RECEIVED JUN 2 2 2018

#234237
Paid $360.00
4705.38-6810.127
CASA GRANDE; PH.3; LOT 4

DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

ROY COOPER
GOVERNOR

MANDY COHEN, MD, MPH
SECRETARY

DANIEL STALEY
DIRECTOR

COMMON FORM FOR ENGINEERED OPTION PERMIT
See Instructions for Use in Appendix A

Except for "Date received", this Section to be completed by the Professional Engineer licensed in accordance with G.S. 89C

LHD USE ONLY: Initial submittal of this NOI received: 6/22/2018 (Date) by RHS (Initials)

PART 1: Notice of Intent to Construct (NOI)

☒ New ☐ Expansion

☐ Repair – LHD Permit Number _____ ☐ Repair – EOP Permit Number _____

1. Facility Owner's name: (Owner, Company Name, Utility, Partnership, Individual, etc.): Kour Lor File # 234237

Mailing address: 131 Rice Field Drive City: Statesville State: NC Zip: 28625

Telephone number: 704-~~890-1539~~ 616-2113 E-mail Address: koul75@gmail.com

2. Professional Engineer (PE) name: George D. Barrier, PE License number: 19221

Mailing address: PO Box 26272 City: Charlotte State: NC Zip: 28221

Telephone number: 704-201-1487 E-mail Address: gbarrier@carolina.rr.com

3. Licensed Soil Scientist (LSS) name: Larry Thompson, LSS License number: 1287

Mailing address: PO Box 541 City: Midland State: NC Zip: 28107

Telephone number: 704-301-4881 E-mail Address: larry@thompsonenv.com

4. Licensed Geologist (LG) (if applicable) name: N/A License Number: _____

Mailing address: _____ City: _____ State: _____ Zip: _____

Telephone number: _____ E-mail Address: _____

5. On-site Wastewater Contractor name: Chris Stevens License number: 7161

Mailing address: 3317 New Salem Road City: Monroe State: NC Zip: 28110

Telephone number: 704-201-9849 E-mail Address: stevenssepticservice@yahoo.com

6. Proof of Errors and Omissions or other appropriate liability insurance for the following persons is attached that includes the name of the insurer, name of the insured and the effective dates of coverage:

☒ PE ☒ LSS ☐ LG ☒ On-site Wastewater Contractor

7. Property location (physical address, tax parcel identification number or subdivision lot, block number of the property to be permitted): 127 Rice Field Drive, Statesville, NC

   County Name: Iredell

8. Type of facility: [X] Place of residence No. Bedrooms: 5 No. Occupants: 10
   [ ] Place of business Basis for flow calculation:_____
   [ ] Place of public assembly Basis for flow calculation:_____

9. Factors that would affect the wastewater load: System is proposed for domestic wastewater only.

10. Type, location, and classification (per Rule .1961) of wastewater system: TS-II Pre-Treated Drip Dispersal System to be located in front of the proposed residence towards Rice Field Drive. System classification Type Vc.

11. Design wastewater flow: 600 gpd *(For flow > 3,000 gpd and industrial process, duplicate plans shall be sent to the State.)*
    Design wastewater strength: [X] domestic [ ] high strength [ ] industrial process

12. A plat as defined in G.S. 130A 334(7a) is attached: [X] Yes [ ] No

13. Owner meets requirements of ownership or control of the system per 15A NCAC 18A .1938(j): [X] Yes [ ] No

14. Easement, right of way or encroachment agreement required per 15A NCAC 18A .1938(j): [ ] Yes [X] No
    If yes, documentation filed in _____County Register of Deeds in Deed book _____ Page _____

15. Multi-party agreements required, as applicable, pursuant to 15A NCAC 18A .1937(h): [ ] Yes [X] No
    If yes, agreements filed in _____County Register of Deeds in Deed book _____ Page _____

16. Location of proposed or existing wells (drinking water, irrigation, geothermal, groundwater monitoring, sampling, etc.) and any potable and non-potable water conveyance lines is indicated on attached plans and complies with 15A NCAC 18A .1950: [X] Yes [ ] No
    This is a saprolite system. [ ] Yes [X] No

17. Evaluation(s) of soil conditions and site features signed and sealed by a LSS, a LG, as applicable, is attached: [X] Yes [ ] No

18. Proposed landscape, site, drainage, or soil modifications are attached: [ ] Yes [X] NA

Attestation by Professional Engineer licensed in North Carolina pursuant to G.S. 89C

I, George D. Barrier, PE hereby attest that the information required to be included with
Registered Professional Engineer (Print Name)
this Notice of Intent to Construct is accurate and complete to the best of my knowledge and that the proposed system shall meet applicable federal, State, and local laws, regulations, rules and ordinances in accordance with G.S. 130A-336-.1(e)(6).

_____ June 21, 2018
Signature of Licensed Professional Engineer *Date*

LHD Reference: _____

This section is for Owner use to either designate PE as their legal representative or to self-submit the NOI.

Designation of Registered Professional Engineer as legal representative of Owner for this Notice of Intent:

I, Kay Lor _____ hereby designate George Barrier, PE _____

Print Name of Owner *Print Name of Registered Professional Engineer*

as my legal representative for purposes of this Notice of Intent pursuant to G.S. 130A-336.1.

_____ 6/19/18

Signature of Owner *Date*

Owner self-submittal of NOI:

I, _____ hereby submit this NOI prepared by _____

Print Name of Owner *Print Name of Licensed PE*

pursuant to G.S. 130A-336.1.

_____ _____

Signature of Owner *Date*

NOTES:

LIABILITY: The Department, the Department's authorized agents or local health departments shall have no liability for wastewater systems designed, constructed and installed pursuant to an Engineered Option Permit. [(NC General Statute 130A-336.1(f)]

RIGHT OF ENTRY: The submittal of this **Notice of Intent to Construct** *grants right of entry to the Local Health Department and the State to the referenced property.*

ISSUANCE OF BUILDING PERMIT: Once the LHD deems that the Notice of Intent to Construct is complete via signature in the section above, the owner may apply to the local permitting agency for a permit for electrical, plumbing, heating, air conditioning or other construction, location or relocation activity under any provision of general or special law pursuant to G.S. 130A-338.

This section for Local Health Department use only.

PART 2: *LHD Completeness Review of the Notice of Intent to Construct*

"(c) Completeness Review for Notice of Intent to Construct. – The local health department shall determine whether a notice of intent to construct, as required pursuant subsection (b) of this section, is complete within 15 business days after the local health department receives the notice of intent to construct. A determination of completeness means that the notice of intent to construct includes all of the required components. If the local health department determines that the notice of intent to construct is incomplete, the department shall notify the owner or the professional engineer of the components needed to complete the notice. The owner or professional engineer may submit additional information to the department to cure the deficiencies in the notice. The local health department shall make a final determination as to whether the notice of intent to construct is complete within 10 business days after the department receives the additional information from the owner or professional engineer. If the department fails to act within any time period set out in this subsection, the owner or professional engineer may treat the failure to act as a determination of completeness."

The review for completeness of this Notice of Intent was conducted in accordance with G.S. 130A-336.1(c). This NOI is determined to be:

☐ INCOMPLETE (If box is checked, Information in this section is required.)

Based upon review of information submitted by the PE in Part 1, the following items are missing: _____

_____

Copies of this form listing missing items were sent to the design PE and the Owner on _____
Date

via _____ with directions to re-submit missing items using Page 5 of this form.
Email, FAX, USPS, hand-delivered

_____ _____ _____
Print Name of Authorized Agent of the LHD *Signature of Authorized Agent of the LHD* *Date*

☑ COMPLETE (If box is checked, information in this section is required.)

Based upon review of information submitted by the PE in Part 1 of this form, this NOI is deemed COMPLETE.

Copies of this signed form were sent to the design PE and the Owner on 06/26/18 via Email.
Date *Email, FAX, USPS, hand-delivered*

A copy of this NOI and tracking information was sent to the State on 06/26/18 via Email.
Date *Email, FAX, USPS, hand-delivered*

Robert H. Snow _____ 06/26/18
Print Name of Authorized Agent of the LHD *Signature of Authorized Agent of the LHD* *Date*

LHD Reference:_____

Re-submittal of NOI with missing items included

This Section is for use by PE to submit items noted as missing during LHD Completeness Review above. Resubmittals must be accompanied by a cover letter from the PE.

LHD USE ONLY: This NOI resubmittal received: _____ *Date* by _____ *Initials*

Item # from initial NOI	Resubmittal description

Attestation by Professional Engineer licensed in North Carolina pursuant to G.S. 89C

I, _____ *Licensed Professional Engineer (Print Name)* hereby attest that the information re-submitted for this Notice of Intent to Construct is accurate and complete to the best of my knowledge and that the proposed system shall meet applicable federal, State, and local laws, regulations, rules and ordinances in accordance with G.S. 130A-336-.1(e)(6).

_____ *Signature of Licensed Professional Engineer* _____ *Date*

The section below is for Local Health Department use after submittal of items noted as missing above.

LHD Follow-up Completeness Review of Notice of Intent to Construct

This follow-up review for completeness of this Notice and Intent was conducted in accordance with G.S. 130A-336.1(c). This NOI is determined to be:

☐ INCOMPLETE
Based upon review of information submitted by the PE in the RESUBMITTAL above, this Notice of Intent remains INCOMPETE because the following items from Part 1 of this form remain missing: _____
_____.

Copies of this signed form were sent to the design PE and the Owner on _____ *Date* via _____ *Email, FAX, USPS, Hand-delivered*.

_____ *Print name of authorized Agent of the LHD* _____ *Signature of authorized Agent of the LHD* _____ *Date*

☐ COMPLETE
Based upon review of information submitted by the PE in the RESUBMITTAL above in addition to information provided in Part 1 of this form, this NOI is deemed complete.

Copies of this signed form were sent to the PE and the Owner on _____ *Date* via _____ *Email, FAX, USPS, Hand-delivered*.

A complete copy of this form with tracking information was sent to the State: _____ *Date* via _____ *Email, FAX, USPS, hand-delivered*.

_____ *Print name of authorized Agent of the LHD* _____ *Signature of authorized Agent of the LHD* _____ *Date*

PART 3: **Authorization to Operate (ATO)**

Except for date received, the Section below is to be completed by the Owner or by the PE designated to act as their legal representative for the EOP.

LHD USE ONLY: Initial submittal of request for ATO received: _____ by _____
Date *Initials*

Date of Post-construction Conference: _____

The following items are included in this submittal for an Authorization to Operate under an EOP:

1. Signed and sealed copy of the Engineer's report that includes:
   a. Signed and sealed evaluation of soil conditions and site features ☐ Yes ☐ No
   b. Drawings, specifications, plans ☐ Yes ☐ No
   c. Reports on special inspections and final inspection ☐ Yes ☐ No
   d. Management Program manual ☐ Yes ☐ No
   e. On-site Wastewater Contractor's signed statement ☐ Yes ☐ No
   f. Signed and sealed statement pursuant to 15A NCAC 18A .1938(h) ☐ Yes ☐ No
2. Fee (as applicable) ☐ Yes ☐ No
3. Notarized letter documenting Owner's acceptance of the system from the PE ☐ Yes ☐ No

Attestation by the Owner or the PE for Authorization to Operate

I, _____ hereby attest that all items indicated above have been provided to the
Print name of Owner or Professional Engineer

_____County LHD and the system shall meet applicable federal, State, and local laws, regulations, rules and ordinances in accordance with G.S. 130A-336-.1(e)(6).

_____ _____
Signature of Owner or Professional Engineer *Date*

This section for LHD Use Only.

LHD Review of required information for the ATO

☐ INCOMPLETE
Based upon review of information submitted by the Owner or PE in the Section above, the following items are missing from the information required for an Authorization to Operate for an EOP: _____
_____.

Copies of this signed form were sent to the design PE and the Owner on _____ via _____.
Date *Email, FAX, USPS, Hand-delivered*

_____ _____ _____
Print name of authorized Agent of the LHD *Signature of authorized Agent of the LHD* *Date*

☐ COMPLETE
Based upon review of information submitted by the Owner or PE in the Section above, this Authorization to Operate is hereby issued in accordance with G.S. 130A-336.1(m).

A copy of this complete NOI/ATO with tracking information was sent to the State on _____ via _____.
Date *Email, FAX, USPS, Hand-delivered*

_____ _____ _____
Print name of authorized Agent of the LHD *Signature of authorized Agent of the LHD* *Date*

ISSUANCE OF CERTIFICATE OF OCCUPANCY: Once the LHD determines completeness based upon the PE submission, the owner may apply to the local permitting agency for permanent electrical service to a residence, place of business or place of public assembly pursuant to G.S. 130A-339.

