

Initial: 17.5

Final: _____

Hole radius (r): 3 cm

Start Saturation: 3:55

Steady State Reading: _____

QUICK REFERENCE

Hole depth: 100.5

Water Level: 17.5

Depth to Water: 83.0

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 2592 cm^{-2}

Q from other side = 0.000842 cm^3/day

Ksat= 2,1825 cm/day

LTAR ~ 0.5357 gpd/sf

Project: N Hewood Lot 5/6
Ksat ID: 2

1452

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
17.5	4:40	44.8					
	4:45	44.2	5	0.6	12	2.4	3456
	4:50	43.8	5	0.4	8	1.6	2304
	4:55	43.3	5	0.5	10	2.0	2880
	5:00	42.6	5	0.8	16	3.2	4608
	5:05	42.2	5	0.4	8	1.6	2304
	5:15	41.4	10	0.8	16	1.6	2304
17.5	5:25	40.5	10	0.9	18	1.8	2592
	5:35	39.6	10	0.9	18	1.8	2592
	5:40	39.1	5	0.5	10	2.0	2880
	5:45	38.5	5	0.6	12	2.4	3456

Average of last few measurements: 2592 Ksat =

Comments:

Project: Myrt ood Lot 5/6
Ksat ID: 5A

Ksat DATA SHEET

Measurement #: 9 Date: 27 Oct 04 Investigator: K. B. Newcomb

System Type: Conventional Trench Depth: 18-24

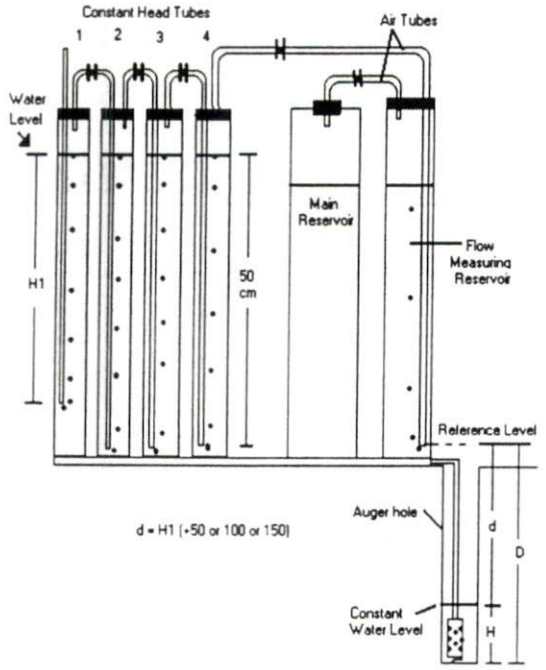
Location: 5

Weather -- Condition: Mostly Sunny Temp: 56° F

Water – Source: Walmart "Drinking Water" Temp: 70° F

Soil Horizon: C Slope: 3% Layer Depth and Thickness: 0-44

Center of Layer: _____



		cm	inches
Hole Depth		53.5	22
Distance b/w reference level and ground [10 cm or 4 in]	+	11.0	
Distance from hole bottom to reference level (D)	=	64.5	
Desired depth of water (H) > 15 cm or 6 in	-	18.0	
Constant-head tube setting (H1)	=	46.5	

Measured (Actual) water level in hole

Initial: 18.5

Final: _____

Hole radius (r): 3cm

Start Saturation: 8:26

Steady State Reading: _____

QUICK REFERENCE

Hole depth: 535

Water Level: 18.5

Depth to Water: 35.5

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000776 cm^{-2}

Q from other side = 720 cm^3/day

Ksat= 0.5587 cm/day

LTAR ≈ 0.1371 gpd/sf

Project: 1st Hewood Lot 5/6

Ksat ID: 5A

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=20 cm²	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
18.5	9:05	43.0					
	9:15	42.7	10	0.3	6	0.6	864
	9:25	42.5	10	0.2	4	0.4	576
	9:35	42.2	10	0.3	6	0.6	864
	9:45	42.0	10	0.2	4	0.4	576
	9:55	41.5	10	0.5	10	1.0	1440
	10:05	41.3	10	0.2	4	0.4	576
	10:15	41.1	10	0.2	4	0.4	576

1575

Average of last few measurements: 720 cm^3/d Ksat =

Comments:

