APPROVED OCT 2 9 2015

ROLLANS *Soil & Environmental Services, PA.*

P.O. Box 832, Mooresville, NC 28115 Phone: (704) 746-5046 Fax: (704) 278-0989

Ashley Rollans, NC Licensed Soil Scientist
Mobile: (704) 746-5046
Email: rollans.ashley@yahoo.com

NC Certified Septic Installer
NC Certified Subsurface Operator
NC Certified Septic Inspector

Attached is a proposed design for an upgrade of an existing 3 Bedroom bed system to a 4 bedroom using gravity PPBPS Drainlines. Upgrade is for an existing 4 bedroom residence at 409 Grasshopper Circle (PIN#: 4627607285), Mooresville, North Carolina.

Contents: **Page**

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

Design Information
- Design Specifications---------- 2-3
- Layout Specifications---------- 4

Site Plan/System Plan---------- 5-6

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

Profile Descriptions---------- SUBMITTED

Septic Permits---------- SUBMITTED

Subdivision Plat---------- SUBMITTED

Application---------- SUBMITTED

Authorization Form---------- SUBMITTED

Zoning Permit & Receipt---------- SUBMITTED

Well Application---------- SUBMITTED

October 27, 2015
Project No.01-3058
Design By: Rollans Soil & Environmental Services, PA

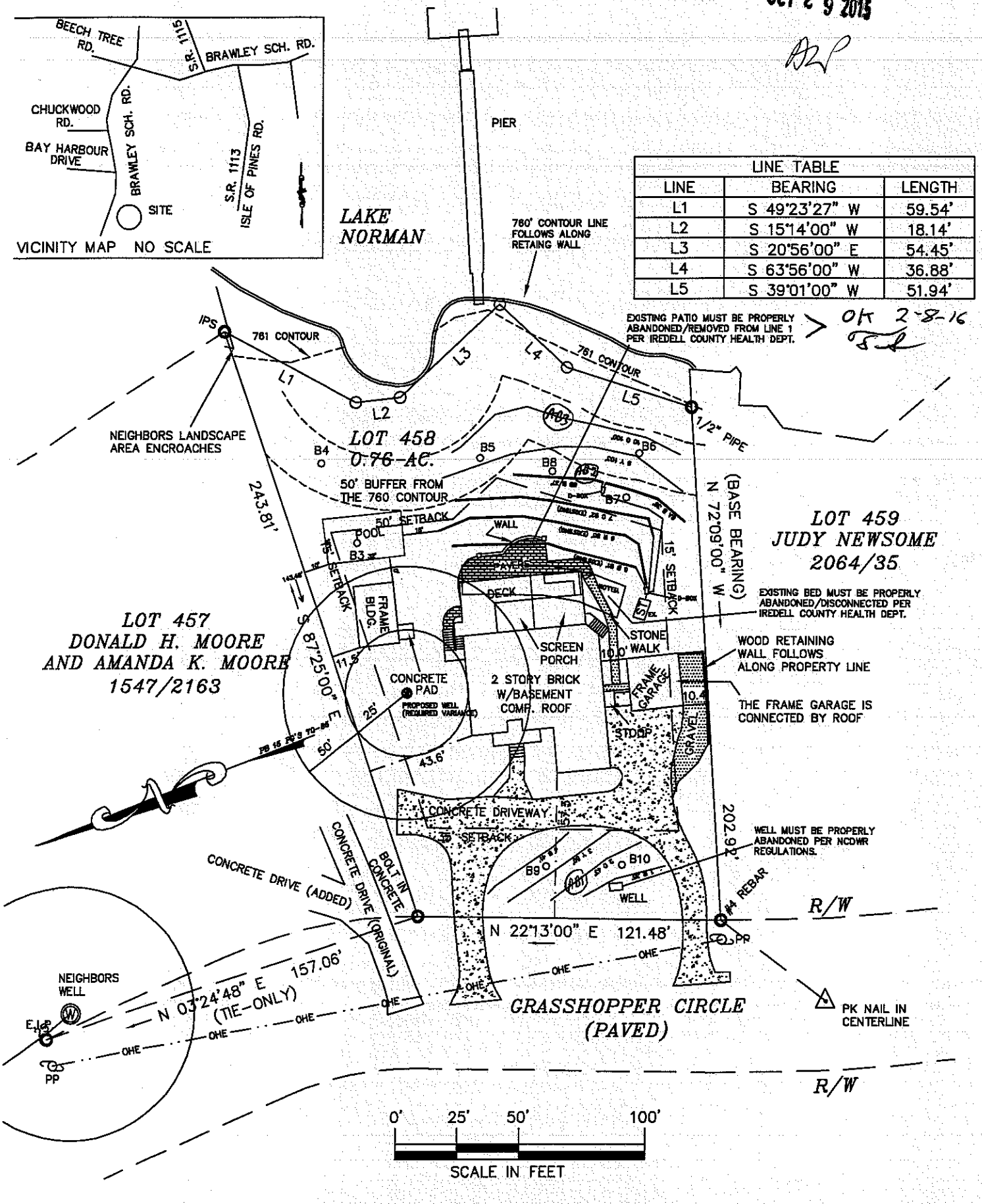
APPROVED OCT 2 9 2015

INFORMATION FOR THE INSTALLER:

The permit should be read very carefully prior to bidding. The following are details that must be considered along with all other considerations.