CERTIFICATES OF INSURANCE

ACORD

GEORG-2

OP ID: TR

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
11/13/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Vaughan Insurance Group, LLC PO Box 52534 Tulsa, OK 74152-0534 David Vaughan 918-779-7880	CONTACT NAME: David Vaughan PHONE (A/C, No, Ext): 918-779-7880 FAX (A/C, No): 918-779-7885 E-MAIL ADDRESS: david@vaughanins.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED George D. Barrier 3901 Davis Lane Charlotte, NC 28269	INSURER A : Mid Continent Casualty Company	23418
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY							
	CLAIMS-MADE X OCCUR			04-GL-000981904	09/01/2017	09/01/2018	EACH OCCURRENCE	$ 1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 100,000
	X Professional			04-GL-000981904	09/01/2017	09/01/2018	MED EXP (Any one person)	$ Excluded
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY	$ 1,000,000
	X POLICY PRO-JECT LOC						GENERAL AGGREGATE	$ 3,000,000
	OTHER:						PRODUCTS - COMP/OP AGG	$ 3,000,000
	AUTOMOBILE LIABILITY							$
	ANY AUTO						COMBINED SINGLE LIMIT (Ea accident)	$
	OWNED AUTOS ONLY / SCHEDULED AUTOS						BODILY INJURY (Per person)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY						BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB / OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB / CLAIMS-MADE						AGGREGATE	$
	DED / RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						PER STATUTE / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) N / A						E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

THOMPE1

Thompson Environmental Consulting, Inc.
PO Box 541
Midland, NC 28107-0541

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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ACORD

THOMP-0 OP ID: TR

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 10/13/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Vaughan Insurance Group, LLC PO Box 52534 Tulsa, OK 74152-0534 David Vaughan	CONTACT NAME: David Vaughan PHONE (A/C, No, Ext): 918-779-7880 FAX (A/C, No): 918-779-7885 E-MAIL ADDRESS: david@vaughanins.com
INSURED Thompson Environmental Consulting, Inc. PO Box 541 Midland, NC 28107-0541	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : Mid Continent Casualty Company — 23418 INSURER B : Hartford Underwriters Ins Co — 30104 INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY							
	CLAIMS-MADE [X] OCCUR			04-GL-000982888	09/25/2017	09/25/2018	EACH OCCURRENCE	$ 1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 100,000
	X Professional Liab			04-GL-000982888	09/25/2017	09/25/2018	MED EXP (Any one person)	$ EXCLUDED
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY	$ 1,000,000
	X POLICY [ ] PRO-JECT [ ] LOC						GENERAL AGGREGATE	$ 3,000,000
	OTHER:						PRODUCTS - COMP/OP AGG	$ 3,000,000
	AUTOMOBILE LIABILITY							$
	ANY AUTO						COMBINED SINGLE LIMIT (Ea accident)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per person)	$
	HIRED AUTOS / NON-OWNED AUTOS						BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N						X PER STATUTE OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? [N] N/A (Mandatory in NH)			38WECNW6175	10/17/2017	10/17/2018	E.L. EACH ACCIDENT	$ 500,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 500,000
							E.L. DISEASE - POLICY LIMIT	$ 500,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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NORTH CAROLINA FARM BUREAU MUTUAL INSURANCE COMPANY, INC.

CERTIFICATE OF LIABILITY INSURANCE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

INSURED NAME AND ADDRESS	Terry's Enterprises Inc. DBA Steven's Truck & Septic Service 3317 New Salem Road Monroe, NC 28110
CERTIFICATE HOLDER	Thompson Environmental Consulting, Inc 114 Orchard Ridge Road Locust, NC 28097 larry@thompsonenv.com

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

X	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
☒	**COMMERCIAL GENERAL LIABILITY - OCCURRENCE** GEN'L AGGREGATE APPLIES PER POLICY			GL 0474879	7/20/2017	7/20/2018	GENERAL AGGREGATE	$2,000,000
							PRODUCTS - COMP/OPS AGGREGATE	$2,000,000
							PERSONAL & ADV INJURY	$1,000,000
							EACH OCCURRENCE	$1,000,000
							DAMAGE TO RENTED PREMISES (Ea Occurrence)	$100,000
							MED EXP (Any one person)	$5,000
☐	**BUSINESSOWNERS**						EACH OCCURRENCE	$
							AGGREGATE	$
	AUTOMOBILE LIABILITY			BAP 2120489	10/8/2017	4/8/2018	COMBINED SINGLE LIMIT (Each accident)	$1,000,000
☒	SCHEDULED AUTOS						BODILY INJURY (Per person)	$
☐	HIRED AUTOS						BODILY INJURY (Per accident)	$
☐	NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
☐	GARAGE LIABILITY							
☐	_____(Other)							
☒	**EXCESS LIABILITY – OCCURRENCE**			UP 7676833	2/24/2017	2/24/2018	EACH OCCURRENCE	$2,000,000
							AGGREGATE	$2,000,000
☒	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** POLICY APPLIES TO THE WORKERS COMPENSATION LAW IN THE STATE OF NC	N/A		WC 0228951	1/29/2017	1/29/2018	WC STATUTORY LIMITS	
							E.L. EACH ACCIDENT	$500,000
							E.L. DISEASE - EA EMPLOYEE	$500,000
							E.L. DISEASE - POLICY LIMIT	$500,000
☐	**OTHER:**							

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES:

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

DATE 11/13/2017

COI 0910

PROJECT DESIGN AND PLAT

Residential Subsurface Wastewater Treatment and Disposal System Engineered Option Package

for

Lot 4 – Casa Grande
127 Rice Field Drive
Statesville, North Carolina
4705.38·6810·127

Tax Parcel # 80051435
June 19, 2018

Prepared for:

Kou Lor
131 Rice Field Drive
Statesville, NC 28625
704-~~890-1539~~
616-2113



Prepared by:

Barrier Foundation Engineering Services, PC
Thompson Environmental Consulting, Inc.
George Barrier, PE
Larry Thompson, REHS, LSS
PO Box 541
Midland, NC 28107-0541
Phone: 704-301-4881
Fax: 206-350-8895
gbarrier@carolina.rr.com
larry@thompsonenv.com



cc: Iredell County Environmental Health

Details

The following engineered option permit package is submitted to the Iredell County Environmental Health (UCEH) at the request of Mr. Kou Lor. This proposal is for a new onsite wastewater treatment and disposal system to serve a 5-bedroom single-family residence located on Iredell County Parcel 80051435, 127 Rice Field Drive, Statesville, NC 28625.

Based upon a soil and site investigation performed by Thompson Environmental Consulting, Inc. (TEC), it has been determined that there is a sufficient amount of "Suitable" Group IV soil available for the installation of a pre-treated drip dispersal system for a 5-bedroom residence. The proposed advanced pre-treatment unit will be the Norweco Singulair Green® Bio-Kinetic® with the Hydro-Kinetic® Bio-Film Reactor and Norweco AT 1500 Ultra-Violet Light Disinfection Unit, while the dripfield components will be provided by Geoflow.

Barrier Foundation Engineering Services would like to request that the following design be considered for permitting under NC General Statute 130A-336.1 (Engineered Option Permit).

Location

From Statesville, take US 64 to Lippard Farm Road. Turn left onto Lippard Farm Road and right onto Happy Acres Drive and keep right. Turn right onto Tanget Drive and bear right onto Rice Field Drive. Property is located on the left at the second drive.

References

Laws and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A, Section .1900, Department of Environment and Natural Resources, Division of Environmental Health, On-Site Wastewater Section, July 2016.

Innovative Wastewater System Approval No: IWWS-2015-03-R1; E-Z Treat Model 600 Pretreatment Systems, January 6., 2017.

Innovative Wastewater System Approval No: IWWS-2007-1-R2; E-Z Drip Subsurface Wastewater Drip System, June 29, August 31, 2010.

Primary Investigator's Credentials

NC Registered Sanitarian No. 1208
NC Licensed Soil Scientist No. 1287
SC Professional Soil Classifier No. 111
Professional Wetland Scientist No. 1346
NC Subsurface Septic System Operator No. 22199
NC Grade IV Wastewater System Installer/Inspector No. 1762/17621

Primary Designer's Credentials

NC Professional Engineer No. 19221
SC Registered Professional Engineer No. 19378
VA Professional Engineer No. 0402054100
GA Professional Engineer No. PE042759

Plans and Specifications

A. Norweco Singulair® Green Bio-Kinetic® Unit and Hydro-Kinetic® Bio-Film Reactor

1. The Norweco Singulair Green® TNT-600 self-contained treatment unit is required for this project.
2. The Singulair Green® TNT-600 unit consists of a three-compartment tank with the first compartment as a pre-treatment tank, the second compartment as an extended aeration tank and the third compartment as a final clarification tank. The Bio-Kinetic® system is installed in the third compartment. The third compartment also includes a flow equalization device installed in the tank outlet end.
3. The Norweco Hydro-Kinetic® Bio-Film reactor is a separate unit and is installed following the Bio-Kinetic unit.
4. Effluent from the Hydro-Kinetic® Bio-Film reactor will pass through the Norweco AT 1500 ultraviolet light disinfection unit prior to entering the drainfield pump tank.
5. Effluent samples shall be collected from the outlet end of the disinfection unit or a tap on the drainfield force main. The tap should be located before the drip system spin filter(s). The preferred location for the tap is in the drainfield pump tank discharge line, in the riser assembly, and at an elevation that will allow for easy collection from the riser top.
6. The Singulair Green® TNT 600 unit shall include the Norweco Service Pro® WASP™ Integrated System Control Panel.
7. System installer shall be Norweco certified.
8. System operator shall be Norweco certified.

B. Dripfield Dosing Tank

1. The dripfield dosing tank shall be of one-piece construction, watertight, structurally sound and 1500 gallons in capacity. It is the responsibility of the septic tank contractor to thoroughly inspect the pump tank prior to accepting delivery.
2. The pump tank shall have access risers that extend, at a minimum, 6 inches above finished grade and must have less than 36 inches of fill over its top once finished grade has been established (a reinforced concrete tank will be required if finished soil cover is 36 inches or greater in depth).
3. The specified pump is the Norweco HB105 high-head submersible effluent pump.
4. Floats, pump and control circuits, and the control panel shall meet all state requirements. Panel and control equipment shall include lightning protection, be

protected from unauthorized access, and remain accessible at all times to the system operator.

5. The pump and alarm controls shall be provided with manual circuit disconnects within the same watertight, corrosion resistant, Nema 4x rated Norweco Service Pro® WASP™ Integrated System Control Panel (controls aerator, AT 1500 UV and effluent pump for drip dispersal field).
6. The peak enable float shall be located at or above the high-water alarm activation level.
7. Float switch tie downs must be made of a corrosion resistant material (all metal in the tanks shall be stainless steel). Floats should be mounted on a separate "float tree" rather than the pump supply line (see pump tank detail).
8. The pump removal system will be via a pump tether made of nylon rope or its equivalent. The tether material should be resistant to mildew and rot.

C. Pipe and Fittings

1. All discharge piping, supply lines, valves and disconnects shall be made of Schedule 40 PVC with pressure fittings.
2. All joints must be properly "welded" utilizing appropriate PVC cement for each application unless otherwise noted by the parts manufacturer.
3. Connection pipes between tanks shall be 4-inch Schedule 40 PVC.
4. Supply line and manifold shall be 1.50-inch Schedule 40 PVC.
5. Return line shall be 1.25-inch Schedule 40 PVC.
6. The washback line from the headworks unit to the septic tank shall be 1.25-inch Schedule 40 PVC.

D. Geoflow Pre-Engineered Dripfield Installation

1. The drainfield has been previously laid out on-site utilizing metal stemmed flags. The property owner/builder should mark this area and isolate from construction traffic. Prior to the system installation, the septic contractor shall contact the system designer for a preconstruction conference at which time the drainfield area will be re-verified.
2. Under no circumstances shall any construction take place within the drainfield area while the soil is in a wet condition. If the installer has doubts as to whether or not the drainfield area is dry enough to begin construction, the system designer should be contacted for permission to proceed with the installation.
3. The specified system is a Geoflow Pre-Engineered drip dispersal system.
4. The Geoflow system headworks shall be self-contained within a single vault and include pressure gauges, solenoids and spin clean filter.
5. The dripfield consists of 2 zones with 6 lines of Geoflow drip tubing measuring 167 feet each. Each zone consists of 1,000 linear feet of drip tubing (total required length of drip tubing is 2,000 linear feet).
6. The proposed trench depth for this system is 6 inches.
7. The drip line shall consist of a nominal size ½ inch linear low-density polyethylene tubing with turbulent flow drip emitters bonded to the inside wall.