Project: Myrtle Wood 5/6

Ksat ID: 5B

Ksat DATA SHEET

Measurement #: 10 Date: 27 Oct 04 Investigator: K B Newcomb

System Type: Conventional Trench Depth: 18-24

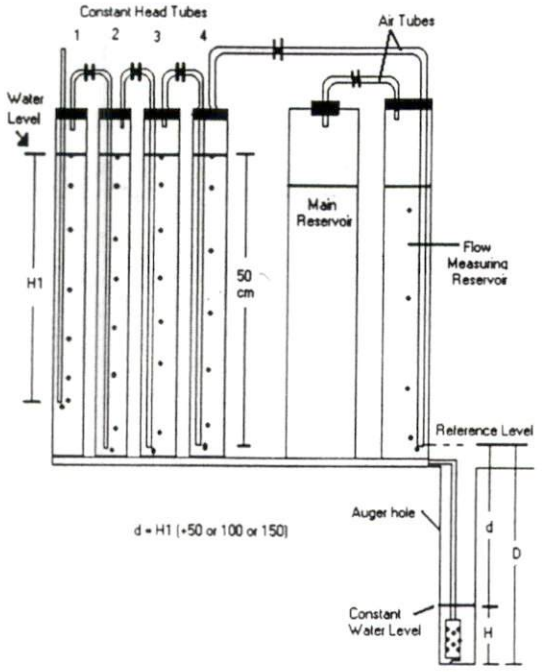
Location: 5

Weather -- Condition: Overcast Temp: 65°F

Water – Source: Walmart "Drinking Water" Temp: 72°F

Soil Horizon: C Slope: 3% Layer Depth and Thickness: _____

Center of Layer: _____



		cm	inches
Hole Depth		100.0	
Distance b/w reference level and ground [10 cm or 4 in]	+	10.0	
Distance from hole bottom to reference level (D)	=	110.0	
Desired depth of water (H) > 15 cm or 6 in	-	18.0	
Constant-head tube setting (H1)	=	92.0	

92.5
7.5
100.0

Measured (Actual) water level in hole

Initial: 18.0

Final: _____

Hole radius (r): 3 cm

Start Saturation: 10:25

Steady State Reading: _____

QUICK REFERENCE

Hole depth: 100 cm

Water Level: 18 cm

Depth to Water: 82 cm

43

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000808 cm^{-2}

Q from other side = 340 cm^3/day

Ksat= 0.2747 cm/day

LTAR ~ 0.0674 gpd/s.f.

Project: 41 yr Hewood 5/6

Ksat ID: C

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF= 20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
13.0	10:56	39.6					
13.0	11:17	39.8	20	0.8	84	4.2	6048
18	11:23	34.7	–	–	–	–	–
18	11:33	34.5	10	.2	4	.4	576
	11:46	34.3	13	.2	4	.308	443
	12:03	34.3	17				0

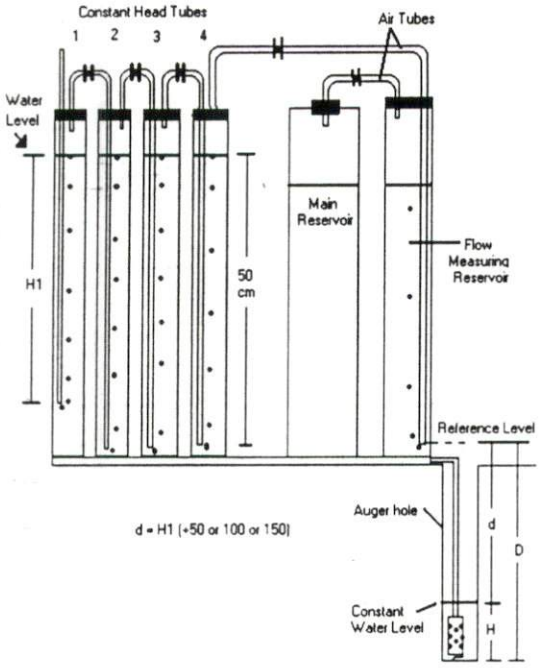
Average of last few measurements: 340 cm^3/s Ksat =

Comments:

Project: Myr[illegible]wood 5/6
Ksat ID: 6A

Ksat DATA SHEET

Measurement #: 12 Date: 27 Oct 04 Investigator: K. B. Newcomb
System Type: conventional Trench Depth: 18 - 24
Location: 6
Weather -- Condition: Overcast Temp: 68°F
Water – Source: Walmart "Drinking Water" Temp: 72° F
Soil Horizon: C Slope: 3% Layer Depth and Thickness: _____
Center of Layer: _____



		cm	inches
Hole Depth		57.0	22.5
Distance b/w reference level and ground [10 cm or 4 in]	+	10.0	
Distance from hole bottom to reference level (D)	=	67.0	
Desired depth of water (H) > 15 cm or 6 in	-	18.0	
Constant-head tube setting (H1)	=	49.0	

Measured (Actual) water level in hole
Initial: 16.0
Final: 16.0
Hole radius (r): 3cm
Start Saturation: 12:14
Steady State Reading: _____

QUICK REFERENCE

Hole depth: 57.0
Water Level: 16.0
Depth to Water: 41.0

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000961 cm^{-2}

Q from other side = 432 cm^3/day

Ksat= 0.4152 cm/day

LTAR ~ 0.1018 gpd/s.f.

