

NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**

ROY COOPER • Governor

KODY H. KINSLEY • Secretary

MARK BENTON • Chief Deputy Secretary for Health

SUSAN KANSAGRA • Assistant Secretary for Public Health

Division of Public Health

Submittal Includes: ☐ (a2) Improvement Permit ☐ (a2) Construction Authorization ☐ Fee \$ _____

IMPROVEMENT PERMIT FOR G.S. 130A-335(a2)

County: _____

PIN/Lot Identifier: _____

Issued To: _____

Property Location: _____

Subdivision (if applicable) _____ Lot #: _____ Block: _____ Section: _____

LSS Report Provided: Yes ☐ No ☐

If yes, name and license number of LSS: _____

New ☐

Expansion ☐

System Relocation ☐

Change of Use ☐

Facility Type: _____

Number of bedrooms: _____ Number of Occupants: _____ Other: _____

Design Wastewater Strength: ☐ Domestic ☐ High Strength ☐ Industrial Process Wastewater

Proposed Design Daily Flow: _____ GPD Proposed LTAR (Initial): _____ Proposed LTAR (Repair): _____

Proposed Wastewater System Type*: _____ (Initial) Pump Required: ☐ Yes ☐ No ☐ May be required

Proposed Wastewater System Type*: _____ (Repair) Pump Required: ☐ Yes ☐ No ☐ May be required

**Please include system classification for proposed wastewater system types in accordance with Rule .1301 Table XXXII*

Effluent Standard: ☐ DSE ☐ HSE ☐ NSF/ANSI 40 ☐ TS-I ☐ TS-II ☐ RCW

Saprolite System (Initial): ☐ Yes ☐ No Saprolite System (Repair): ☐ Yes ☐ No

Fill System (Initial): ☐ Yes ☐ No If yes, specify: ☐ New ☐ Existing (when adding more than 6 inches of fill to system area provide a fill plan)

Fill System (Repair): ☐ Yes ☐ No If yes, specify: ☐ New ☐ Existing (when adding more than 6 inches of fill to system area provide a fill plan)

Usable Depth to LC (Initial)*: _____ Usable Depth to LC (Repair)*: _____ *** Limiting Condition**

Max. Trench Depth (Initial)*: _____ Max. Trench Depth (Repair)*: _____ *** Measured on the downhill side of the trench**

Artificial Drainage Required: ☐ Yes ☐ No If yes, please specify details: _____

Type of Water Supply: ☐ Private well ☐ Public well ☐ Shared well ☐ Municipal Supply ☐ Spring ☐ Other: _____

Drainfield location meets requirements of Rule .0508: Yes ☐ No ☐ Drainfield location meets requirements of Rule .0601: Yes ☐ No ☐

Permit valid for: ☐ Five years [site plan submitted pursuant to GS 130A-334(13a)] ☐ No expiration [plat submitted pursuant to GS 130A-334(7a)]

Permit conditions:

Licensed Soil Scientist Print Name: _____

Licensed Soil Scientist Signature: Heath Clapp Date: _____

The LSS evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2).

See attached site sketch

This Section for Local Health Department Use Only

Initial submittal received: _____ by _____
Date Initials

G.S. 130A-335(a3) states the following:

When an applicant for an Improvement Permit submits to a local health department an Improvement Permit application, the permit fee charged by the local health department, the common form developed by the Department, and a soil evaluation pursuant to subsection (a2) of this section, the local health department shall, within five business days of receiving the application, conduct a completeness review of the submittal. A determination of completeness means that the Improvement Permit includes all of the required components. If the local health department determines that the Improvement Permit is incomplete, the local health department shall notify the applicant of the components needed to complete the Improvement Permit. The applicant may submit additional information to the local health department to cure the deficiencies in the Improvement Permit. The local health department shall make a final determination as to whether the Improvement Permit is complete within five business days after the local health department receives the additional information from the applicant. If the local health department fails to act within any period set out in this subsection, the applicant may treat the failure to act as a determination of completeness. The Department shall develop a common form for use as the Improvement Permit.

The review for completeness of this Improvement Permit was conducted in accordance with G.S. 130A-335(a3). This Improvement Permit is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

Copies of this were sent to the LSS and the Applicant on _____
Date

State Authorized Agent: _____ Date: _____

☐ Complete

State Authorized Agent: _____ Date: _____

This Improvement Permit is issued pursuant to G.S. 130A-335 (a2) and (a3) using the signed and sealed LSS/LG evaluation(s) attached here. The issuance of this permit in no way guarantees the issuance of other permits. The permit holder is responsible for checking with appropriate governing bodies in meeting their requirements. *This permit is subject to revocation if the site plan, plat, or the intended use changes.*** The Improvement Permit shall not be affected by a change in ownership of the site. This permit is subject to compliance with the provisions of 15A NCAC 18E and to the conditions of this permit.**

The Department, the Department's authorized agents, and the local health departments shall be discharged and released from any liabilities, duties, and responsibilities imposed by statute or in common law from any claim arising out of or attributed to evaluations, submittals, or actions from a licensed soil scientist or licensed geologist pursuant to GS 130A-335(a2).

Improvement Permit Expiration Date: _____

See attached site sketch

Re-submittal of Improvement Permit

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

The following items are being resubmitted pursuant to G.S. 130A-335(a3) for issuance of the Improvement Permit:

I, _____ hereby attest that the information required to be included with this re-submittal
Licensed Soil Scientist (Print Name)
is accurate and complete to the best of my knowledge and that the proposed Improvement Permit meets all applicable federal,
State, and local laws, regulations, rules, and ordinances.

Signature of Licensed Soil Scientist

Date

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

LHD Follow-up Completeness Review of Improvement Permit

The review for completeness of this Improvement Permit re-submittal was conducted in accordance with G.S. 130A-335(a3). This Improvement Permit is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

Copies of this were sent to the LSS and the Applicant on _____
Date

State Authorized Agent: _____

Date: _____

☐ Complete

State Authorized Agent: _____

Date: _____

CONSTRUCTION AUTHORIZATION FOR G.S. 130A-335(a2)

County: _____

Pre-Construction Conference Required: Yes ☐ No ☐

PIN/Lot Identifier: _____

Issued To: _____

Property Location: _____

AOWE/PE Plans/Evaluations Provided: Yes ☐ No ☐ If yes, name and license number of AOWE/PE: _____

Facility Type: _____

Number of bedrooms: _____ Number of Occupants: _____ Other: _____

☐ New ☐ Expansion ☐ Repair ☐ System Relocation ☐ Change of Use

Basement? ☐ Yes ☐ No Basement Fixtures? ☐ Yes ☐ No

Crawl Space? ☐ Yes ☐ No Slab Foundation? ☐ Yes ☐ No

Type of Wastewater System* _____ (Initial) _____ (Repair)

**Please include system classification for proposed wastewater system types in accordance with Rule .1301 Table XXXII*

Design Daily Flow: _____ GPD Wastewater Strength: ☐ Domestic ☐ High Strength ☐ Industrial Process WW

Session Law 2014-120 Section 53, Engineering Design Utilizing Low-flow Fixtures and Low-flow Technologies? ☐ Yes ☐ No
(if yes, please provide engineering documentation)

Effluent Standard: ☐ DSE ☐ HSE ☐ NSF/ANSI 40 ☐ TS-I ☐ TS-II ☐ RCW

Type of Water Supply: ☐ Private well ☐ Public well ☐ Shared well ☐ Municipal Supply ☐ Spring ☐ Other: _____

Installation Requirements/Conditions

Septic Tank Size: _____ gallons Total Trench/Bed Length: _____ feet Trench/Bed Spacing: _____ feet on center

Trench/Bed Width: _____ inches LTAR: _____ gpd/ft² Usable Depth to LC (Initial)*: _____ **^xLimiting condition**

Soil Cover: _____ inches Slope Corrected Maximum Trench/Bed Depth*: _____ inches **^{*}Measured on the downhill side of the trench**

Pump Tank Size (if applicable): _____ gallons Requires more than 1 pump? ☐ Yes ☐ No

Pump Requirements: _____ ft. TDH vs. _____ GPM Grease Trap Size (if applicable): _____ gallons

Distribution Method: ☐ Serial ☐ D-Box or Parallel ☐ Pressure Manifold(s) ☐ LPP ☐ Other: _____

Artificial Drainage Required: Yes ☐ No ☐ If yes, please specify details: _____

Legal Agreements (If the answer is "Yes" to any type of legal agreements, please attach a copy of the agreement.)