8. The laterals are to be installed on contour with the land and per the detail shown in the attached drawings.
9. The air/vacuum relief valves provide instant and continuous vacuum relief and non-continuous air relief and must be installed at the highest point on each side of the drainfield on both the supply and return lines.
10. Connections to the manifold shall be made with PVC tees and lockslip adapters.
11. Connections lines (solid tubing) shall be conveyed over earthen dams constructed at least 2 inches higher than the driplines served to retain effluent in the lines at the end of each dose cycle.
12. Connections from solid tubing to the GeoFlow PC drip tubing shall be made utilizing lockslip fittings.
13. The trenches should be left open for the final inspection by the system designer.

E. Final Landscaping

1. Final cover over the drainfield will be 6 inches deep.
2. The drainfield shall be shaped to shed rainwater and be free from low spots.
3. The drainfield area should be planted with grass as soon as possible to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized prior to planting. After applying grass seed, the area should be heavily mulched with straw or other suitable material.

F. Utility Conflicts

1. The builder and property owner must take special care in planning for water, power, gas, telephone and cable lines. These utilities shall be kept clear of all parts of the septic system and its proposed repair area. Improper planning for underground utilities can negatively impact the installation and, in some cases, cause irreparable damage and permit revocation. If there are any questions regarding preferred routes, contact the system designer.
2. Lawn irrigation should not be placed over the drainfield area.

Maintenance

G. In General

The designed system is classified as a Type V(c) wastewater treatment and disposal system and requires ongoing maintenance. State regulations require that a system of this type be managed by a person certified by the North Carolina Department of Environment and Natural Resources to operate subsurface wastewater systems (Section .1961 Maintenance of Sewage Systems). A "Maintenance Contract" between the system owner and an Operator in Responsible Charge (ORC) will be required by the Iredell County Environmental Health prior to the issuance of a final system approval or Operation Permit. Based upon the Norweco Singulair Green® TNT approval, the ORC shall be either an employee of Norweco or authorized in writing by Norweco to operate and maintain the system.

1. System management entity, inspection/maintenance and reporting frequency requirements shall be comparable to at least Type V(a) systems in Rule .1961(b), Table V(b), except that the maximum inspection interval for systems up to 1500 gallons per day shall be quarterly for the first year of operation and every six months thereafter if the system remains in compliance.
2. The ORC shall provide monitoring reports to the local health department which include a log of all malfunction incidences/notifications, maintenance activities and wastewater volume delivered to each zone between each required monitoring period. Minimum maintenance during each required inspection shall include visual observations of the drip field(s), checking/cleaning filter screen(s), measured dosing flow rate to each zone, and recording of flow meter reading, pump run times and cycle counts. Flushing flow rates and pressure head measurements during flushing at the inlet and outlet of each field zone shall be taken at least once per year.
3. Effluent filters should be inspected semi-annually. When it becomes necessary to clean the effluent filters, the filters should be removed, and the accumulated debris washed back into the septic or pump tank – not onto the lawn.
4. All piping and valves should be inspected semi-annually for damage and corrections/repairs made immediately.
5. The pump and float controls/switches should be inspected semi-annually to assure proper operation
6. The drainfield area should be maintained to prevent over growth of vegetation. Any damp areas, leakages or malfunctions should be addressed immediately.

Norweco Singulair Green® TNT Specific Maintenance

Norweco Singulair Bio-Kinetic® with Hydro-Kinetic® Bio-Film Reactor TNT systems shall be operated and maintained according to the latest version of Norweco's O&M manual.

On a quarterly basis for the first year and every six months thereafter (provided that the system remains in compliance), the designated ORC shall provide a report to the system owner, Norweco and the local health department within 30 days of each inspection. At a minimum, the report shall specify:

1. The date and time of inspection
2. System operating conditions measured and observed according to VII.D and VIII.E,
3. Results from any laboratory analysis of any influent and effluent samples
4. Maintenance activities performed since the last inspection report,
5. An assessment of overall system performance,
6. A list of any improvements or maintenance needed,
7. A determination of whether the system is malfunctioning, and the specific nature of the malfunction, and
8. Any changes made in system settings based on recommendations form the manufacturer.

At each Norweco component inspection, the ORC shall, at a minimum, observe, monitor, and record the following:

1. Proper operation of system aerator, noting any unusual sounds or physical appearance.
2. Air flowrate for the system aerator.
3. Solids level in aeration chamber.
4. Clarity of effluent.
5. Water tightness of tanks, risers, and pipe connections at the tanks.
6. Cleaning, if needed, of the Bio-Kinetic filtration system.
7. Operation of pumps, floats, valves, electrical controls, and alarms.
8. Drainfield pump delivery rate (drawdown test), determination of the average pump run time, and drainfield dosing volume.
9. Any structural damage, accessibility issues, adequate ventilation, excess odors, ponding of effluent, insect infestations, vegetative growth over the drainfield, or surfacing of effluent on the drainfield area.
10. Samples of influent and effluent as required.
11. Logging all work performed on the Service Pro website.

Influent Sampling

1. Influent sampling shall comply with 15A NCAC 18A .1970(n)(3) and (5).
2. Influent samples shall be taken from the influent pipe to the treatment system.
    a. BOD not to exceed 350 mg/l
    b. TSS not to exceed 200 mg/l
    c. TKN not to exceed 100 mg/l
    d. FOG not to exceed 30 mg/l.

Effluent Sampling

1. Effluent samples are to be collected every six months for a period of two years.
2. Effluent sampling shall comply with 15A NCAC 18A .1970(n)(3) and (5).
3. Effluent samples shall be collected from the outlet end of the disinfection unit or a tap on the discharge line from the drainfield pump tank. The treatment numbers listed below are based upon the TS-II treatment standards – the site-specific soils require only TS-I pretreatment levels:
    a. CBOD < 10 mg/l
    b. TSS < 10 mg/l
    c. NH4-N < 10 mg/l
    d. TN < 20 mg/l or > 60% removal
    e. Fecal Coliform < 1,000 colonies/ml
3. Effluent sampling shall not commence until at least 30 seconds of continuous discharge through the sample tap has been completed.

4. The system shall be tested for effluent $CBOD_5$, TSS, NH3-N, TKN, NOx-N, and fecal coliform bacteria (parameters listed above).
5. Reporting shall be done quarterly.
6. All samples shall be collected, preserved, and analyzed in accordance with 40 CFR 136. A state certified wastewater laboratory shall analyze samples for the treatment performance standards and complete chain of custodies shall be maintained.

Design Specifics

Daily Design Flow:	600 GPD
Effluent Loading Rate:	0.15 GPD per sq. ft.
Norweco Singulair Green TNT 600 Unit:	1
Norweco Hydro-Kinetic Bio-Film Reactor:	1
Disinfection Unit:	Norweco AT1500 UV
Drainfield Dosing Tank:	1,500 Gallons (One Piece)
Control Panel:	Norweco Service Pro WASP
Total Length of Drip Line:	2000 Linear Feet
Number of Zones:	2 (1000 Linear Feet Each)
Number of Laterals per Zone:	6 (167 Linear Feet)
Length of Runs:	83.5 Feet
Number of Emitters per Zone:	500 (1,000 Total)
Installation Depth:	6 Inches
Supply/Return Line Length and Diameter:	(2) 1.5" SCH 40 Supply Lines (1) 1.25" SCH 40 Return Line
Length of Supply and Return Lines:	100 Feet
Pump Requirements:	18.25 GPM at 87.22 Feet TDH
Drainfield Run Time:	8.25 Minutes
Drainfield Rest Time:	111.75 Minutes
Doses Per Zone Per Day:	6

Total Doses Per Day:	12
Recommended Drainfield Pump:	Norweco HB105

NOTE: Zone supply and return lines are to be installed below frost line and at a depth to provide that conveyance lines will be filled at pump shut off at the location where they go up to the top feed manifolds.

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Engineering the future of water and wastewater treatment

Project Name:	127 Rice Field Drive
Contact Name:	Kou Lor
Prepared By:	Don Barrier, PE
Date:	6/14/2018

Fill in all fields highlighted in yellow.
Fields highlighted in blue are automatically calculated.
Fields highlighted in red indicate a design problem that must be addressed.

TOTAL FIELD

Total Quantity of Effluent to be Disposed per Day	600	Gallons / Day	Maximum Daily Flow is 1,500 Gallons per Day
Soil Loading Rate	0.150	Gallons / Square Foot / Day	
Total Dispersal Field Area	4,000	Square Feet	Maximum Area is 12,000 Square Feet

FLOW PER ZONE

Number of Zones	2		Maximum is 6 Zones
Dispersal Area per Zone	2000	Square Feet	
Drip Tubing Spacing	24	Inches	24 Inches is Standard
Drip Emitter Spacing	24	Inches	Based on Standard Norweco Drip Tubing
Tubing Required per Zone	1,000	Linear Feet	
Total Drip Tubing Required	2,000	Linear Feet	
Total Number of Emitters per Zone	500		
Emitter Drip Rate	1.02	Gallons / Hour	Based on Standard Norweco Drip Tubing
Dose Rate per Zone	8.50	Gallons / Minute	

DESIGN REQUIREMENTS

Drip Field Pressure	25	PSI	25 PSI Standard. 10 PSI Minimum, 45 PSI Maximum
Flush Velocity	2.00	Feet / Second	2 Feet / Second is Standard
Number of Laterals	6		
Maximum Length of Each Drip Tubing Lateral Line	315	Feet	
Actual Length of Each Drip Tubing Lateral Line	167	Feet	
Flush Flow Required per Drip Line	1.48	Gallons / Minute	
Total Flow Required to Maintain Flushing Velocity	8.88	Gallons / Minute	
Total System Flow Required (plus 5%)	18.25	Gallons / Minute	

PUMP CALCULATIONS

Supply Manifold Size	1-1/2	Inches
Return Manifold Size	1-1/4	Inches
Distance From Pump Tank to Drip Field	200	Feet
Field Head		
Head Loss Based on Field Pressure	57.75	Feet
Static Head		
Height From Pump Outlet to Pump Tank Outlet	3	Feet
Height From Pump Tank Outlet to Drip Field	3	Feet
Total Static Head	6	Feet
Friction Head (Supply Line)		
Equivalent Length of Fittings	5	Feet
Length of Pipe From Pump Tank to Drip Field	200	Feet
Total Equivalent Length of Supply Line Pipe	205	Feet
Total Supply Line Friction Head	4.17	Feet
Friction Head (Return Line)		
Equivalent Length of Fittings	5	Feet
Length of Pipe From Drip Field to Pump Tank	200	Feet
Total Equivalent Length of Return Line Pipe	205	Feet
Total Return Line Friction Head	2.98	Feet
Tubing Head		
Head Loss Through Drip Tubing	4.95	Feet
Headwork / Filter Assembly Head		
Head Loss Through Headworks Assembly	5.88	Feet
Zone Valve Head		
Head Loss Through Zone Indexing Valve	5.49	Feet
Total Dynamic Head (TDH)	87.22	Feet
Actual Pump Delivery Based on Calculated TDH	22.4	Gallons per Minute — Based on Norweco Model HB105 Pump

PUMP TIMER SETTINGS

Doses per Zone per Day	6		Based on a Single Pump Timer and Alternated Zones
Total Doses per Day	12		
Dose Time per Zone per Day	35.50	Minutes	Rounded up to nearest 1/4 minute
Total Dose Time per Day	71.00	Minutes	Rounded up to nearest 1/4 minute
Time per Dose	5.92	Minutes	
Time Required to Pressurize Drip Field	2.20	Minutes	Based on Norweco Model HB105 Pump
Pump "On" Time Setting	8.25	Minutes	Rounded up to nearest 1/4 minute
Pump "Off" Time Setting	111.75	Minutes	Rounded up to nearest 1/4 minute

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Engineering the future of water and wastewater treatment

Project Name: 127 Rice Field Drive
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Fill in all fields highlighted in yellow.
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TOTAL FIELD

Total Quantity of Effluent to be Disposed per Day	600	Gallons / Day	Maximum Daily Flow is 1,500 Gallons per Day
Soil Loading Rate	0.150	Gallons / Square Foot / Day	
Total Dispersal Field Area	4,000	Square Feet	Maximum Area is 12,000 Square Feet

FLOW PER ZONE

Number of Zones	2		Maximum is 6 Zones
Dispersal Area per Zone	2000	Square Feet	
Drip Tubing Spacing	24	Inches	24 Inches is Standard
Drip Emitter Spacing	24	Inches	Based on Standard Norweco Drip Tubing
Tubing Required per Zone	1,000	Linear Feet	
Total Drip Tubing Required	2,000	Linear Feet	
Total Number of Emitters per Zone	500		
Emitter Drip Rate	1.02	Gallons / Hour	Based on Standard Norweco Drip Tubing
Dose Rate per Zone	8.50	Gallons / Minute	

DESIGN REQUIREMENTS

Drip Field Pressure	25	PSI	25 PSI Standard. 10 PSI Minimum, 45 PSI Maximum
Flush Velocity	2.00	Feet / Second	2 Feet / Second is Standard
Number of Laterals	6		
Maximum Length of Each Drip Tubing Lateral Line	315	Feet	
Actual Length of Each Drip Tubing Lateral Line	167	Feet	
Flush Flow Required per Drip Line	1.48	Gallons / Minute	
Total Flow Required to Maintain Flushing Velocity	8.88	Gallons / Minute	
Total System Flow Required (plus 5%)	18.25	Gallons / Minute	

PUMP CALCULATIONS

Supply Manifold Size	1-1/2	Inches
Return Manifold Size	1-1/4	Inches
Distance From Pump Tank to Drip Field	200	Feet
Field Head		
Head Loss Based on Field Pressure	57.75	Feet
Static Head		
Height From Pump Outlet to Pump Tank Outlet	3	Feet
Height From Pump Tank Outlet to Drip Field	3	Feet
Total Static Head	6	Feet
Friction Head (Supply Line)		
Equivalent Length of Fittings	5	Feet
Length of Pipe From Pump Tank to Drip Field	200	Feet
Total Equivalent Length of Supply Line Pipe	205	Feet
Total Supply Line Friction Head	4.17	Feet
Friction Head (Return Line)		
Equivalent Length of Fittings	5	Feet
Length of Pipe From Drip Field to Pump Tank	200	Feet
Total Equivalent Length of Return Line Pipe	205	Feet
Total Return Line Friction Head	2.98	Feet
Tubing Head		
Head Loss Through Drip Tubing	4.95	Feet
Headwork / Filter Assembly Head		
Head Loss Through Headworks Assembly	5.88	Feet
Zone Valve Head		
Head Loss Through Zone Indexing Valve	5.49	Feet
Total Dynamic Head (TDH)	87.22	Feet
Actual Pump Delivery Based on Calculated TDH	22.4	Gallons per Minute — Based on Norweco Model HB105 Pump

PUMP TIMER SETTINGS

Doses per Zone per Day	6		Based on a Single Pump Timer and Alternated Zones
Total Doses per Day	12		
Dose Time per Zone per Day	35.50	Minutes	Rounded up to nearest 1/4 minute
Total Dose Time per Day	71.00	Minutes	Rounded up to nearest 1/4 minute
Time per Dose	5.92	Minutes	
Time Required to Pressurize Drip Field	2.20	Minutes	Based on Norweco Model HB105 Pump
Pump "On" Time Setting	8.25	Minutes	Rounded up to nearest 1/4 minute
Pump "Off" Time Setting	111.75	Minutes	Rounded up to nearest 1/4 minute

SOIL REPORT

PERMITS/INSP PAYMENT
COUNTY OF IREDELL
PO BOX 788
200 SOUTH CENTER STREET
STATESVILLE NC 28687

RECEIPT# 462360

Central Permitting Center
2018

DATE: 06/22/18 TIME: 16:13
CLERK: chrystal.sloan
PAID BY: LOR KOU T ETAL

APPLICATION #: 234237

PERMIT ALLOCATION:

1	10492751 447004 PEHIA	360.00	Environmental Health Fees
TOTAL RECEIPT AMOUNT:		360.00	

AMOUNT PAID: 360.00
PAID BY: LOR KOU T ETAL
PAYMENT METHOD: CREDIT CAR091855
APPLICATION #: 234237

AMT TENDERED: 360.00
AMT APPLIED: 360.00
CHANGE: .00

PHASE I SOIL AND SITE EVALUATION

Lot 4 – Casa Grande
127 Rice Field Drive
Iredell County Tax Parcel 80051435
Statesville, North Carolina

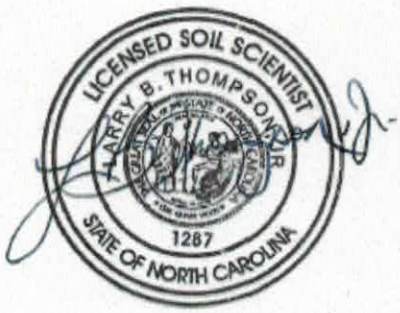
Prepared For:

Kou Lor
131 Rice Field Drive
Statesville, NC 28625
704-890-1539

Thompson Environmental Consulting
WATER • WASTEWATER • WETLANDS

Thompson Environmental Consulting, Inc.
PO Box 541
Midland, NC 28107

May 7, 2018



INTRODUCTION & SITE DESCRIPTION

This Phase I Soil and Site Evaluation was performed on a portion of a 5.044-acre tract located on Iredell County Tax Parcel 80051435, 131 Rice Field Drive, North Carolina.

Thompson Environmental Consulting, Inc. (TEC) was retained to determine areas that are suitable for placement of an onsite subsurface wastewater septic system for a single-family residence. The property was evaluated in accordance with North Carolina statutes for waste disposal ("Laws and Rules for Sewage Treatment and Disposal Systems", amended July 1, 2016).

INVESTIGATION METHODOLOGY & SITE PHYSICAL CHARACTERISTICS

Soil borings were evaluated, and soil color was determined with a Munsell Soil Color Chart. Observations of the landscape (slope, drainage patterns, etc.) as well as soil properties (depth, texture, structure, seasonal wetness, restrictive horizons, etc.) were recorded. Each pit was located using a hand-held GPS unit with sub-meter accuracy.

The property has been previously developed with a single-family residence served by a onsite wastewater treatment and disposal system and private well. The study area is comprised of an open lawn vegetated with tall fescue located close to Rice Field Drive.

FINDINGS

The field survey was conducted on May 7, 2018 by Larry Thompson, LSS. Five (5) borings were advanced, logged, and their locations noted on the attached Figure.

All borings were rated as "Provisionally Suitable" for a Subsurface Drip Dispersal System. Surfaces typically exhibited a friable clay loam texture with weak, medium, subangular blocky structure 7 to 11 inches in depth. Upper subsurface horizons exhibited firm clay textures with moderate, medium, subangular blocky structure ranging in depth from 18 to 26 inches. A long-term acceptance rate (LTAR) of 0.1 gal./day/sq. ft. would typically be recommended for these soils but will need to be confirmed through a Hydraulic Assessment. The final LTAR will be a percentage of the geometric mean of the combined saturated hydraulic conductivity tests.

DISCUSSION

It is estimated that a minimum of 12,000 sq. ft. of usable soil would be required for the installation of a Pre-Treated Drip Dispersal System, and the required repair area for a 5-bedroom single family residence. There appears to be an adequate area of provisionally suitable soil available, however, this observation will need to be confirmed through the hydraulic assessment.

CONCLUSION

The findings presented herein represent TEC's professional opinion based on this Phase I Soil

and Site Evaluation and knowledge of the current laws and rules governing on-site wastewater systems in North Carolina.

The soils evaluated appear to be adequate to support the installation of, and the required repair area for, a pre-treated drip dispersal system for a 5-bedroom single family residence at a LTAR of 0.1 gal./day/sq. ft. (actual LTAR will be determined through a hydraulic assessment).

Soils naturally change across a landscape and contain many inclusions. As such, attempts to quantify them are not always precise and exact. Due to this inherent variability of soils and the subjectivity when determining limiting factors, there is no guarantee that a regulating authority will agree with the findings of this report. This report does not guarantee or represent approval or issuance of an Improvement Permit, which can only be authorized by Iredell County Environmental Health.

THOMPSON ENVIRONMENTAL CONSULTING, INC.
PO BOX 241
WOODLEAF, NC 27054

PROPERTY ID #: 80051435
COUNTY: Iredell

SOIL/SITE EVALUATION
***for* ON-SITE WASTEWATER SYSTEM**
(Complete all fields in full)

OWNER: Kou Lor
ADDRESS: 131 Rice Field Drive, Statesville, NC
APPLICATION DATE ____
PROPOSED FACILITY: ____ PROPOSED DESIGN FLOW (.1949): 600
DATE EVALUATED: 5-7-18
LOCATION OF SITE: 131Rice Field Drive, Statesville, NC
PROPERTY SIZE: 5.044 acres
WATER SUPPLY: ☒ Private ☐ Public ☐ Well ☐ Spring ☐ Other ____
PROPERTY RECORDED: ____
EVALUATION METHOD: ☒ Auger Boring ☐ Pit ☐ Cut
TYPE OF WASTEWATER: ☒ Sewage ☐ Industrial Process ☐ Mixed

PROFILE #	.1940 LANDSCAPE POSITION/ SLOPE %	HORIZON DEPTH (IN.)	SOIL MORPHOLOGY (.1941)		OTHER PROFILE FACTORS				PROFILE CLASS & LTAR
			.1941 STRUCTURE/ TEXTURE	.1941 CONSISTENCE/ MINERALOGY	.1942 SOIL WETNESS/ COLOR	.1943 SOIL DEPTH	.1956 SAPRO CLASS	.1944 RESTR HORIZ	
1	LS 3%	0-11"	SBK/SCL	FI/SS/SP/SEXP	24"	24"	N/A	N/A	PS TBD
		11-24"	SBK/C	FI/SS/SP/SEXP					
		24+	M/C	FI/S/P/EXP					
2	LS 3%	0-11"	SBK/SCL	FI/SS/SP/SEXP	18"	18"	N/A	N/A	PS TBD
		11-18"	SBK/C	FI/SS/SP/SEXP					
		18+	M/C	FI/S/P/EXP					
3	LS 3%	0-10"	SBK/SCL	FI/SS/SP/SEXP	20"	20"	N/A	N/A	PS TBD
		10-20"	SBK/C	FI/SS/SP/SEXP					
		20+	M/C	FI/S/P/EXP					
4	LS 3%	0-9"	SBK/SCL	FI/SS/SP/SEXP	22"	22"	N/A	N/A	PS TBD
		9-22"	SBK/C	FI/SS/SP/SEXP					
		22+	M/C	FI/S/P/EXP					

DESCRIPTION	INITIAL SYSTEM	REPAIR SYSTEM
Available Space (.1945)	PS	PS
System Type(s)	DRIP	DRIP
Site LTAR	TBD	TBD

OTHER FACTORS (.1946): ____
SITE CLASSIFICATION (.1948): PS
EVALUATED BY: Larry Thompson, LSS
OTHER(S) PRESENT: ____

COMMENTS: *LTAR to be determined through saturated hydraulic conductivity testing.

LEGEND

use the following standard abbreviations

LANDSCAPE POSITION	GROUP	SOIL TEXTURE	CONVENTIONAL .1955 LTAR*	LPP .1957 LTAR*	MINERALOGY/ CONSISTENCE	STRUCTURE
CC (Concave Slope) CV (Convex Slope) D (Drainage Way) DS (Debris Slump) FP (Flood Plain) FS (Foot Slope) H (Head Slope) L (Linear Slope) N (Nose Slope) R (Ridge) S (Shoulder Slope) T (Terrace)	I	S (Sand) LS (Loamy Sand)	1.2 - 0.8	0.6 - 0.4	SEXP (Slightly Expansive) EXP (Expansive)	G (Single Grain) M (Massive) CR (Crumb) GR (Granular) SBK (Subangular Blocky) ABK (Angular Blocky) PL (Platy) PR (Prismatic)
	II	SL (Sandy Loam) L (Loam)	0.8 - 0.6	0.4 - 0.3		
	III	Si (Silt) SiCL (Silty Clay Loam) CL (Clay Loam) SCL (Sandy Clay Loam) SiL (Silt Loam)	0.6 - 0.3	0.3 - 0.15		
					MOIST	**WET**
	IV	SC (Sandy Clay) SiC (Silty Clay) C (Clay)	0.4 - 0.1	0.2 - 0.05	VFR (Very Friable) FR (Friable) FI (Firm) VFI (Very Firm v. Very Sticky)	NS (Non-sticky) SS (Slightly Sticky) S (Sticky) VS (Very Sticky)
		O (Organic)	None	None	EFI (Extremely Firm)	NP (Non-plastic) SP (Slightly Plastic) P (Plastic) VP (Very Plastic)

*Adjust LTAR due to depth, consistence, structure, soil wetness, landscape, position, wastewater flow and quality.

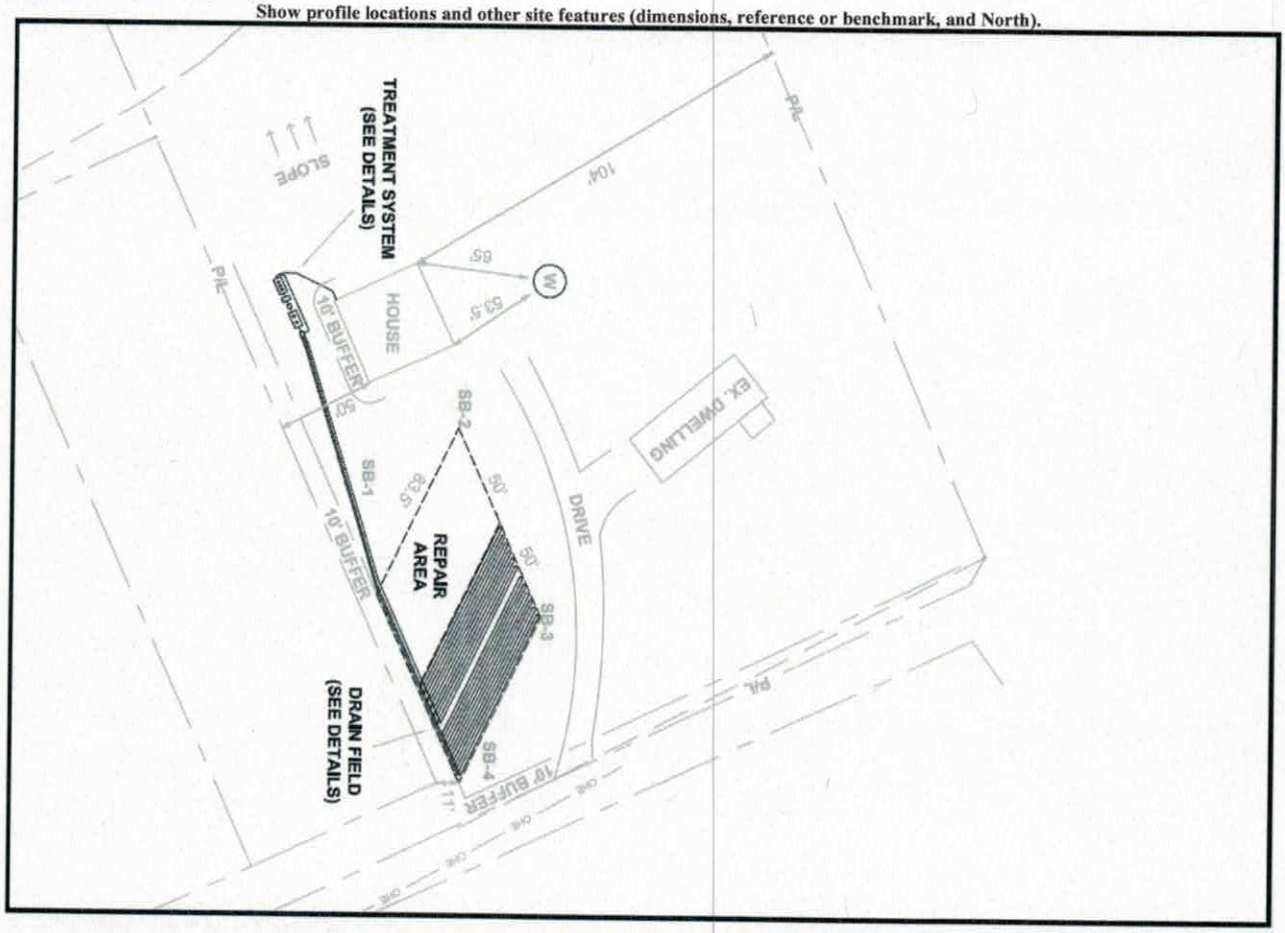
NOTES

HORIZON DEPTH	In inches below natural soil surface
DEPTH OF FILL	In inches from land surface
RESTRICTIVE HORIZON	Thickness and depth from land surface
SAPROLITE	S(suitable) or U(unsuitable)
SOIL WETNESS	Inches from land surface to free water or inches from land surface to soil colors with chroma 2 or less - record Munsell color chip designation
CLASSIFICATION	S (Suitable), PS (Provisionally Suitable), or U (Unsuitable)

Evaluation of saprolite shall be by pits.

Long-term Acceptance Rate (LTAR): gal/day/ft^2

Show profile locations and other site features (dimensions, reference or benchmark, and North).



HYDRAULIC ASSESSMENT

Lot 4 – Casa Grande
127 Rice Field Drive
Iredell County Tax Parcel 80051435
Statesville, North Carolina

Prepared For:

Kou Lor
131 Rice Field Drive
Statesville, NC 28625
704-890-1539

Prepared By:

Thompson Environmental Consulting
WATER • WASTEWATER • WETLANDS

Thompson Environmental Consulting, Inc.
PO Box 541
Midland, NC 28107

LICENSED SOIL SCIENTIST
LARRY B. THOMPSON, JR.
1287
STATE OF NORTH CAROLINA

June 8, 2018

INTRODUCTION

A previous soil investigation performed by Thompson Environmental Consulting, Inc. for a proposed septic area on a 5.044-acre tract located on Iredell County Tax Parcel 80051435, 131 Rice Field Drive (new address for the proposed residence will be 127 Rice Field Drive), Statesville, North Carolina, identified a potentially useable area for a pretreated subsurface drip dispersal system for 4-bedroom single family residence. To determine if a subsurface drip system is feasible, saturated hydraulic conductivity tests (K_{SAT}) need to be performed to assist in determining a conservative long-term acceptance rate (LTAR) for the site.

Pretreated drip systems require that K_{SAT} tests be performed to substantiate the LTAR of the soils. The system LTAR, in this case, is based on the most hydraulically limiting soil horizon within 18 inches of the naturally occurring surface. Based on the previous soil investigations the soil horizons throughout the study area were consistent, with a clay subsurface horizon (Bt) noted as likely the most hydraulically limiting. The K_{SAT} tests were performed below this area as shown in the Soil Boring and Ksat Location Figures.

HYDRAULIC CONDUCTIVITY MEASUREMENTS

A constant-head permeameter (Amoozemeter) was used to measure the K_{SAT} at various locations within the study area. Tests were conducted in accordance with the "Recommended Guidance for In-situ Measurements of Saturated Hydraulic Conductivity by the Constant Head Well Permeameter Method and for Reporting Results, August 19, 2014." The soils of the proposed system area consistently exhibited one diagnostic subsurface horizon within and immediately beneath the proposed treatment zone. As such, six K_{SAT} measurements were performed within the proposed drip irrigation areas. All tests were performed in the Bt horizon (15, 16 and 15.5-inch depths).

Table 1 presents the results for the individual tests. The Appendix contains the results of the K_{SAT} tests. K_{SAT} data provided in the Appendix were logged only after providing sufficient time for the Amoozemeters to generally reach steady-state. The value of the K_{SAT} must be modified by an appropriate design factor to determine loading rates. This factor reflects the influence of several parameters including: inherent uncertainty of test values, variation of permeability within a soil, rooting habits of vegetation, drainage characteristics of the site, and long-term changes in soil permeability due to wastewater application.

The adjusted geometric mean of the measured K_{SAT} is 4.986922535; the results are listed in Table 1. A conservative design factor of 3 percent of the measured K_{SAT} is recommended for the proposed wastewater treatment and disposal system given that TS-II pretreated effluent is being considered. This resulted in a proposed loading rate of 0.15 gal/ft^2/day for the system.

Table 1: Hydraulic conductivity tests results and depth of tests

Test number	Depth of test (inches)	Measured K_{sat} (gal/ft²/day)
1	15	8.109208115
2	16	2.455557212
3	15.5	6.228297699
Geometric Mean		**4.986922535**

The hydraulic linear loading rate is typically defined by using Darcy's Law: $F = Kd\frac{dX}{dZ}$

F = Wastewater Flow Downslope for Unit Length (per foot of drip line)
K = Saturated Hydraulic Conductivity of the Most Restrictive Soil Horizon
d = Depth of Soil for Horizontal Transmission
$\frac{dx}{dZ}$ = Slope of the Groundwater Surface

The hydraulic linear loading rate per foot is: F = 4.986922535 GPD/SF x 1 FT x .01 = 0.050 GPD/FT. For a 83.5-foot long drainline the hydraulic linear loading rate is 0.050 GPD/FT x 83.5 FT = 4.175 GPD/SF.

CONCLUSIONS

The findings presented herein represent Thompson Environmental Consulting's professional opinion based upon our site evaluation and knowledge of the current laws and regulations governing on-site wastewater systems in North Carolina (Section .1900 of the North Carolina Administrative Code - NCAC).

This hydraulic assessment and report has been provided to assist with a septic system design for the subject property. An Improvement Permit for a subsurface wastewater treatment and disposal would be issued by Iredell County Environmental Health. Any concurrence with the findings of this report would be made by the local health department at the time an Improvement Permit is issued.

Saturated Hydraulic Conductivity Testing
Thomspon Environmental Job #: 131 Rice Field Dr

Date: 6/6/2018
Test #: K1
Horizon: Bt
Depth(inches): 15.0

Weather Condition: Sunny

SET UP		cm	in
Hole Depth:		38.1	15.0
Reference:	+	7.6	3.0
Head:	-	15.2	6.0
CHT Tube(s) setting:	=	30.5	12.0

	cm	in
Target Water Level:	15.2	6.00
Beginning Water Level:	15.2	6.00
Ending Water Level:	15.2	6.00

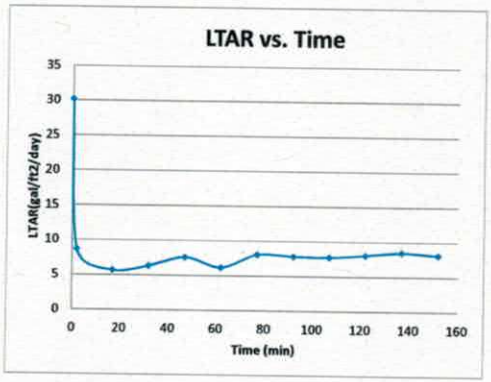
Hole diameter (d): 5.0 cm
Hole radius (r): 2.5 cm
coefficient A: 0.001136

Valve Setting: 1-ON x 2-ON

Initial Reservoir Reading (cm) 31.8
Coversion Factor (C.F.): 105.0 Formula Used: x

s>=2H {sinh^-1(H/r)-[(r/H)^2+1]^1/2+r/H}/(2πH^2)
s<2H {3ln(H/r)/[πH(3H+2s)]}

Date/Time	Logger Reading (m)	Reservoir Reading (cm)	Change in Water Level (cm)	Chamber C.F.	Clock Time (min)	Elapsed Time (min)	Elapsed Time (hr)	Q (cm3/hr)	K (cm/hr)	K (in/hr)	K Gal/ft2/day
06/06/18 11:58:00AM	0.318	31.8	0.0	105.0	0.0						
06/06/18 12:00:00PM	0.3037	30.37	1.4	105.0	2.0	2.00	0.033	4513.5	5.12837	2.0190	30.20812179
06/06/18 12:15:00PM	0.2729	27.29	3.1	105.0	17.0	15.00	0.250	1293.4	1.46961	0.5786	8.656555776
06/06/18 12:30:00PM	0.2526	25.26	2.0	105.0	32.0	15.00	0.250	852.3	0.96838	0.3813	5.704154303
06/06/18 12:45:00PM	0.2300	23.00	2.3	105.0	47.0	15.00	0.250	946.5	1.07544	0.4234	6.334764326
06/06/18 01:00:00PM	0.2030	20.30	2.7	105.0	62.0	15.00	0.250	1134.9	1.28955	0.5077	7.595984373
06/06/18 01:15:00PM	0.1811	18.11	2.2	105.0	77.0	15.00	0.250	920.8	1.04624	0.4119	6.162779774
06/06/18 01:30:00PM	0.1524	15.24	2.9	105.0	92.0	15.00	0.250	1203.5	1.36741	0.5384	8.054609845
06/06/18 01:45:00PM	0.1246	12.46	2.8	105.0	107.0	15.00	0.250	1169.2	1.32848	0.5230	7.825297109
06/06/18 02:00:00PM	0.0948	9.48	3.0	97.5	122.0	15.00	0.250	1161.3	1.31945	0.5195	7.772063795
06/06/18 02:15:00PM	0.0639	6.39	3.1	97.5	137.0	15.00	0.250	1205.0	1.36915	0.5390	8.06484702
06/06/18 02:30:00PM	0.0314	3.14	3.3	97.5	152.0	15.00	0.250	1268.6	1.44145	0.5675	8.49071353
										Average:	8.109208115



Saturated Hydraulic Conductivity Testing
Thomspon Environmental Job #: 131 Rice Field Dr

Date: 6/6/2018
Test #: K2
Horizon: Bt
Depth(inches): 16.0

Weather Condition: Sunny

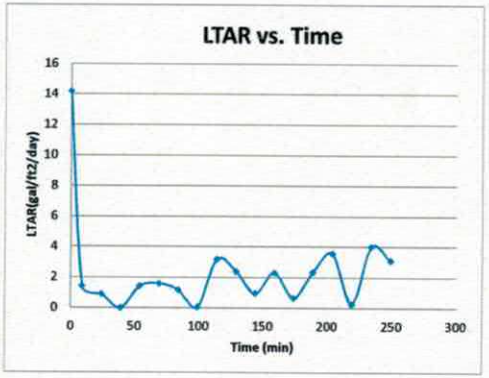
SET UP		cm	in
Hole Depth:		40.6	16.0
Reference:	+	7.6	3.0
Head:	-	15.2	6.0
CHT Tube(s) setting:	=	33.0	13.0

	cm	in
Target Water Level:	15.2	6.00
Beginning Water Level:	15.2	6.00
Ending Water Level:	15.2	6.00

Hole diameter (d): 5.0 cm
Hole radius (r): 2.5 cm
coefficient A: 0.001136

Valve Setting: x (1-ON / 2-ON)
Initial Reservoir Reading (cm): 33.5
Coversion Factor (C.F.): 105.0
Formula Used: x
s>=2H {sinh^-1(H/r)-[(r/H)^2+1]^1/2+r/H}/(2πH^2)
s<2H {3ln(H/r)/[πH(3H+2s)]}

Date/Time	Logger Reading (m)	Reservoir Reading (cm)	Change in Water Level (cm)	Chamber C.F.	Clock Time (min)	Elapsed Time (min)	Elapsed Time (hr)	Q (cm3/hr)	K (cm/hr)	K (in/hr)	K Gal/ft2/day
06/06/18 12:06:00PM	0.335	33.5	0.0	105.0	0.0						
06/06/18 12:15:00PM	0.3047	30.47	3.0	105.0	9.0	9.00	0.150	2121.6	2.41064	0.9491	14.19964683
06/06/18 12:30:00PM	0.2996	29.96	0.5	105.0	24.0	15.00	0.250	214.1	0.24331	0.0958	1.433204599
06/06/18 12:45:00PM	0.2963	29.63	0.3	105.0	39.0	15.00	0.250	137.0	0.15572	0.0613	0.917250943
06/06/18 01:00:00PM	0.2963	29.63	0.0	105.0	54.0	15.00	0.250	0.0	0.00000	0.0000	0
06/06/18 01:15:00PM	0.2912	29.12	0.5	105.0	69.0	15.00	0.250	214.1	0.24331	0.0958	1.433204599
06/06/18 01:30:00PM	0.2855	28.55	0.6	105.0	84.0	15.00	0.250	239.8	0.27251	0.1073	1.605189151
06/06/18 01:45:00PM	0.2813	28.13	0.4	105.0	99.0	15.00	0.250	175.6	0.19952	0.0785	1.175227771
06/06/18 02:00:00PM	0.2811	28.11	0.0	105.0	114.0	15.00	0.250	8.6	0.00973	0.0038	0.057328184
06/06/18 02:15:00PM	0.2698	26.98	1.1	105.0	129.0	15.00	0.250	475.4	0.54015	0.2127	3.181714209
06/06/18 02:30:00PM	0.2613	26.13	0.9	105.0	144.0	15.00	0.250	359.8	0.40876	0.1609	2.407783726
06/06/18 02:45:00PM	0.2579	25.79	0.3	105.0	159.0	15.00	0.250	141.3	0.16059	0.0632	0.945915035
06/06/18 03:00:00PM	0.2496	24.96	0.8	105.0	174.0	15.00	0.250	346.9	0.39417	0.1552	2.32179145
06/06/18 03:15:00PM	0.2473	24.73	0.2	105.0	189.0	15.00	0.250	98.5	0.11192	0.0441	0.659274115
06/06/18 03:30:00PM	0.2389	23.89	0.8	105.0	204.0	15.00	0.250	351.2	0.39903	0.1571	2.350455542
06/06/18 03:45:00PM	0.2262	22.62	1.3	105.0	219.0	15.00	0.250	535.4	0.60828	0.2395	3.583011497
06/06/18 04:00:00PM	0.2253	22.53	0.1	105.0	234.0	15.00	0.250	38.5	0.04380	0.0172	0.257976828
06/06/18 04:15:00PM	0.2110	21.10	1.4	105.0	249.0	15.00	0.250	599.6	0.68127	0.2682	4.012972876
06/06/18 04:30:00PM	0.2000	20.00	1.1	105.0	264.0	15.00	0.250	462.5	0.52555	0.2069	3.095721933
										Average:	2.455557212



Saturated Hydraulic Conductivity Testing
Thomspon Environmental Job #: 131 Rice Field Dr

Date: 6/6/2018
Test #: K3
Horizon: Bt
Depth(inches): 15.5

Weather Condition: Sunny

SET UP		cm	in
Hole Depth:		39.4	15.5
Reference:	+	7.6	3.0
Head:	-	15.2	6.0
CHT Tube(s) setting:	=	31.8	12.5

	cm	in
Target Water Level:	15.2	6.00
Beginning Water Level:	15.2	6.00
Ending Water Level:	15.2	6.00

Hole diameter (d): 5.0 cm
Hole radius (r): 2.5 cm
coefficient A: 0.001136

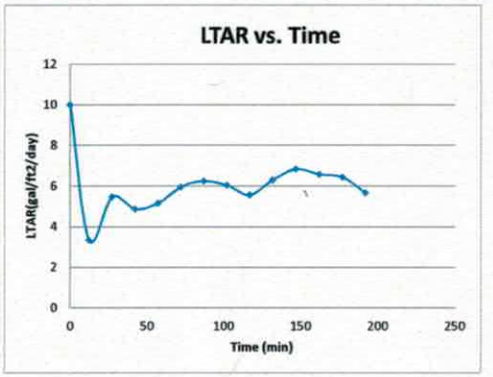
Valve Setting: 1-ON x 2-ON

Initial Reservoir Reading (cm): 31.2
Coversion Factor (C.F.): 105.0 Formula Used: x

s>=2H {sinh^-1(H/r)-[(r/H)^2+1]^1/2+r/H)/(2πH^2)
s<2H {3ln(H/r)/[πH(3H+2s)]}

Date/Time	Logger Reading (m)	Reservoir Reading (cm)	Change in Water Level (cm)	Chamber C.F.	Clock Time (min)	Elapsed Time (min)	Elapsed Time (hr)	Q (cm3/hr)	K (cm/hr)	K (in/hr)	K Gal/ft2/day
06/06/18 12:18:00PM	0.312	31.2	0.0	105.0	0.0						10
06/06/18 12:30:00PM	0.3024	30.24	1.0	105.0	12.0	12.00	0.200	501.5	0.56981	0.2243	3.356407414
06/06/18 12:45:00PM	0.2830	28.30	1.9	105.0	27.0	15.00	0.250	818.0	0.92945	0.3659	5.474841567
06/06/18 01:00:00PM	0.2656	26.56	1.7	105.0	42.0	15.00	0.250	728.1	0.82726	0.3257	4.872895636
06/06/18 01:15:00PM	0.2473	24.73	1.8	105.0	57.0	15.00	0.250	770.9	0.87592	0.3449	5.159536555
06/06/18 01:30:00PM	0.2261	22.61	2.1	105.0	72.0	15.00	0.250	890.8	1.01218	0.3985	5.962131131
06/06/18 01:45:00PM	0.2038	20.38	2.2	105.0	87.0	15.00	0.250	933.7	1.06084	0.4177	6.24877205
06/06/18 02:00:00PM	0.1823	18.23	2.2	105.0	102.0	15.00	0.250	903.7	1.02678	0.4042	6.048123407
06/06/18 02:15:00PM	0.1625	16.25	2.0	105.0	117.0	15.00	0.250	830.9	0.94405	0.3717	5.560833843
06/06/18 02:30:00PM	0.1401	14.01	2.2	105.0	132.0	15.00	0.250	942.2	1.07057	0.4215	6.306100234
06/06/18 02:45:00PM	0.1139	11.39	2.6	97.5	147.0	15.00	0.250	1022.1	1.16129	0.4572	6.840480806
06/06/18 03:00:00PM	0.0887	8.87	2.5	97.5	162.0	15.00	0.250	982.3	1.11611	0.4394	6.574314238
06/06/18 03:15:00PM	0.0640	6.40	2.5	97.5	177.0	15.00	0.250	962.4	1.09351	0.4305	6.441230954
06/06/18 03:30:00PM	0.0423	4.23	2.2	97.5	192.0	15.00	0.250	847.1	0.96247	0.3789	5.669347905
										Average:	6.228297699

Geomean of 3 Tests: 4.986922535

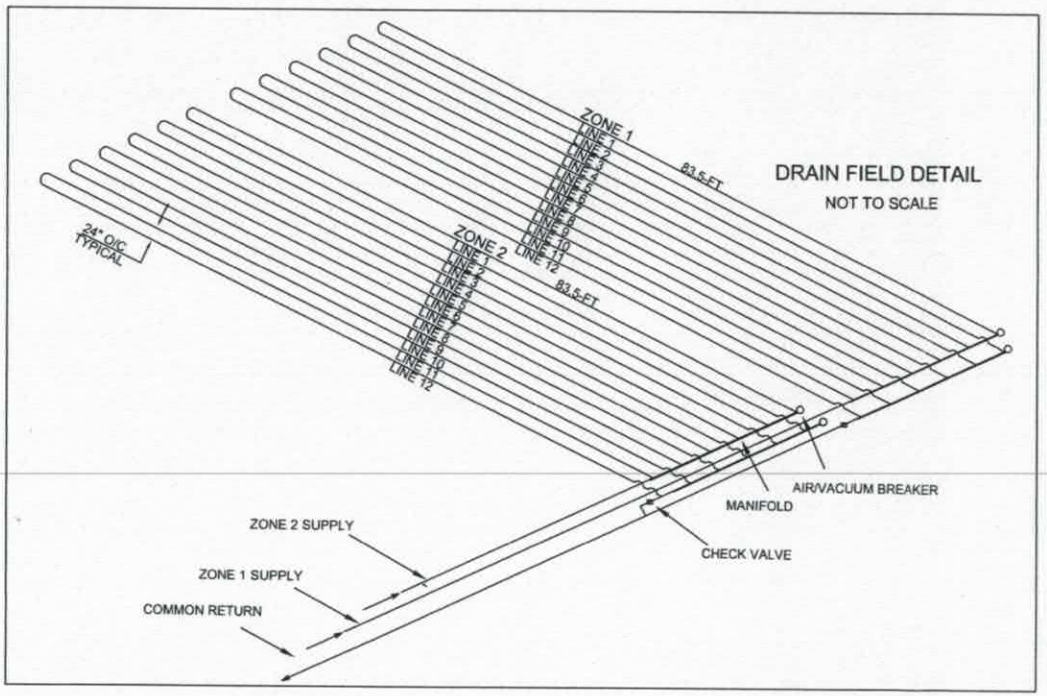


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Charlotte, NC 28221
C-3745

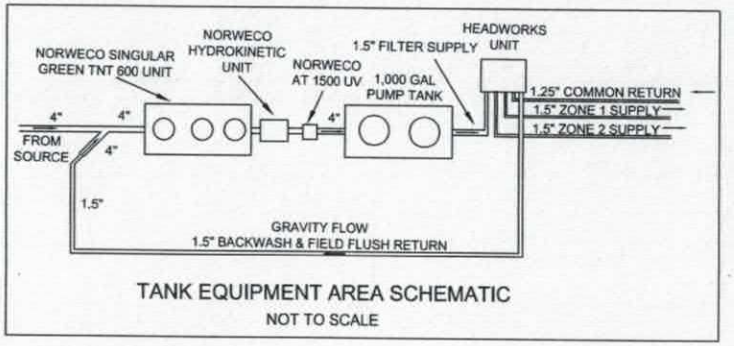
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Address: 127 Rice Field, Iredell County, NC

Drawing By: GDB Reviewed By: GDB
Date: 21JUN18 Date: 21JUN18
Rev: -

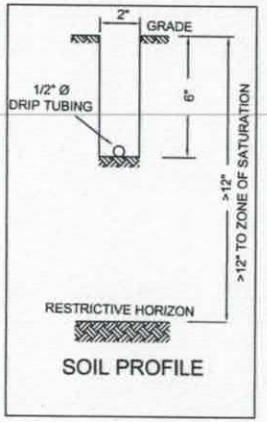
Prepared for review by: Owner ☐ Agent ☐ Engineer ☐ Regulator ☒ Installer ☐ Soil Scientist ☐