Project: Hewood 5/6

Ksat ID: 6A-

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF= 20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
	1:43	45.0					
	2.03	44.7	20	0.3	6	0.3	432
16.0	2:23	44.4	20	0.3	6	0.3	432
	2:43	44.1	20	0.3	6	0.3	432
	3:03	43.8	20	0.3	6	0.3	432

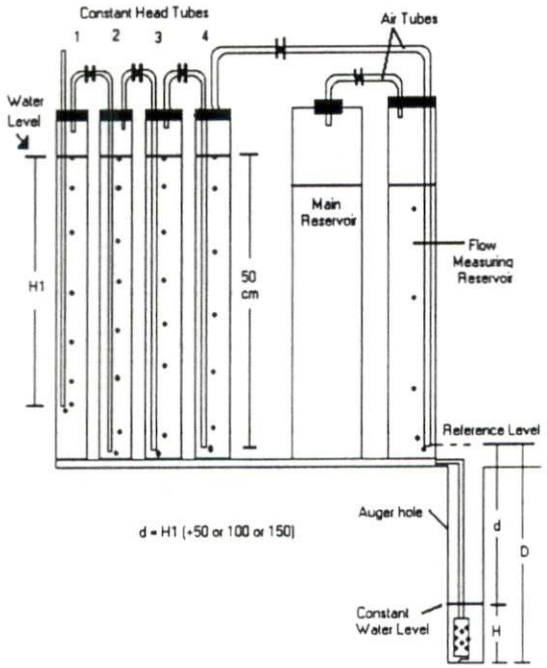
Average of last few measurements: 432 Ksat =

Comments:

Project: Myrtl ood Lot 5/6
Ksat ID: 68

Ksat DATA SHEET

Measurement #: 12 Date: 27 Oct 04 Investigator: K. B. Newcomb
System Type: Conventional Trench Depth: 18-24 inches
Location: 5
Weather -- Condition: Mostly Sunny Temp: 56° F
Water – Source: Walmart "Drinking Water" Temp: 70° F
Soil Horizon: C Slope: 3% Layer Depth and Thickness: 0-44 inch
Center of Layer: 22 inches



		cm	inches
Hole Depth		100.0	
Distance b/w reference level and ground [10 cm or 4 in]	+	10	
Distance from hole bottom to reference level (D)	=	110	
Desired depth of water (H) > 15 cm or 6 in	-	18	
Constant-head tube setting (H1)	=	92	

Measured (Actual) water level in hole
Initial: 18.0
Final: 17.5
Hole radius (r): 3
Start Saturation: 3.08
Steady State Reading: _____

QUICK REFERENCE

Hole depth:
Water Level:
Depth to Water:

Ksat = A X Q

Conversion Factor (C.F.) 1-ON = 20 cm^2 2-ON = 105 cm^2

(to obtain flow volume, multiply change in water level by the appropriate C.F.)

Use Table 2 to determine A = 0.000842 cm^{-2}

Q from other side = 1728 cm^3/day

Ksat= 1.4550 cm/day

LTAR ≈ 0.3571 gpd/sf

Project: Hewood Lot 5/6

Ksat ID: 6B

H	Clock Time	Reservoir Reading	Change in time	Change in water level	Flow Volume CF=20 cm^2	Q	Q (1440 min/day)
cm	h : min	cm	min	cm	cm^3	cm^3/min	cm^3/day
	4:08	40.0					
	4:28	38.5	20	1.5	30	1.5	2160
17.5	4:38	37.9	10	0.6	12	1.2	1728
	4:48	37.3	10	0.6	12	1.2	1728
	4:58	36.5	10	0.8	16	1.6	2304
	5:08	35.6	10	0.9	18	1.8	2592
	5:18	35.0	10	0.6	12	1.2	1728
	5:28	34.5	10	0.5	10	1.0	1440
	5:38	33.7	10	0.8	16	1.6	2304
17.5	5:48	33.2	10	0.5	10	1.0	1440

Average of last few measurements: 1728 Ksat =

Comments: