ROLLANS *SOIL & ENVIRONMENTAL SERVICES*

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Attached is a proposed design for a PPBPS Septic System with low pressure distribution for a 4 bedroom single family residence on Lot #10 in Lakewood Crossing Subdivision, Iredell County, North Carolina.

Contents: **Page**

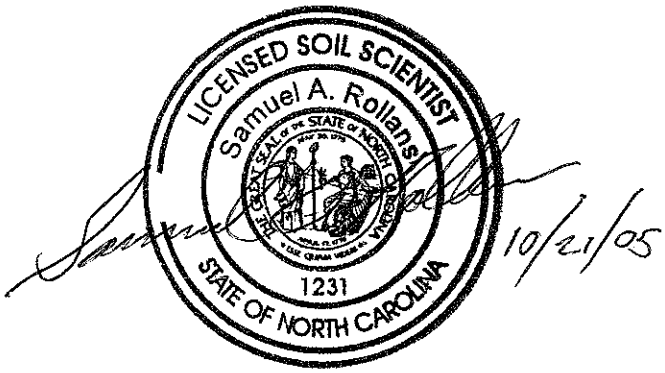
Information for the Installer---------- 1

Design Information
- Design Specifications---------- 2-3
- Layout Specifications---------- 4
- System Tapsheet---------- 5

Site Plan/System Plan---------- 6

Calculations---------- 7

Profile Descriptions---------- 8



October 7, 2005
Project No. 01-1089
Design By: Rollans Soil & Environmental Services

LP PPBPS SYSTEM
FOR WASTEWATER TREATMENT

Owner/Applicant: Nation Land Company LLC

Address: 4330 Sterilite Street SE
Massillion, OH 44646
Phone: 330-832-4091
County: Iredell
Location: Lakewood Crossing Subdivision Lot #10

Source of Wastewater Flow: 4 Bedroom Single Family Residence
Estimated Daily Wastewater Production: 480 gpd
System Flow: 30.27692308

Design Specifications

Drainfield Size: 320
Loading Rate: 0.25 gpd/ft.^{2}
Depth of Gravel in Trench: NA (PPBPS)
Gravel Size: NA (PPBPS)
Trench Depth: 36 in.
Trench Width: 36 in.
Septic Tank Size: 1000
Pump Tank Size: 1000

Estimated Supply Line Length: 52
Supply Line Diameter: 2 in. SCH 40 PVC
Supply Line Volume: 9.05
Dosing Volume: 178.12
Supply Manifold: N/A
Supply Manifold Length: N/A
Supply Manifold Volume: N/A

Recommended Float Controls: SJE Sensor Float Control Switches as Required for Control Panel or County Approved Equivalents
Recommended Control Panel: SJE-Rhombus Model 112 (NEMA 4x) Control Panel or County Approved Control Panel.

Pressure Head: 2 ft.
Friction Head: 0.93
Elevation Head: 10.20
Total Dynamic Head: 15.09

Threaded Union: In Tank
Gate Valves: 1 in Tank
1 per lateral (4)
Check Valves: In Tank
Anti-Siphon Hole: NA
Additional Comments: Soil suitability was performed by Rollans Soil & Environmental Services

Lakewood Crossing Lot 10
LP PPBPS

DESIGN FLOW:	480
SOIL APPLICATION RATE:	0.25 gpd/ft²
TOTAL AREA TRENCH BOTTOM:	960
TOTAL LATERAL LENGTH:	320
NUMBER OF FIELDS:	1
LATERAL LENGTH REQUIRED PER FIELD:	320
SUPPLY LINE LENGTH:	52
TOTAL DYNAMIC HEAD:	15.09
MANIFOLD SIZE:	N/A
DOSING VOLUME:	178.12
PUMP TANK DRAW DOWN*:	8.5
SEPTIC TANK SIZE:	1000
PUMP TANK SIZE:	1000

**Pump tank draw down based on a volume basis of 21 gallons per inch. Draw down may vary among pump tank manufacturers.*

Lakewood Crossing Lot 10

Project #: 01-1089

LAYOUT FOR 4 BEDROOM HOME — October 7, 2005

LINE #	FLAG COLOR	BS	HI	FS	ELEVATION	FLAGGED LINE LENGTH	DESIGN LINE LENGTH
TBM		2.3			100.00		
INSTR. 1			102.30				
HOUSE CNR				7.80	94.50		
P. TANK				8.00	94.30		
1	ORANGE			2.10	100.20	50	50
2	BLUE			2.80	99.50	70	70
3	PINK			3.20	99.10	70	70
4	ORANGE			3.30	99.00	70	70
5	BLUE			3.80	98.50	80	80
6	***PINK***			***4.80***	***97.50***	***80***	***80***
7	***ORANGE***			***5.70***	***96.60***	***80***	***80***
8	***BLUE***			***6.40***	***95.90***	***80***	***80***
9	***PINK***			***7.20***	***95.10***	***80***	***80***
					Total	660	660

	LINE LENGTH	LTAR GPD/FT2	SYSTEM TYPE	SOIL LTAR GPD/FT2	TRENCH SYSTEM	DISTRIBUTION
****System***	***320***	***0.25***	***MOD.***	***0.25***	***PPBPS***	***LOW PRESSURE***
Repair	340	0.25	MOD.	0.25	PPBPS	LOW PRESSURE

Notes:
** TBM located top of ground at EIP at corner of lot 10 and 11 (see site plan)
**TBM is assumed to be 100'
**All measures in feet
**Nitrification lines are demonstrated on contour via colored pin flags
**BS, HI, and FS indicate rod readings

LP PPBPS TAPSHEET - Lakewood Crossing Lot 10

SYSTEM

Line #	Color	Elevation	Length	Hole Size	Flow/hole	Trench Area	Number of Panels
1	PINK	97.5	**80**	0.156	**0.41**	240	18.46153846
2	ORANGE	96.6	**80**	0.156	**0.41**	240	18.46153846
3	BLUE	95.9	**80**	0.156	**0.41**	240	18.46153846
4	PINK	95.1	**80**	0.156	**0.41**	240	18.46153846
	total	**feet =**	**320**	**gal/min =**	**30.276923**		
			Des. Flow	**480**			
			Pump Run=	**5.88**			
			soil LTAR	**0.3**			
			LTAR +5%	**0.315**			
			LTAR with mod.	**0.27**			
			LTAR with mod.. + 5%	**0.2835**			

.156 equals 5/32 inch hole

CALCULATIONS

Location Lakewood Crossing

Project Number 01-1089

Lot No: Lot 10

No. of Bedrooms	4	
Design Flow	480	$^{gal}/_{day}$
LTAR	0.25	$^{gal}/_{ft^2\ day}$
PPBPS? (YES OR NO)	YES	
Supply Line Length	52	ft.
Supply Line Volume	9.048	gal.
Required Feet of Line	320	ft.
Amount of Line from Layout	320	ft.
Gallons per Minute	30.27692	$^{gal}/_{min}$
	Note:	*Flow/hole (.41gpm) x # of panels (74)*
Required Septic Tank Capacity	1000	gal.
Minimum Standard Tank Size	1000	
Panel Volume	3.6	gal.
# of Panels	73.84615	
Dosing Volume	178.12	gal.
	Note:	*Dosing Volume based on 67% of # of panels times 3.6 gal/panel*
Tank Draw Down	8.5	*Generic Draw Down of 21 gal.per in.*
Pump Run Time	5.88	minutes
Elevation Head	10.2	ft.
Pressure Head	2	ft.
Friction Factor	1.78	ft./100 ft. *(From the interpolater.)*
Friction Head	0.93	ft.
Total Dynamic Head (+15%)	15.09	ft.

FRICTION FACTOR INTERPOLATER
2" SCH 40 PVC

GPM	*f*
20	0.84
	-0.88
25	1.27
	-1.28
30	1.78
	-1.76
35	2.37
	-2.25
40	3.03
43.07	3.48
45	3.77
48.14	4.28
50	4.58
57.11	5.89
60	6.42