DRAIN FIELD DETAIL
NOT TO SCALE



TANK EQUIPMENT AREA SCHEMATIC
NOT TO SCALE



SOIL PROFILE

SYSTEM DETAILS
NOT TO SCALE



Notes

All dimensions are approximate, based on rough tape measurement, and survey is courtesy of Patterson Land Surveying, P.A., dated December 20, 2016, and are intended for illustration only.
The system as designed, if installed in accordance with the manufacturer's recommendations, will function sartisfactorily.
This drawing and the information contained in it are the property of Barrier Foundation Engineering Services, PC. who should be angaged to supervise construction, inspection and preparation of "as-built"

BARRIER FOUNDATION ENGINEERING SERVICES, PC
PO Box 26072
Charlotte, NC 28221
C-3745

Project Name: On-Site Drainfield System Proposal
Address: 127 Rice Field, Iredell County, NC

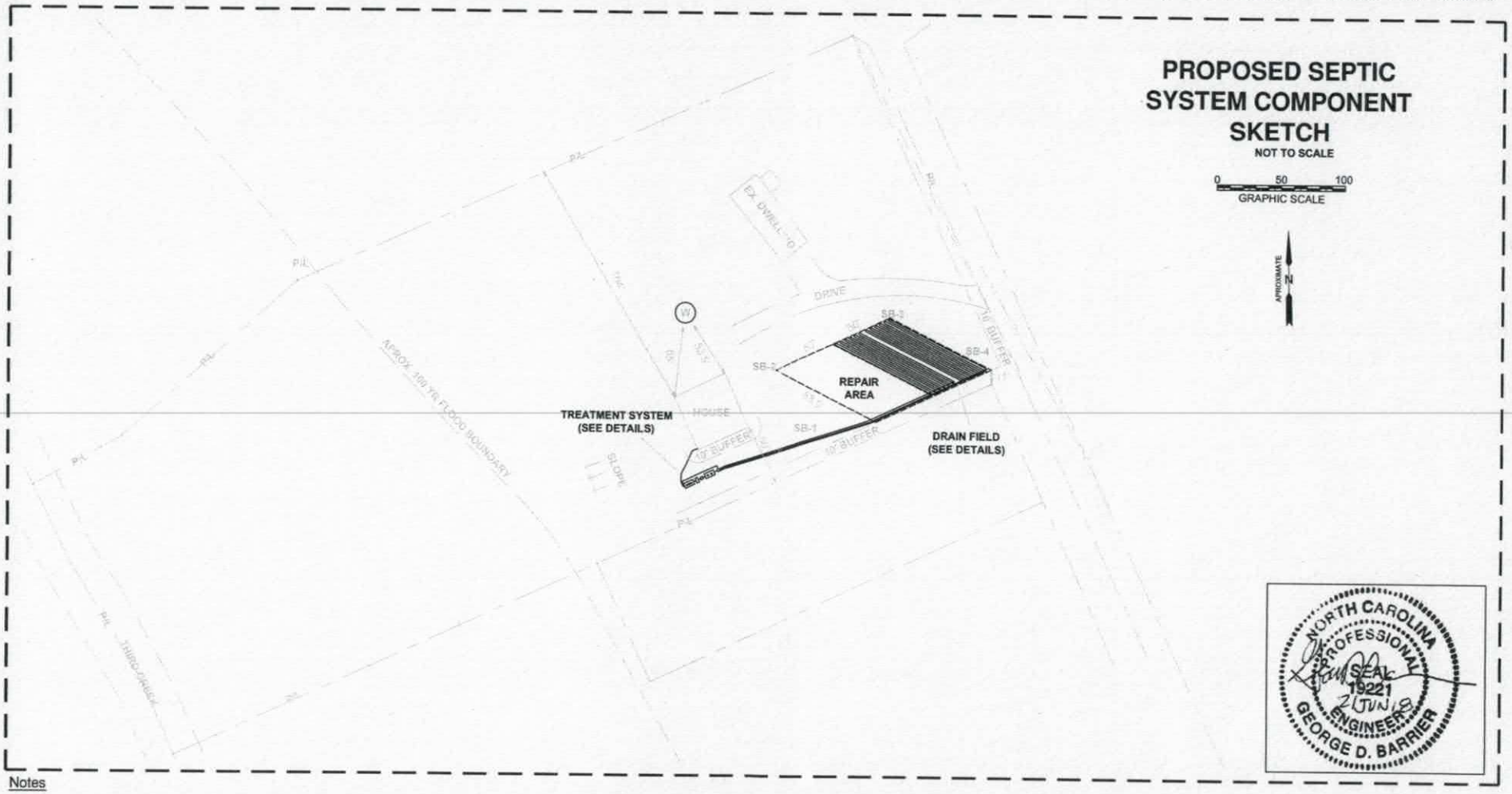
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Date: 21JUN18 Date: 21JUN18
Rev: - Page 1 of 6

Prepared for review by: Owner ☐ Agent ☐ Engineer ☐ Regulator [X] Installer ☐ Soil Scientist ☐

PROPOSED SEPTIC SYSTEM COMPONENT SKETCH

NOT TO SCALE

0 50 100
GRAPHIC SCALE



NORTH CAROLINA PROFESSIONAL SEAL 19221 ENGINEER GEORGE D. BARRIER 21JUN18

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Notes

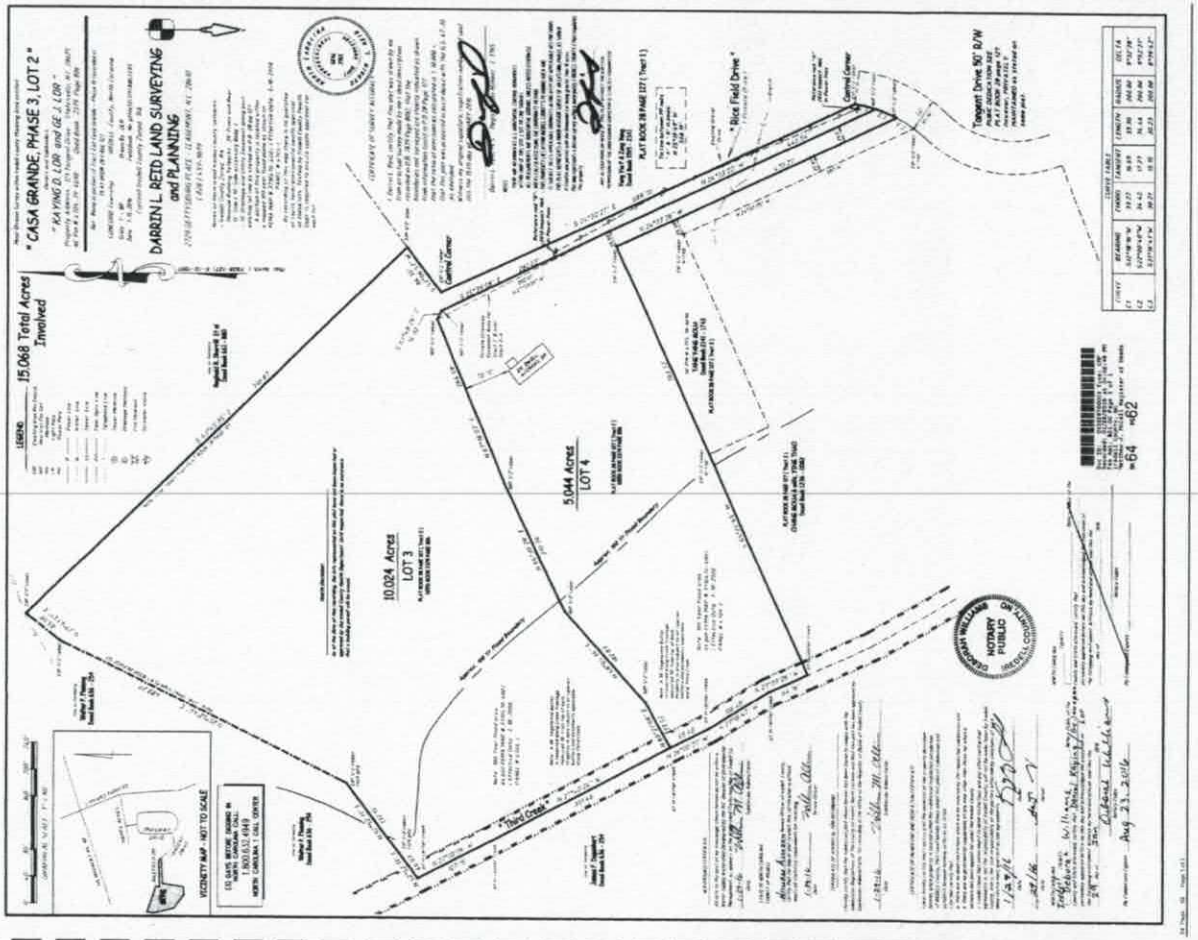
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BARRIER FOUNDATION ENGINEERING SERVICES, PC
PO Box 26072
Charlotte, NC 28221
C-3745

Project Name: On-Site Drainfield System Proposal
Address: 127 Rice Field Drive, Iredell County, NC

Drawing By: GDB Reviewed By: GDB
Date: 21JUN18 Date: 21JUN18
Rev: -

Prepared for review by: Owner ☐ Agent ☐ Engineer ☐ Regulator ☒ Installer ☐ Soil Scientist ☐



PROPERTY PLOT PLAN
COURTESY OF
DARRIN L. REID LAND SURVEYING

DATED JANUARY 15, 2016

NOT TO SCALE
FOR SCALED DRAWING
REFER TO THE ORIGINAL

Notes

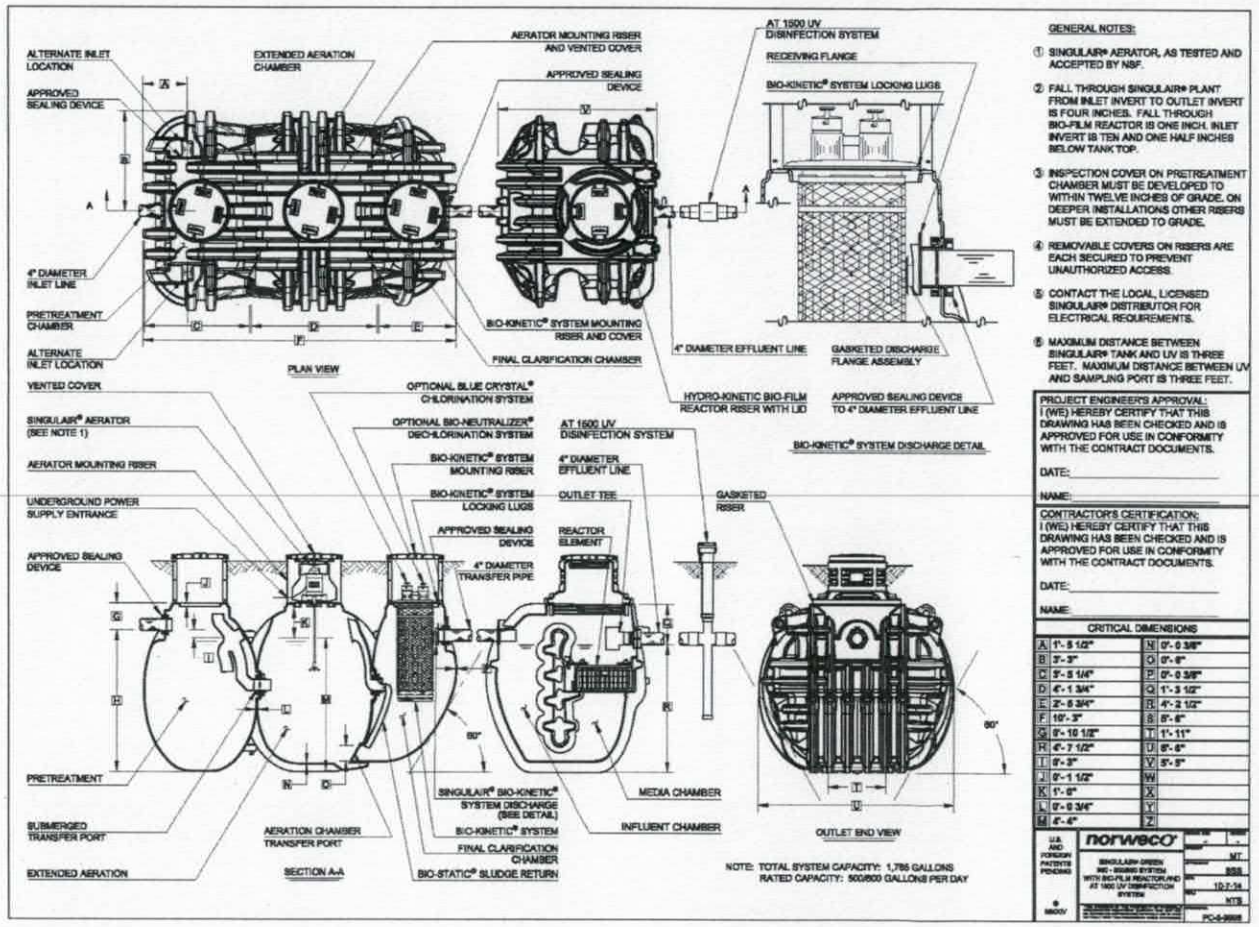
All dimensions are approximate, based on rough tape measurement, and survey is courtesy of Patterson Land Surveying, P.A., dated December 20, 2016 and are intended for illustration only.
The system as designed, if installed in accordance with the manufacturer's recommendations, will function sartisfactorily.
This drawing and the information contained in it are the property of Barrier Foundation Engineering Services, PC. who should be angaged to supervise construction, inspection and preparation of "as-built"