Multi-party Agreement Required [.0204(g)]: ☐ Yes ☐ No Declaration of Restrictive Covenants: ☐ Yes ☐ No

Easement, Right-of-Way, or Encroachment Agreement Required [.0301(b)]: ☐ Yes ☐ No

Management Entity Required: ☐ Yes ☐ No Minimum O&M Requirements: _____

Permit conditions:

The requirements of 15A NCAC 18E are incorporated by reference into this permit and shall be met. Systems shall be installed in accordance with the attached site sketch. ***This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes.*** The Construction Authorization shall not be affected by a change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of 15A NCAC 18E, or 15A NCAC 18A .1900, as applicable, and to the conditions of this permit.

AOWE/PE Print Name: _____

AOWE/PE Signature: Heath Clapp Date: _____

This AOWE/PE submittal is pursuant to and meets the requirements of G.S. 130A-335(a2) and (a5).

See attached site sketch

This Section for Local Health Department Use Only

Initial submittal received: _____ by _____
Date Initials

G.S. 130A-335(a5) states the following:

When an applicant for a Construction Authorization, or an Improvement Permit and Construction Authorization together, submits a Construction Authorization, or an Improvement Permit and Construction Authorization application together, the permit fee charged by the local health department, the common form developed by the Department, and any necessary signed and sealed plans or evaluations conducted by a person licensed pursuant to Chapter 89C of the General Statutes as a licensed engineer or a person certified pursuant to Article 5 of Chapter 90A of the General Statutes as an Authorized On-Site Wastewater Evaluator, the local health department shall, within five business days of receiving the application, conduct a completeness review of the submittal. A determination of completeness means that the Construction Authorization or Improvement Permit and Construction Authorization includes all of the required components. If the local health department determines that the Construction Authorization or Improvement Permit and Construction Authorization is incomplete, the local health department shall notify the applicant of the components needed to complete the Construction Authorization or Improvement Permit and Construction Authorization. The applicant may submit additional information to the local health department to cure the deficiencies in the Construction Authorization or Improvement Permit and Construction Authorization. The local health department shall make a final determination as to whether the Construction Authorization or Improvement Permit and Construction Authorization is complete within five business days after the local health department receives the additional information from the applicant. If the local health department fails to act within any period set out in this subsection, the applicant may treat the failure to act as a determination of completeness. The applicant may apply for the building permit for the project upon the decision of completeness of the Construction Authorization or Improvement Permit and Construction Authorization by the local health department or if the local health department fails to act within five business days. The Authorized On-Site Wastewater Evaluator or licensed engineer submitting the evaluation pursuant to this subsection may request that the local health department revoke or suspend the Construction Authorization or Improvement Permit and Construction Authorization for cause. Upon written request of the Authorized On-Site Wastewater Evaluator or licensed engineer, the local health department shall suspend or revoke the Construction Authorization or Improvement Permit and Construction Authorization pursuant to G.S. 130A-23. The Department shall develop a common form for use as the Construction Authorization.

The review for completeness of this Construction Authorization was conducted in accordance with G.S. 130A-335(a5). This

Construction Authorization is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing: _____

Copies of this were sent to the AOWE/PE and the Applicant on _____
Date

State Authorized Agent: _____ Date: _____

☐ Complete

State Authorized Agent: _____ Date of Issuance: _____

This Construction Authorization is issued pursuant to G.S. 130A-335(a2) and (a5) using the signed and sealed plans or evaluations attached here. This Construction Authorization is subject to revocation if the site plan, plat, or the intended use changes. The Construction Authorization shall not be affected by a change in ownership of the site. This Construction Authorization is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal and to the conditions of this permit.

The Department, the Department's authorized agents, and the local health departments shall be discharged and released from any liabilities, duties, and responsibilities imposed by statute or in common law from any claim arising out of or attributed to plans, evaluations, preconstruction conference findings, submittals, or actions from a person licensed pursuant to Chapter 89C of the General Statutes as a licensed engineer or a person certified pursuant to Article 5 of Chapter 90A of the General Statutes as an Authorized On-Site Wastewater Evaluator in GS 130A-335(a2), (a5), and (a7). The Department, the Department's authorized agents, and the local health departments shall be responsible and bear liability for their actions and evaluations and other obligations under State law or rule, including the issuance of the operations permit pursuant to GS 130A-337.

Construction Authorization Expiration Date: _____

See attached site sketch

Re-submittal of Construction Authorization

LHD USE ONLY: This CA resubmittal received: _____ by _____
Date Initials

The following items are being resubmitted pursuant to G.S. 130A-335(a5) for issuance of the Construction Authorization:

I, _____ hereby attest that the information required to be included with this re-submittal
Authorized Onsite Wastewater Evaluator (Print Name)
is accurate and complete to the best of my knowledge and that the proposed Construction Authorization meets all applicable federal, State, and local laws, regulations, rules, and ordinances.

Signature of Authorized On-Site Wastewater Evaluator

Date

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

LHD Follow-up Completeness Review of Construction Authorization

The review for completeness of this Construction Authorization re-submittal was conducted in accordance with G.S. 130A-335(a5). This Construction Authorization is determined to be:

☐ Incomplete (If box is checked, information in this section is required.)

The following items are missing:

Copies of this were sent to the AOWE/PE and the Applicant on _____
Date

State Authorized Agent: _____

Date: _____

☐ Complete

State Authorized Agent: _____

Date: _____





Agri-Waste Technology, Inc.
1225 Crescent Green, Suite 250, Cary NC 27518
agriwaste.com | 919.859.0669



**Soil Suitability for Domestic Sewage Treatment and Disposal Systems
Birchwood Trails – Lot 71
53 Thunderbird Lane, Fuquay Varina, NC 27526
(Harnett County)
October 6, 2025**

Soil suitability for domestic sewage treatment and disposal systems was evaluated on October 1, 2025, for the property located at 53 Thunderbird Lane in Fuquay Varina, NC (Harnett County). Heath Clapp of Agri-Waste Technology, Inc. (AWT) conducted the soil evaluation. This evaluation was done to facilitate permitting for a septic system for a 4-bedroom home. This report and attached documents were prepared *to this application is to be used to issue an Improvement Permit in accordance with G.S. 130A-335(a2) and (a3). The LSS evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2).*

A drawing of the site plan, septic layout, septic system design, and soil pit locations is included in Attachment 1. Profile descriptions for each soil boring are included in Attachment 2.

The total property area is approximately 0.56 acres. The house and septic area are an open field. The proposed septic system for the property is a conventional pump, accepted status system for initial and for repair.

Soil Suitability for Domestic Sewage Treatment and Disposal Systems

The drawing in Attachment 1 details the property boundaries, soil pit/boring locations, and layout of drain field trenches. Multiple soil pits and borings were advanced within the proposed septic system area on the property. Soil pits/borings were examined to determine soil suitability for on-site sewage disposal systems in accordance with 15A 18A .1900 Rules for Sewage Treatment and Disposal Systems. All soil pits/borings are suitable for a conventional style trench. Soil pits/borings are within the proposed drainfield area.

The layout shown in Attachment 1 indicates there is available space for a four-bedroom accepted system. The initial system can be installed with the use of an accepted status drainfield based on the layout in the field.

The proposed LTAR (Long Term Acceptance Rate) by AWT is 0.4GPD/ft². The soils on this property are group III soils within the distribution and treatment zone as used to define the LTAR. With an LTAR of 0.4GPD/ft², 600 linear feet of trench is necessary to support a 4-bedroom home for the initial and repair system with the use of an accepted trench product. The maximum slope corrected trench depth is 23 inches. The attached drawings substantiate that the necessary linear footage of trench can be installed on the property for the initial and repair system.

Any logging, disturbances, or grading done in the usable area or within the proposed setbacks will change the potential of using the area designated for a drainfield. Prior to moving forward with the development on the property, the Harnett County Health Department should be contacted to complete the necessary Construction Oversight and to issue an OP (Operations Permit) for the property once the septic system has been installed.

Conclusions

An IP (Improvement Permit) and CA (Construction Authorization) for this property can be issued with the site plan that is in Attachment 1. A CA permit will be required to secure a building permit for the property. The county issues an Operation Permit after the system has been installed to meet the specifications of the Authorization to Construct. Additional septic layouts have been or will be performed as needed. It will be critical to not disturb any of the proposed septic area or there is a risk that the IP and CA will be revoked. The LSS/AOWE Evaluation and attached documents were prepared *to this application is to be used to issue an Improvement Permit in accordance with G.S. 130A-335(a2) and (a3). The LSS/AOWE evaluation is being submitted pursuant to and meets the requirements of G.S. 130A-335(a2) and (a5).*

We appreciate the opportunity to assist you in this matter. Please contact us with any questions, concerns, or comments.

Sincerely,

Heath Clapp, NC LSS



Agri-Waste Technology, Inc.
1225 Crescent Green, Suite 250, Cary NC 27518
agriwaste.com | 919.859.0669

SOIL & SITE EVALUATION for ON-SITE WASTEWATER SYSTEMS

Evaluation Date	10/1/2025	Site Location	53 Thunderbird Lane, Fuquay Varina, NC 27526	County	Harnett
PIN/Parcel	0642-84-4681	Property Size	0.56 acres	Property Recorded	Yes
Proposed Facility	SFR	Bedrooms	4	Wastewater Strength	Domestic
Water Supply	Municipal	Design Flow (.0400)	480	Evaluation Method	Auger

Profile #	.0502 Landscape Position Slope %	Horizon Depth (in)	Soil Morphology		Other Factors					
			.0503 Structure Texture	.0503 Consistence Mineralogy	.0504 Soil Wetness Color	.0505 Soil Depth (in)	.0506 Saprolite	.0507 Restrictive Horizon	.0509 Profile Class LTAR	.0502(d) Slope Correction
1	2%	Ap 0-10"	LS	NS, NP, VFr	10YR 3/3	36	S	S	0.4	0.8
		E 10-20"	LS	NS; NP; VFr	10YR 7/6					
		Bt1 20-36"	SCL	S; SP; Fi-Fr	2.5YR 5/8					
		Bt2 36"+	SCL	S; SP; Fi	2.5YR 5/8 10YR 6/2	System Type		Conventional		
2	2%	Ap 0-10"	LS	NS, NP, VFr	10YR 3/3	38	S	S	0.4	0.8
		E 10-20"	LS	NS; NP; VFr	10YR 7/6					
		Bt1 20-38"+	SCL	S; SP; Fi-Fr	2.5YR 5/8					
						System Type		Conventional		
3	2%	Ap 0-10"	LS	NS, NP, VFr	10YR 3/3	38	S	S	0.4	0.8
		E 10-20"	LS	NS; NP; VFr	10YR 7/6					
		Bt1 20-38"+	SCL	S; SP; Fi-Fr	2.5YR 5/8					
						System Type		Conventional		
4	2%	Ap 0-10"	LS	NS, NP, VFr	10YR 3/3	38	S	S	0.4	0.8
		E 10-18"	LS	NS; NP; VFr	10YR 7/6					
		Bt1 18-38"+	SCL	S; SP; Fi-Fr	2.5YR 5/8					
						System Type		Conventional		
5	2%	Ap 0-10"	LS	NS, NP, VFr	10YR 3/3	36	S	S	0.4	0.8
		E 10-18"	LS	NS; NP; VFr	10YR 7/6					
		Bt1 18-36"	SCL	S; SP; Fi-Fr	2.5YR 5/8					
		Bt2 36"+	SCL	S; SP; Fi	2.5YR 5/8 10YR 6/2	System Type		Conventional		

Evaluated By:
Heath Clapp, LSS

Site Classification	Suitable	Site Classification	Suitable
Primary LTAR	0.4	Repair LTAR	0.4
Primary Trench Depth	23"	Repair Trench Depth	23"



Agri-Waste Technology, Inc.
1225 Crescent Green, Suite 250, Cary NC 27518
agriwaste.com | 919.859.0669

SOIL & SITE EVALUATION for ON-SITE WASTEWATER SYSTEMS

LEGEND

Soil Group	Soil Texture	Conventional LTAR	Anaerobic Dip LTAR	Aerobic Drip LTAR (TS-II)	Mineralogy &		Structure
					Moist	Wet	
I	S (Sand)	0.8-1.2	0.4-0.6	0.8-1.5	Lo	NS	SG (Single grain)
	LS (Loamy Sand)				(Loose)	(Non Sticky)	M (Massive)
II	SL (Sandy Loam)	0.6-0.8	0.3-0.4	0.6-0.8	VFR (Very Friable)	SS (Slightly Sticky)	GR (Granular)
	L (Loam)				FR (Friable)	S (Sticky)	SBK (Subangular Blocky)
	SiL (Silt Loam)				FI (Firm)	VS (Very Sticky)	ABK (Angular Blocky)
	SCL (Sandy Clay Loam)				VFI (Very Firm)	NP (Non Plastic)	PR (Prismatic)
III	CL (Clay Loam)	0.3-0.6	0.15-0.3	0.2-0.6	EFI (Extremely Firm)	SP (Slightly Plastic)	
IV	SiCL (Silty Clay Loam)	0.1-0.4	0.05-1.5	0.05-0.2		P (Plastic)	PL (Platy)
	SC (Sandy Clay)					VP (Very Plastic)	
	SiC (Silty Clay)				SEXP (Slighty Expansive)		
	C (Clay)				EXP (Expansive)		



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

1/20/2025

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 Hartsfield & Nash Agency, Inc. 10405 Ligon Mill Rd., Ste H Wake Forest NC 27587	CONTACT NAME: Connie Garkalns PHONE (A/C, No, Ext): 984-235-4273 E-MAIL ADDRESS: connie@hartsfield-nash.com FAX (A/C, No): 919-556-8758
License#: 100009111 AGRITEC-01	INSURER(S) AFFORDING COVERAGE INSURER A : Selective Insurance Company of INSURER B : Accident Fund INSURER C : Evanston Insurance Company INSURER D : INSURER E : INSURER F :
INSURED Agri-Waste Technology Inc 501 N. Salem St Ste 203 Apex NC 27502	NAIC # 39926 10166 35378

COVERAGES

CERTIFICATE NUMBER: 1304989694

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	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☒ PRO-JECT ☐ LOC OTHER:			S 2253659	1/18/2025	1/18/2026	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$300,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$2,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COMP/OP AGG \$4,000,000 \$
A	☒ AUTOMOBILE LIABILITY ☒ ANY AUTO ☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS ☒ HIRED AUTOS ONLY ☒ NON-OWNED AUTOS ONLY			S 2253659	1/18/2025	1/18/2026	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
A	☒ UMBRELLA LIAB ☒ OCCUR ☐ EXCESS LIAB ☐ CLAIMS-MADE DED RETENTION \$			S 2253659	1/18/2025	1/18/2026	EACH OCCURRENCE \$2,000,000 AGGREGATE \$2,000,000 \$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y / N N	N / A	100003072	1/18/2025	1/18/2026	☒ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
C	Prof & Pollution Liability A Leased & Rented			MKLV3ENV104794 S 2253659	8/22/2024 1/18/2025	8/22/2025 1/18/2026	Each Claim 5,000,000 Equipment 25,000

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

CERTIFICATE HOLDER**CANCELLATION**

Artisan Custom Homes
21016 Catawba Avenue
Cornelius NC 28031
USA

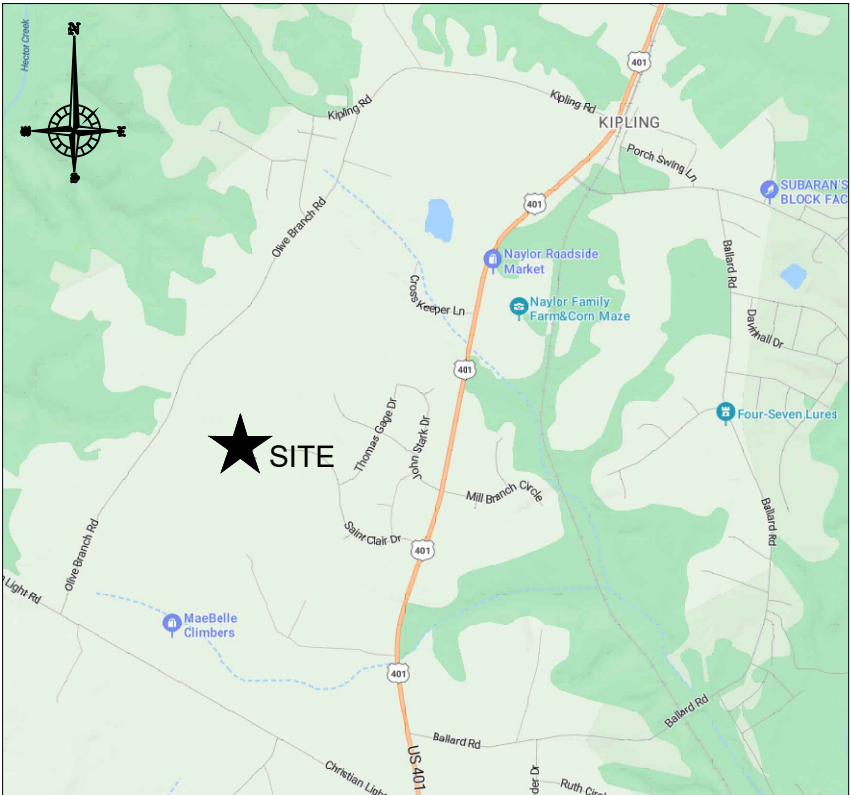
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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BIRCHWOOD TRAILS - LOT 71

Project Location	53 Thunderbird Lane, Fuquay Varina, NC 27526 Harnett County PIN: 0642-84-4681
Project Owner	KB Home 1800 Perimeter Park Drive, STE 140, Morrisville, NC 27560 919-768-7960 enpollock@kbhome.com
Project Consultant	Heath Clapp, LSS, AOWE (919) 629-6404 Jeff Vaughan, LSS, AOWE (919) 367-6313 Agri-Waste Technology, Inc. 1225 Crescent Green, Suite 250 Cary, NC 27518 (919) 859-0669 (919) 233-1970 Fax
System Overview	Single Family Residence Four (4) Bedroom, 480 gpd Conventional Pressure Manifold Accepted/Innovative Trench Product



VICINITY MAP

Sheet Index

Sheet 1	Cover Sheet
Sheet 2	Property Layout
Sheet 3	Primary Drainfield
Sheet 4	Repair Drainfield
Sheet 5	Detail Sheet 1
Sheet 6	Detail Sheet 2

AWT

Engineers and Soil Scientists

Agri-Waste Technology, Inc.
1225 Crescent Green, Suite 250
Cary, North Carolina 27518
919-859-0669
www.agriwaste.com

KB Home
Birchwood Trails - Lot 71

Project Location:
53 Thunderbird Lane,
Fuquay Varina, NC 27526
Harnett County
PIN: 0642-84-4681

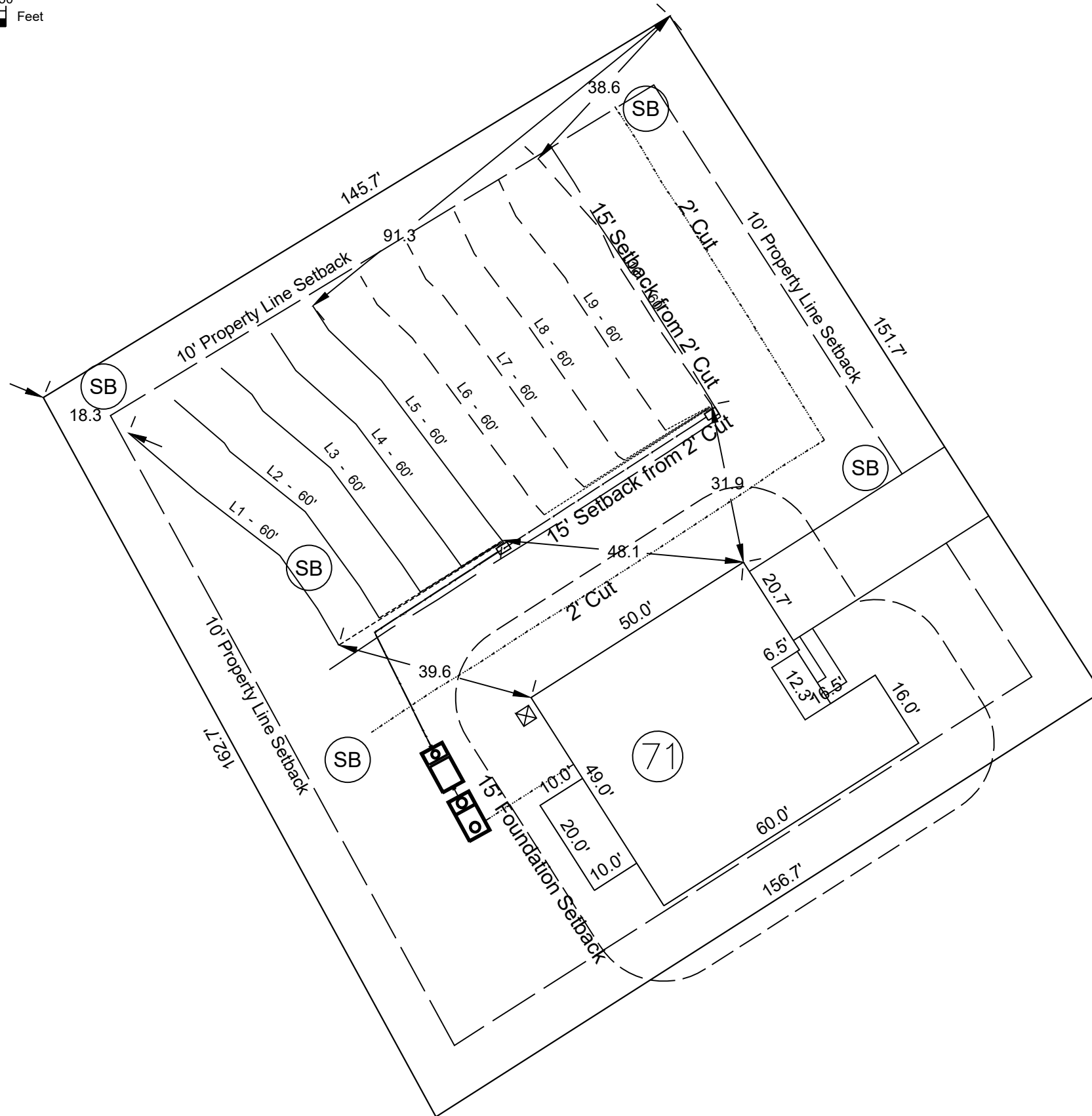
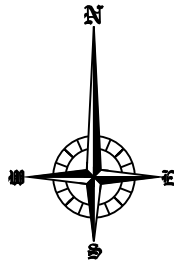
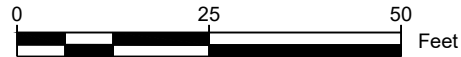
Project Owner:
KB Home
1800 Perimeter Park Drive, STE 140
Morrisville, NC 27560
919-768-7960
enpollock@kbhome.com

NC ONSITE WASTEWATER
EVALUATOR SEAL



REV.	ISSUED DATE	DESCRIPTION
SHEET TITLE Cover Sheet		
DRAWN BY: H. Clapp	CREATED ON: 10/6/2025	
REVISED BY: ####	REVISED ON: ####	
RELEASED BY: ####	RELEASED ON: ####	
DRAWING NUMBER WW-1		





REV.	ISSUED DATE	DESCRIPTION
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SHEET TITLE

Property Layout

DRAWN BY: H. Clapp	CREATED ON: 10/6/2025
REVISED BY: ####	REVISED ON: ####
RELEASED BY: ####	RELEASED ON: ####

DRAWING NUMBER

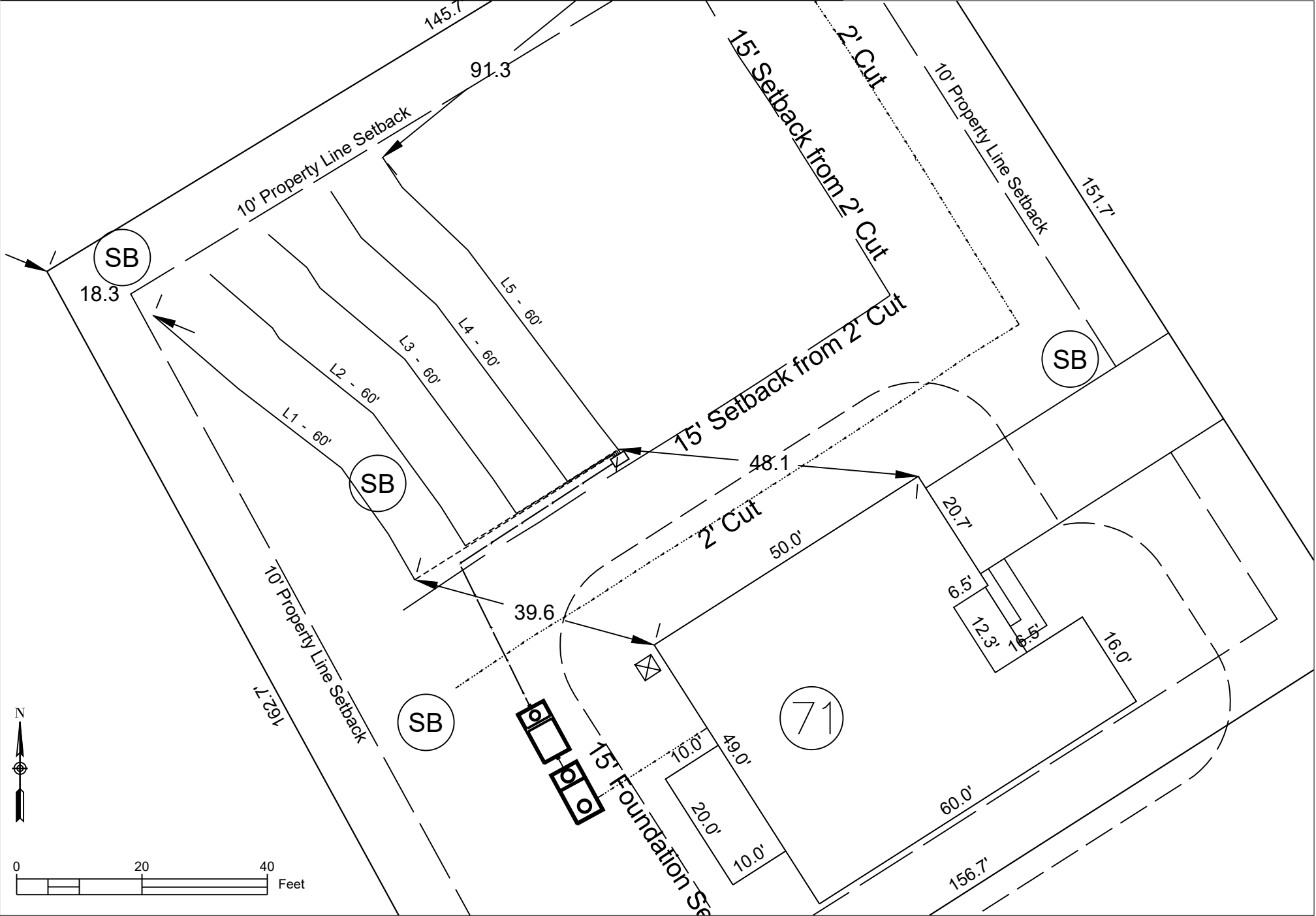
WW-2

General Drainfield Notes:

1. Clear all trees less than 8" in diameter (measured at a height 3' from soil surface) from the drainfield.
2. Vegetation that will re-grow from a cut stump shall be stumped or pulled from the ground. Stumps shall not be pushed over.
3. Drainfield area shall be cleared of all leaves, pine straw, debris, etc. The accumulated material shall be removed from the drainfield.
4. In clayey soils, sides of trenches shall be raked and limed per manufacturer's instructions.
5. Supply lines shall be installed with a minimum of 18" cover.
6. The trenches shall be backfilled appropriately so that no low areas are present.
7. Apply lime over the drainfield area as needed. Seed fine fescue over the drainfield at the rate recommended by the seed manufacturer. Hand rake the seed into the soil surface. Straw the seeded area at the rate of 1.5-2 bales per 1000 sq. ft.

DRAINFIELD INFO. - Primary						
Proposed Type of System/Distribution:			Pump to Pressure Manifold using EZflow			
Line No.	Flag Color	Line Length (ft)	Tap	Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
1	interp	60	1/2in SCH 80	5.48	0.091	0.533
2	interp	60	1/2in SCH 80	5.48	0.091	0.533
3	interp	60	1/2in SCH 80	5.48	0.091	0.533
4	interp	60	1/2in SCH 80	5.48	0.091	0.533
5	interp	60	1/2in SCH 80	5.48	0.091	0.533
Total		300	Total	27.40	Avg.	0.53
Note: Line lengths are calculated in 5' increments to reflect use of EZflow product.						

Note:
Primary distribution is pressure manifold utilizing accepted trench product.



1 Primary Drainfield
SOURCE: Agri-Waste Technology, Inc.

KB Home
Birchwood Trails - Lot 71
Project Location:
53 Thunderbird Lane,
Fuquay Varina, NC 27526
Harnett County
PIN: 0642-84-4681
Project Owner:
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Morrisville, NC 27560
919-768-7960
enpollock@kbhome.com

NC ONSITE WASTEWATER
EVALUATOR SEAL



REV.	ISSUED DATE	DESCRIPTION

SHEET TITLE
Primary Drainfield

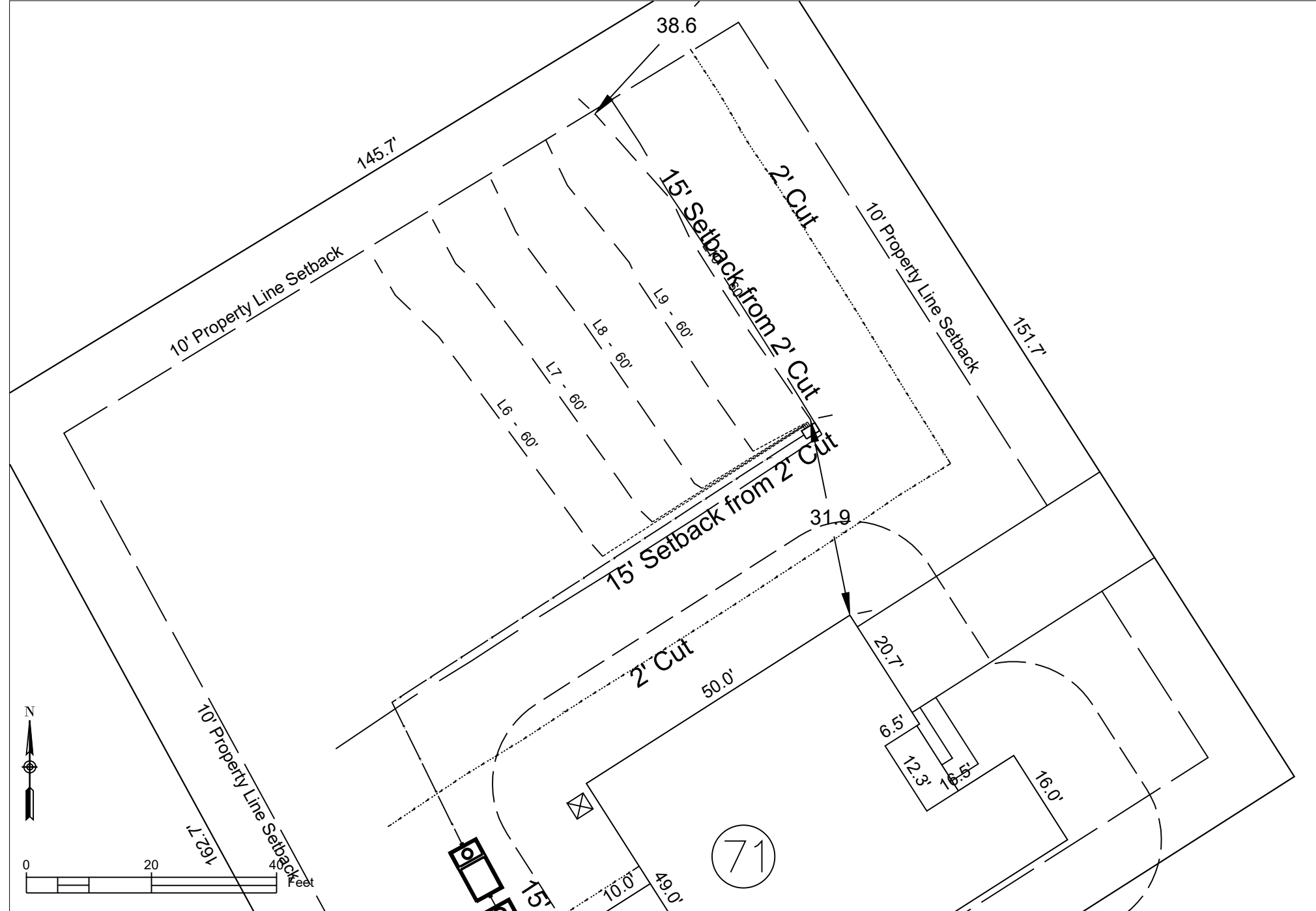
DRAWN BY: H. Clapp	CREATED ON: 10/6/2025
REVISED BY: ####	REVISED ON: ####
RELEASED BY: ####	RELEASED ON: ####

DRAWING NUMBER
WW-3

1. Clear all trees less than 8" in diameter (measured at a height 3' from soil surface) from the drainfield.
2. Vegetation that will re-grow from a cut stump shall be stumped or pulled from the ground. Stumps shall not be pushed over.
3. Drainfield area shall be cleared of all leaves, pine straw, debris, etc. The accumulated material shall be removed from the drainfield.
4. In clayey soils, sides of trenches shall be raked and limed per manufacturer's instructions.
5. Supply lines shall be installed with a minimum of 18" cover.
6. The trenches shall be backfilled appropriately so that no low areas are present.
7. Apply lime over the drainfield area as needed. Seed fine fescue over the drainfield at the rate recommended by the seed manufacturer. Hand rake the seed into the soil surface. Straw the seeded area at the rate of 1.5-2 bales per 1000 sq. ft.

DRAINFIELD INFO. - Repair						
Proposed Type of System/Distribution:		<i>Pump to Pressure Manifold</i>				
		<i>using EZflow</i>				
Line No.	Flag Color	Line Length (ft.)		Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
6	interp	60	1/2in SCH 80	5.48	0.091	0.533
7	interp	60	1/2in SCH 80	5.48	0.091	0.533
8	interp	60	1/2in SCH 80	5.48	0.091	0.533
9	interp	60	1/2in SCH 80	5.48	0.091	0.533
10	interp	60	1/2in SCH 80	5.48	0.091	0.533
	Total	300	Total	27.40	Avg.	0.53

Note:
Repair distribution is pressure manifold
utilizing accepted trench product.



KB Home
Birchwood Trails - Lot 71

Project Location:
53 Thunderbird Lane,
Fuquay Varina, NC 27526
Harnett County
PIN: 0642-84-4681

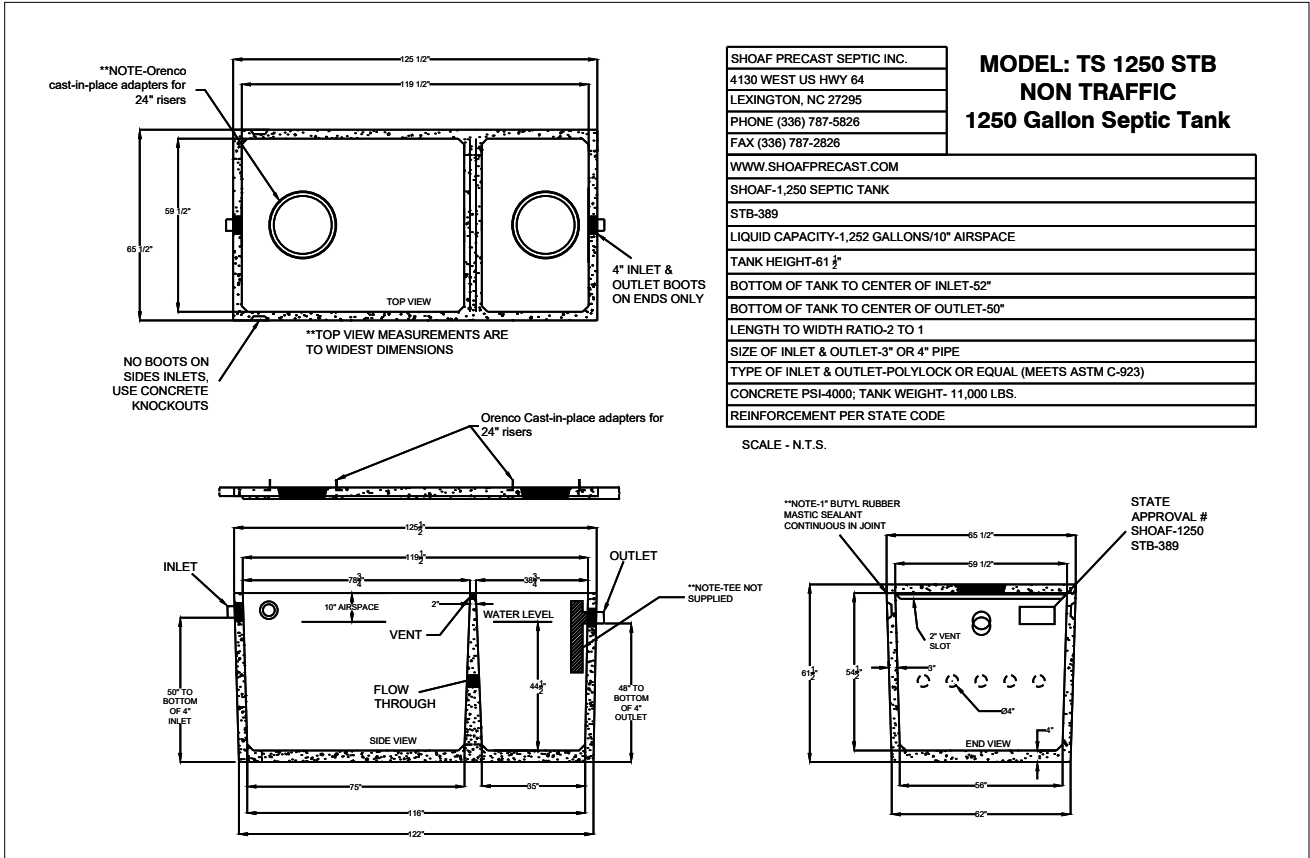
Project Owner:
KB Home
1800 Perimeter Park Drive, STE 140,
Morrisville, NC 27560
919-768-7960
enpollock@kbhome.com

NC ONSITE WASTEWATER
EVALUATOR SEAL



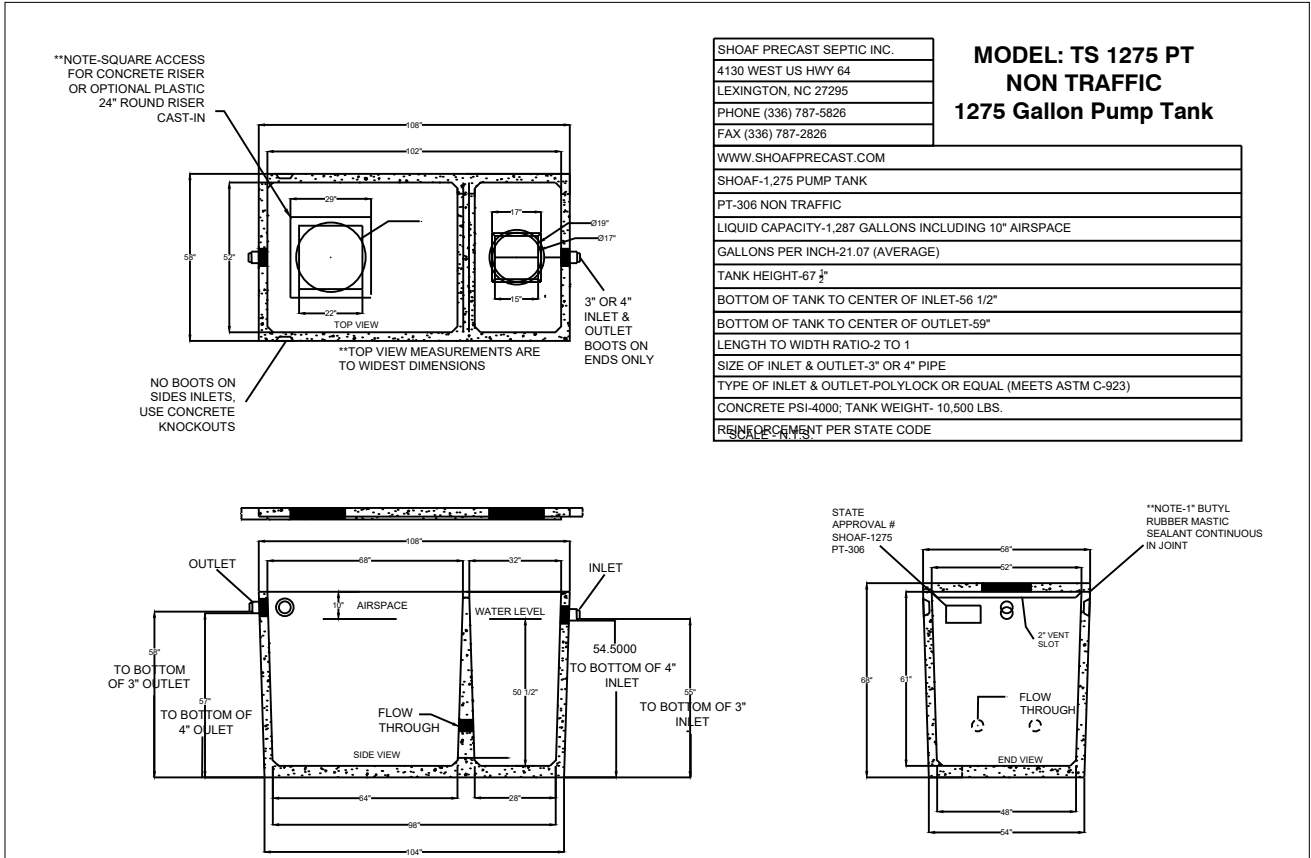
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SHEET TITLE		
Repair Drainfield		
DRAWN BY: H. Clapp		CREATED ON: 10/6/2025
REVISED BY: #####		REVISED ON: #####
RELEASED BY: #####		RELEASED ON: #####

DRAWING NUMBER
WW-4



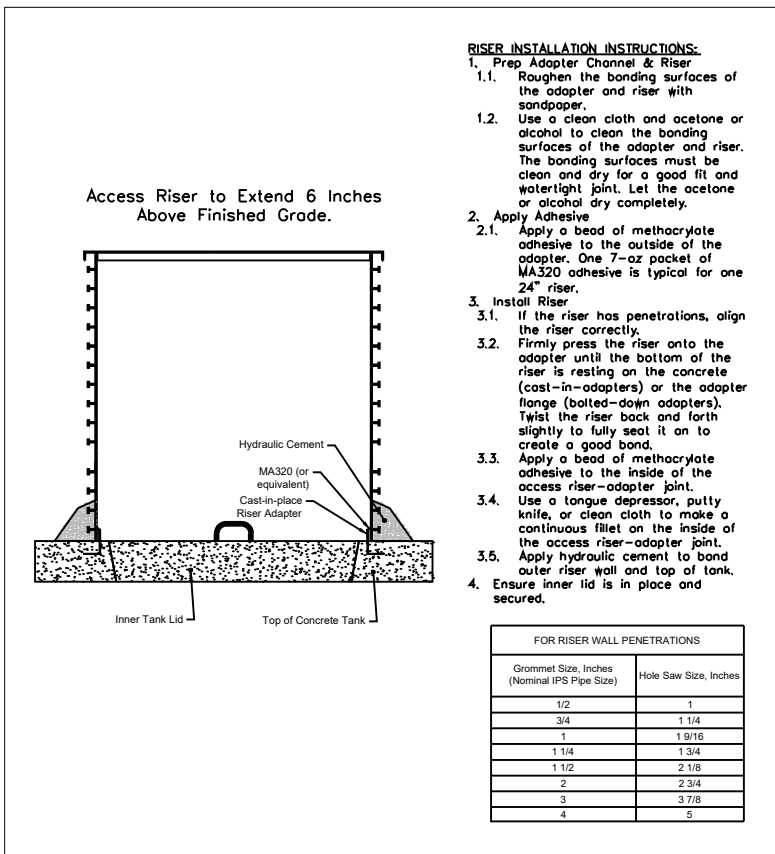
1 Septic Tank

SOURCE: Shoaf Precast Septic, Inc.



2 Pump Tank (or equiv. tank with 1-day storage)

SOURCE: Shoaf Precast Septic, Inc.