- Tanks shall be approved by DENR, and certification supplied by the manufacturer.
- Tanks shall be water tested prior to installation.
- The installer shall be responsible to the owner for placement of the tanks and to insure that final grades are returned to the original natural grade, with exception of added structural features.
- The supply trench shall be compacted to eliminate cavities left during initial fill placement.
- Installation of the system shall be during dry conditions in order to protect the soil structure.
- All fittings shall be pressure rated fittings.
- All joints shall be cleaned with PVC pipe cleaner and a heavy bodied glue applied to weld all joints.
- Where required by the county health department, post installation inspections by the designer must be scheduled 5 week days in advance.
- Trenches shall be carefully excavated so the bottom is within 2" from the highest to . the lowest points of elevation within the trench. If the bottom elevation needs adjusting after it has been trenched, it will be done by removing high points rather than filling low points. It is extremely important to insure that trenches are not over excavated during initial trenching. All fine grading within the trench will be hand done with a shovel. No loose material will be left in the trench
- All pipe openings in the tanks shall be properly grouted. This also applies to the joints around the riser.
- All tanks shall be properly back filled and compacted to prevent slump at a later date.
- Earth dams, constructed of relatively impervious material, shall be installed at the beginning and end of each lateral.
- No heavy equipment shall be used on the field during or after installation. The use of a small loader (i.e. Bobcat) or a trencher (i.e. Ditch Witch 2300/2310) may be used for installation.
- Elevations at pinflag locations should be checked by the installer prior to beginning trenches.
- Pumptank riser should be 6" above grade, control panel should be 12" above grade.
- Septic tank riser shall be a minimum of 6" above finished grade.
- System is specified as a Hybrid Installation (Gravity PPBPS and an Existing 3BR Conv.)
- Repair is specified as a PPBPS installation with Low Pressure Distribution
- Backfill 4 - 6" of material (Excavation material) over panels, lime sidewalls install trenches 24" wide to be level but have no more than 1/4" fall in 10 feet.
- **Distribution Devices must be bedded on level pads.**
- **Properly abandon/disconnect existing bed system per Iredell County requirements**
- **Existing Well must be properly abandoned per NCDWR Rules.**

APPROVED OCT 2 9 2015



APPROVED OCT 2 9 2015

GRAVITY PPBPS SYSTEM
FOR WASTEWATER TREATMENT

Owner/Applicant:	Rollans Soil & Env. Services
Address:	P.O. Box 832 Mooresville, NC 28115
Phone:	704.746.5046
County:	Iredell
Location:	409 Grasshopper Circle
Source of Wastewater Flow:	4 Bedroom Single Family Residence
Estimated Daily Wastewater Production:	480 gpd
System Flow:	NA

Design Specifications

Drainfield Size:	73
Loading Rate:	0.275
Depth of Gravel in Trench:	NA
Gravel Size:	NA
Trench Depth:	30 in.
Trench Width:	24 in.
Septic Tank Size:	1000
Pump Tank Size:	NA
Estimated Supply Line Length:	4
Supply Line Diameter:	3 in. SCH 40 PVC
Supply Line Volume:	1.52
Dosing Volume:	N/A
Supply Manifold:	N/A
Supply Manifold Length:	N/A
Supply Manifold Volume:	N/A
Recommended Float Controls:	N/A
Recommended Control Panel:	N/A
Pressure Head:	N/A
Friction Head:	N/A
Elevation Head:	N/A
Total Dynamic Head:	N/A
Threaded Union:	N/A
Gate Valves:	N/A
Check Valves:	N/A
Anti-Siphon Hole:	N/A
Additional Comments:	Soil suitability was performed by Rollans Soil & Environmental Services

APPROVED OCT 2 9 2015

409 Grasshopper Circle
GRAVITY PPBPS

DESIGN FLOW (Upgrade Only):	120
SOIL APPLICATION RATE:	0.275
TOTAL AREA TRENCH BOTTOM:	146
TOTAL LATERAL LENGTH:	73
NUMBER OF FIELDS:	1
LATERAL LENGTH REQUIRED PER FIELD:	73.00
SUPPLY LINE LENGTH:	4
TOTAL DYNAMIC HEAD:	N/A
MANIFOLD SIZE:	N/A
DOSING VOLUME:	N/A
PUMP TANK DRAW DOWN*:	N/A
SEPTIC TANK SIZE:	1000
PUMP TANK SIZE:	N/A

APPROVED OCT 2 9 2015

409 Grasshopper Circle

Project #:01-3058

LAYOUT FOR 4 BEDROOM HOME 10/27/2015

LINE #	FLAG COLOR	BS	HI	FS	ELEVATION	FLAGGED LINE LENGTH	DESIGN LINE LENGTH
TBM							
INSTR. 1 HOUSE CNR P. TANK							
1	RED					35	35
2	ORANGE					43	43
3	YELLOW					50	50
4	BLUE					41	41
BED	***YELLOW***	***EXISTING BED; (77' X 15' WIDE) ABANDON***				***77' X 15'***	***77' X 15'***
5	***BLUE***		***EXISTING***			***81***	***81***
6	***RED***		***EXISTING***			***95***	***95***
7	***ORANGE***		***EXISTING***			***92***	***92***
8A	***BLUE***					***36***	***36***
8B	***BLUE***					***37***	***37***
9	YELLOW					103	103
10	ORANGE					100	100
					Total	713	713

	LINE LENGTH	LTAR GPD/FT2	SYSTEM TYPE	SOIL LTAR GPD/FT2	TRENCH SYSTEM	DISTRIBUTION
Existing Bed	**77' x 15'**		**Conv. Bed**		**Bed**	**GRAVITY**
	TO BE ABANDONED					
**** System*** (upgrade only)	***73***	***0.275***	MOD.	***0.275***	PPBPS	***GRAVITY***
Repair TS-II	372	0.3/0.25 Front/Rear	MOD.	0.3/0.25 Front/Rear	PPBPS	LOW PRESSURE

Notes:

****Lot recorded prior to January 1, 1983. See attached Plat dated 1976.**

****Septic Permits (3) Attached - Existing Conventional System illustrated as 3 bedrooms.**

****All septic lines, soil borings, existing tank & existing system located via licensed surveyor.**

**All measures in feet

**Nitrification lines are demonstrated on contour via colored pin flags

APPROVED OCT 2 9 2015

CALCULATIONS

Location 409 Grasshopper Circle

Project Number 01-3058

Lot No: 458 (CL&T)

Total No. of Bedrooms	4	
Design Flow for Upgrade (1 BR)	120	$^{gal}/_{day}$
LTAR	0.275	$^{gal}/_{ft^2\ day}$
PPBPS? (YES OR NO)	YES	
Supply Line Length	4	ft.
Supply Line Volume	1.52	gal.
Required Feet of Line (Upgrade)	73	ft.
Amount of Line from Layout	73	ft.
Gallons per Minute	NA	$^{gal}/_{min}$
Required Septic Tank Capacity	1000	gal.
Minimum Standard Tank Size	1000	
Panel Volume	N/A	gal.
# of Panels	N/A	
Dosing Volume	N/A	gal.
Tank Draw Down	N/A	
Pump Run Time	N/A	minutes
Elevation Head	N/A	ft.
Pressure Head	N/A	ft.
Friction Factor	N/A	ft./100 ft. *(From the interpolater.)*
Friction Head	N/A	ft.
Total Dynamic Head (+15%)	N/A	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

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH
ON-SITE WASTEWATER SECTION

Sheet 1 of 3
PROPERTY ID #: 9697607221
COUNTY: Iredell

SOIL/SITE EVALUATION
for ON-SITE WASTEWATER SYSTEM

OWNER: Joseph Polak / Applicant: Rollins Soil & Environmental Services APPLICATION DATE
ADDRESS: 409 Grasshopper Circle, Mooresville NC 28117 DATE EVALUATED: 8/9 of 2015
PROPOSED FACILITY: 4BR Single Family PROPOSED DESIGN FLOW (.1949): 480 PROPERTY SIZE: .76AC
LOCATION OF SITE: 409 Grasshopper Circle, Mooresville, NC 28117 PROPERTY RECORDED:
WATER SUPPLY: ☒ Private ☐ Public ☒ Well ☐ Spring ☐ Other
EVALUATION METHOD: ☒ Auger Boring ☐ Pit ☐ Cut TYPE OF WASTEWATER: ☒ Sewage ☐ Industrial Process ☐ Mixed

PROFILE #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	PROFILE CLASS & LTAR
B 1	L/10% Fill	0-4	CL wmsbk	FrSSSP	+Fe Depl. Yellow +CH.R 2's				UN
		4-24	RBC wmabk	FrSSSP					
		24-28	YB CL wfsbk	Fr SSSP					
		28-40	DGrey CL	wfsbk FrSSSP					
B 2	L/10% Fill	0-3	B CL wmsbk	Fr SS SP	+Compacted +CH.R 2's@12"				UN
		3-22	RBC wmabk/sbk	Fr SS SP					
		22-AR							
B 3	L/6%	0-18	Fill		+Comm Blk +Few Yellow				PS .275-.3
		18-36	RB C wfsbk	Fr SSSP					
		36-59	RB C wfsbk	Fr SS SP					
B 4	L/6%	0-5	Fill BL(SAP)		+Common BLK				PS .275-.3
		5-30	RC mmabk	Fr SSSP					
		30-60	BRC wmsbk	Fr SS SP					

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM
Available Space (.1945)	PS	PS
System Type(s)	Hybrid (Conv/PRBS)	PRBS w/ TSII
Site LTAR	0.3	0.3

OTHER FACTORS (.1946):
SITE CLASSIFICATION (.1948): PS
EVALUATED BY: Wendell Overby
OTHER(S) PRESENT: S. Ashley Rollins

COMMENTS:

APPROVED OCT 2 9 2015

SOIL/SITE EVALUATION

(Continuation Sheet)

DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

PROPERTY ID #: 4627607285
DATE OF EVALUATION: 8/9 of 2015
COUNTY: Iredell

PROFILE #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE	SOIL MORPHOLOGY (.1941) .1941 CONSISTENCE/ MINERALOGY	OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	PROFILE CLASS & LTAR
B5	L/4%	0-8	Fill			49"	–	–	PS .275-.3
		8-19	RB CL wfsbk	Fr SS SP					
		19-42	RC wfsbk	Fr SS SP					
		42-47	RY CL wfsbk	Fr SS SP					
		47-AR							
B6	L/7%	0-7	Fill			56"	–	–	PS .275-.3
		7-17	BL Gr wfsbk	Fr SS SP					
		17-21	RB CL wmsbk	Fr SS SP					
		21-37	RBC mmsbk	Fr SS SP					
		37-56	RB CL wmsbk	Fr SS SP					
B7	L/6%	0-6	Fill			58"	–	–	PS .275-.3
		6-16	BR CL wmsbk	Fr SS SP					
		16-52	RC wmsbk	Fr SS SP					
		52-58	RB CL wmsbk	Fr SS SP					
B8	L/5%	0-4	Fill		✓	56"			PS .3
		4-14	BL Gr	Fr SS SP					
		14-22	B CL wmsbk	Fr SS SP					
		22-56	RBC wmsbk	Fr SS SP					
B9	L/8%	0-7	Fill			60"			PS .3
		7-13	BR CL wfsbk	Fr SS SP					
		13-47	RBC mmsbk	Fr SS SP	– Few SAP Inclu				
		47-60	RCL mfsbk	Fr SS SP	– Few SAP				

COMMENTS: AB1 0-8 B CL wfsbk Fr SS SP SE-P .3
LSS 8-21 YR CL wfsbk Fr SS SP SE-P
8-9% 21-48 YR CL mfsbk Fr SS SP SE-P con sap
0-4 Fill
4-15 B CL wfsbk Fr SS SP SE-P
AB2 15-21 RB/BR C wfsbk/sbk Fr SS SP SE-P Few Mn .275
LSS 21-42 R C wfsbk/sbk Fr SS SP SE-P Few Mn
42-48 R CL wfsbk Fr SS SP SE-P few Mn, few SAP

My soil notes are more limiting than Rollan's, use by borings AZP

APPROVED OCT 2 9 2015

SOIL/SITE EVALUATION

(Continuation Sheet)

DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

PROPERTY ID #: 4627607285
DATE OF EVALUATION: 8/9 of 2015
COUNTY: Iredell

PROFILE #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941) .1941 STRUCTURE/ TEXTURE	SOIL MORPHOLOGY (.1941) .1941 CONSISTENCE/ MINERALOGY	OTHER PROFILE FACTORS .1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	PROFILE CLASS & LTAR
B		0-7	Bw/CL Grwmsbk	Fr SS SP					PS
10	L/9%	7-48	RBC wmsbk	F SS SP	Few SAP	48"	—	—	.3
AB	FS	0-4	B CL wFSBk	Fr SS SP SE P		40"	—	—	PS
3	5%	4-14	R CL wFSBk	Fr SS SP SE P	few/com Mn				.275-.25
		14-20	RC wFSBk	Fr SS SP SE P	few/com Mn few Yellow gravel, few Mn				
		20-34	RC MFABk	Fi S P SE P	Chr 2 >44", Soil was saturated >42", few Mn, few YB				
		34-48	R CL wFSBk	Fr SS SP SE P					

COMMENTS:

APPROVED OCT 2 9 2015