BARRIER FOUNDATION ENGINEERING SERVICES, PC
PO Box 26072
Charlotte, NC 28221

Project Name: Residential On-Site Drip System Proposal
Address: 127 Rice Field, Iredell County, NC

Owner [X] Engineer [ ] Agent [ ] GC [ ]

Drawing By: GDB Reviewed By: GDB
Date: 21JUN18 Date: 21JUN18
Rev:



GENERAL NOTES:

1. SINGULAIR® AERATOR, AS TESTED AND ACCEPTED BY NSF.
2. FALL THROUGH SINGULAIR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. FALL THROUGH BIO-FILM REACTOR IS ONE INCH. INLET INVERT IS TEN AND ONE HALF INCHES BELOW TANK TOP.
3. INSPECTION COVER ON PRETREATMENT CHAMBER MUST BE DEVELOPED TO WITHIN TWELVE INCHES OF GRADE. ON DEEPER INSTALLATIONS OTHER RISERS MUST BE EXTENDED TO GRADE.
4. REMOVABLE COVERS ON RISERS ARE EACH SECURED TO PREVENT UNAUTHORIZED ACCESS.
5. CONTACT THE LOCAL, LICENSED SINGULAIR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.
6. MAXIMUM DISTANCE BETWEEN SINGULAIR® TANK AND UV IS THREE FEET. MAXIMUM DISTANCE BETWEEN UV AND SAMPLING PORT IS THREE FEET.

PROJECT ENGINEER'S APPROVAL:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.
DATE:
NAME:

CONTRACTOR'S CERTIFICATION:
I (WE) HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.
DATE:
NAME:

CRITICAL DIMENSIONS

A	1'- 5 1/2"	M	0'- 0 3/8"
B	3'- 3"	O	0'- 6"
C	5'- 5 1/4"	P	0'- 0 3/8"
D	4'- 1 3/4"	Q	1'- 3 1/2"
E	2'- 5 3/4"	R	4'- 2 1/2"
F	10'- 3"	S	5'- 6"
G	0'- 10 1/2"	T	1'- 11"
H	4'- 7 1/2"	U	5'- 6"
I	0'- 3"	V	5'- 5"
J	0'- 1 1/2"	W	
K	1'- 0"	X	
L	0'- 0 3/4"	Y	
M	4'- 4"	Z	

norweco

MANUFACTURER'S DETAILS
SINGULAIR TNT 600
COURTESY OF NORWECO

NOT TO SCALE

NORTH CAROLINA PROFESSIONAL SEAL 19221 ENGINEER GEORGE D. BARRIER 21JUN18

Notes

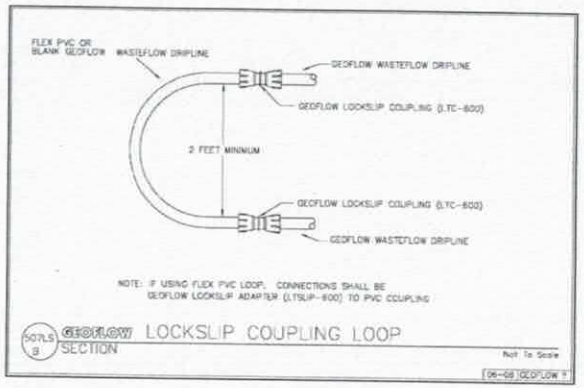
The system as designed, if installed in accordance with the manufacturer's recommendations, will function sartisfactorily in accordance with all requirements of Regulation 61-56.
This drawing and the information contained in it are the property of Barrier Foundation Engineering Services, PC. who should be angaged to supervise construction, inspection and preparation of "as-built"

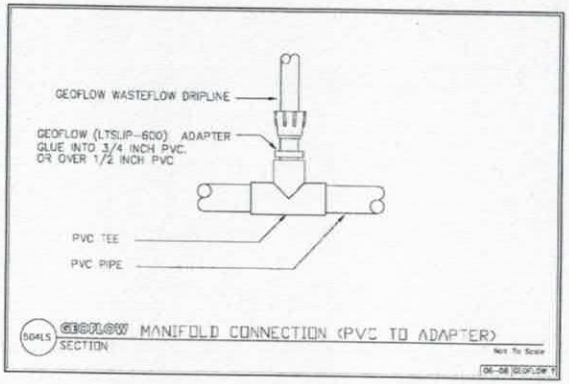
BARRIER FOUNDATION ENGINEERING SERVICES, PC
PO Box 26072
Charlotte, NC 28221

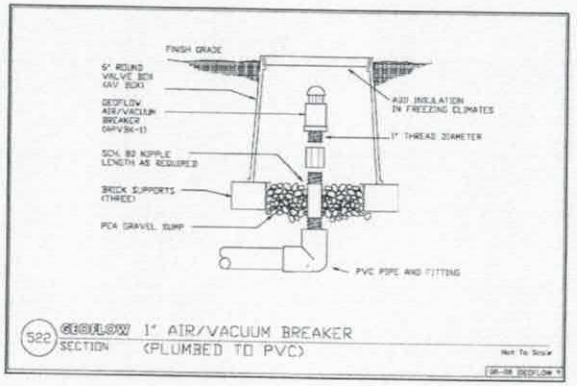
Project Name: Residential On-Site Drip System Proposal
Address: 127 Rice Field, Iredell County, NC

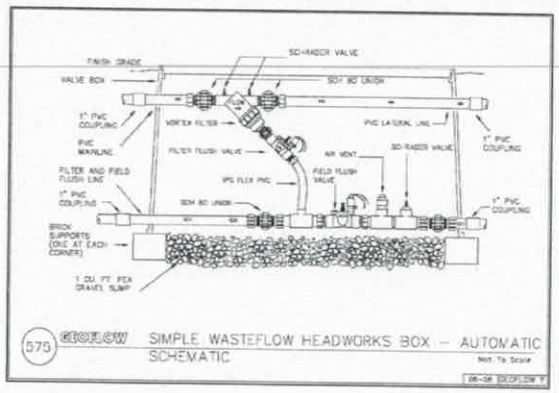
Owner [X] Engineer [ ] Agent [ ] GC [ ]

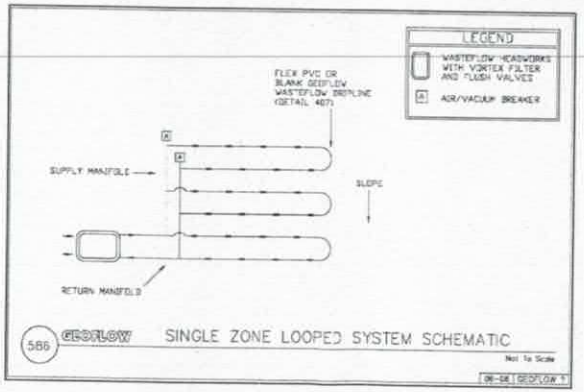
Drawing By: GDB Date: 21JUN18 Rev:
Reviewed By: GDB Date: 21JUN18











MANUFACTURER'S DETAILS
NORWECO DRIP (GEOFLOW) COMPONENTS



Notes

The system as designed, if installed in accordance with the manufacturer's recommendations, will function sartisfactorily.

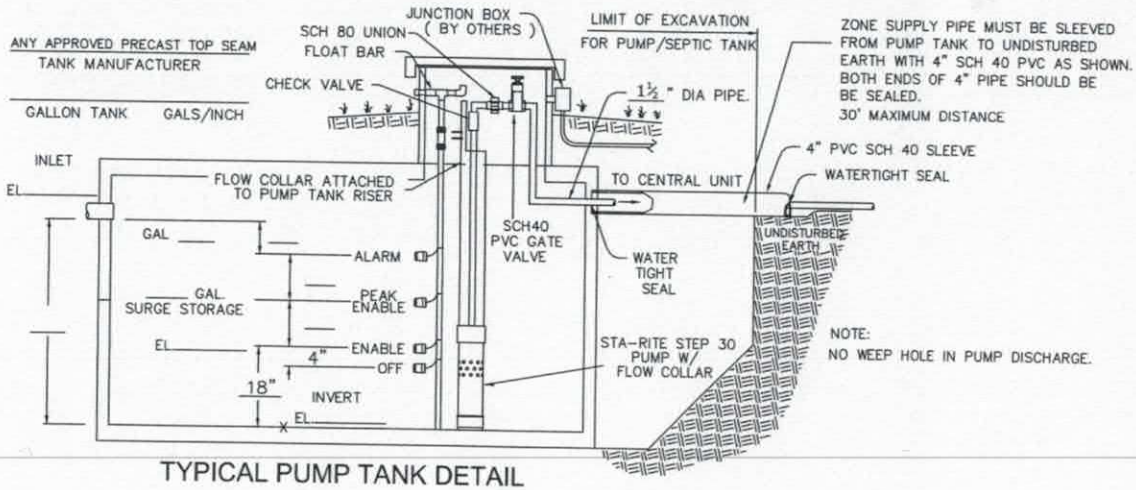
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BARRIER FOUNDATION ENGINEERING SERVICES, PC
PO Box 26072
Charlotte, NC 28221

Project Name: Residential On-Site Drip System Proposal
Address: 127 Rice Field Drive, Iredell County, NC

Owner [X] Engineer [ ] Agent [ ] GC [ ]

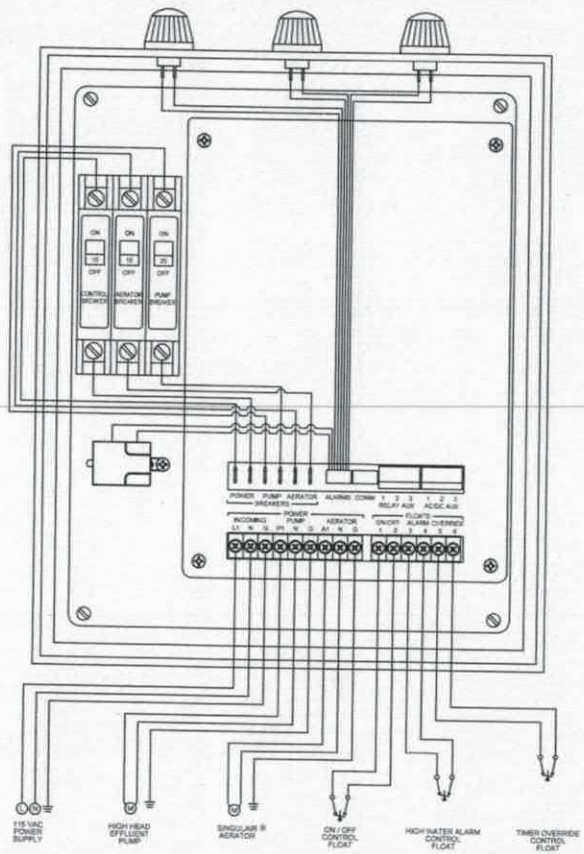
Drawing By: GDB Reviewed By: GDB
Date: 21JUN18 Date: 21JUN18
Rev: -



TYPICAL PUMP TANK DETAIL
NTS

120 VOLT - 1Ø - 60 Hz - 20 AMP SERVICE

NOTE: AERATOR, PUMP AND INTEGRATED SYSTEM CONTROL PANEL MUST BE PROPERLY GROUNDED.



MANUFACTURER'S DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19221 ENGINEER GEORGE D. BARRIER 21JUN18

TYPICAL DRIP PANEL DETAIL



GENERAL NOTES:
A DEDICATED 20 AMP CIRCUIT BREAKER AT MAIN SERVICE PANEL SHOULD NOT BE ENERGIZED UNTIL THE AERATOR IS INSTALLED AND READY TO BE PLACED INTO OPERATION.
① INSURE THE AERATOR IS OPERATING WHEN THE FACILITY IS OCCUPIED.
② THE LOCAL, LICENSED NORWECO DISTRIBUTOR WILL PLACE THE AERATOR INTO SERVICE.

COURTESY OF NORWECO

Notes

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