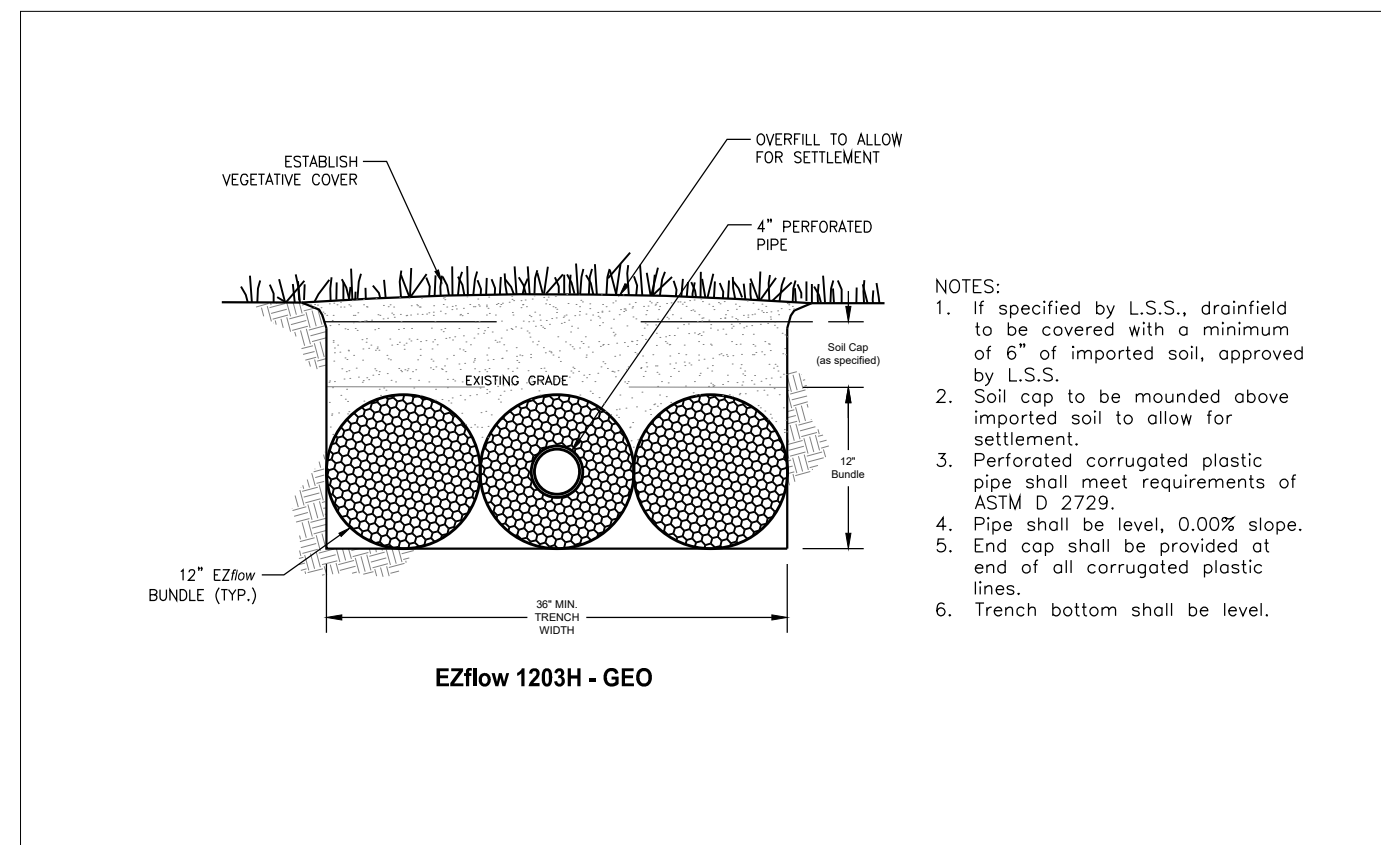
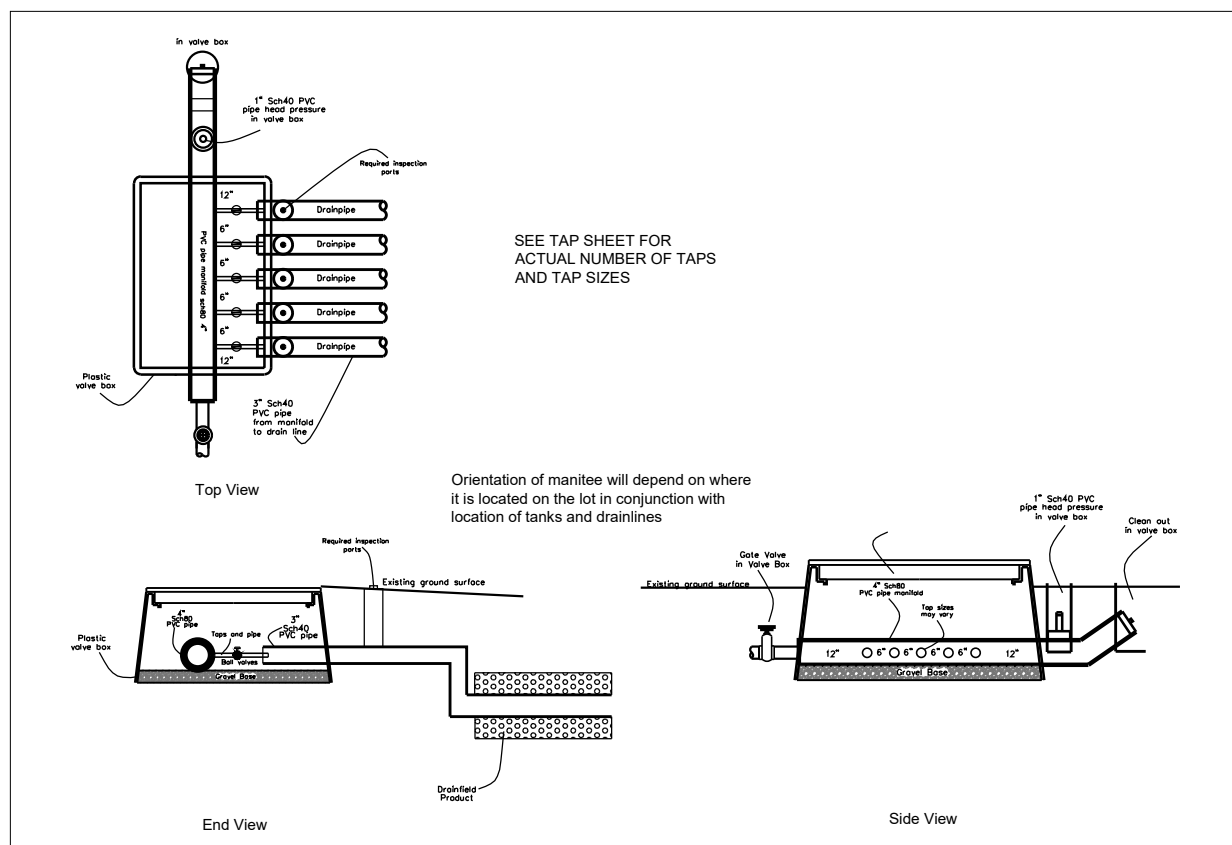
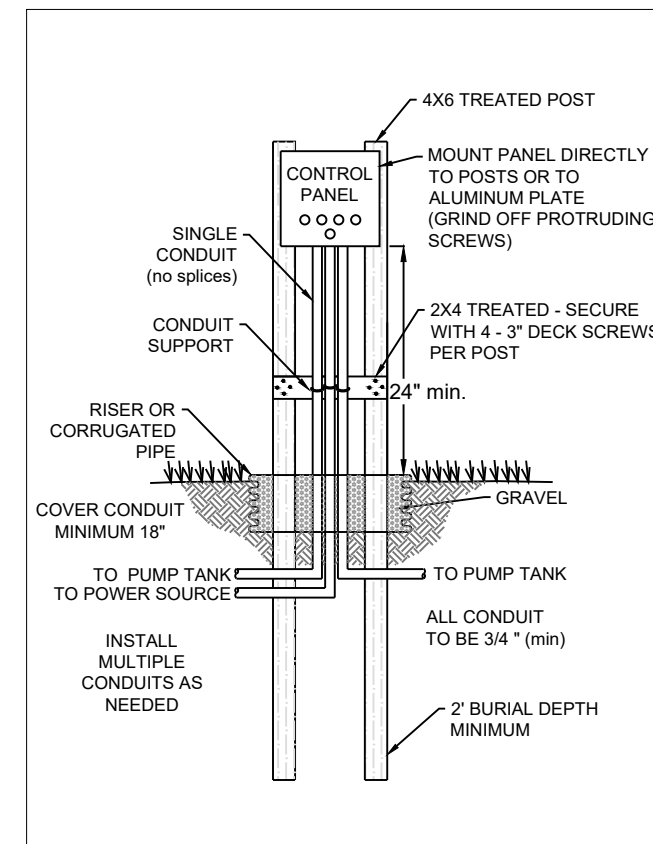
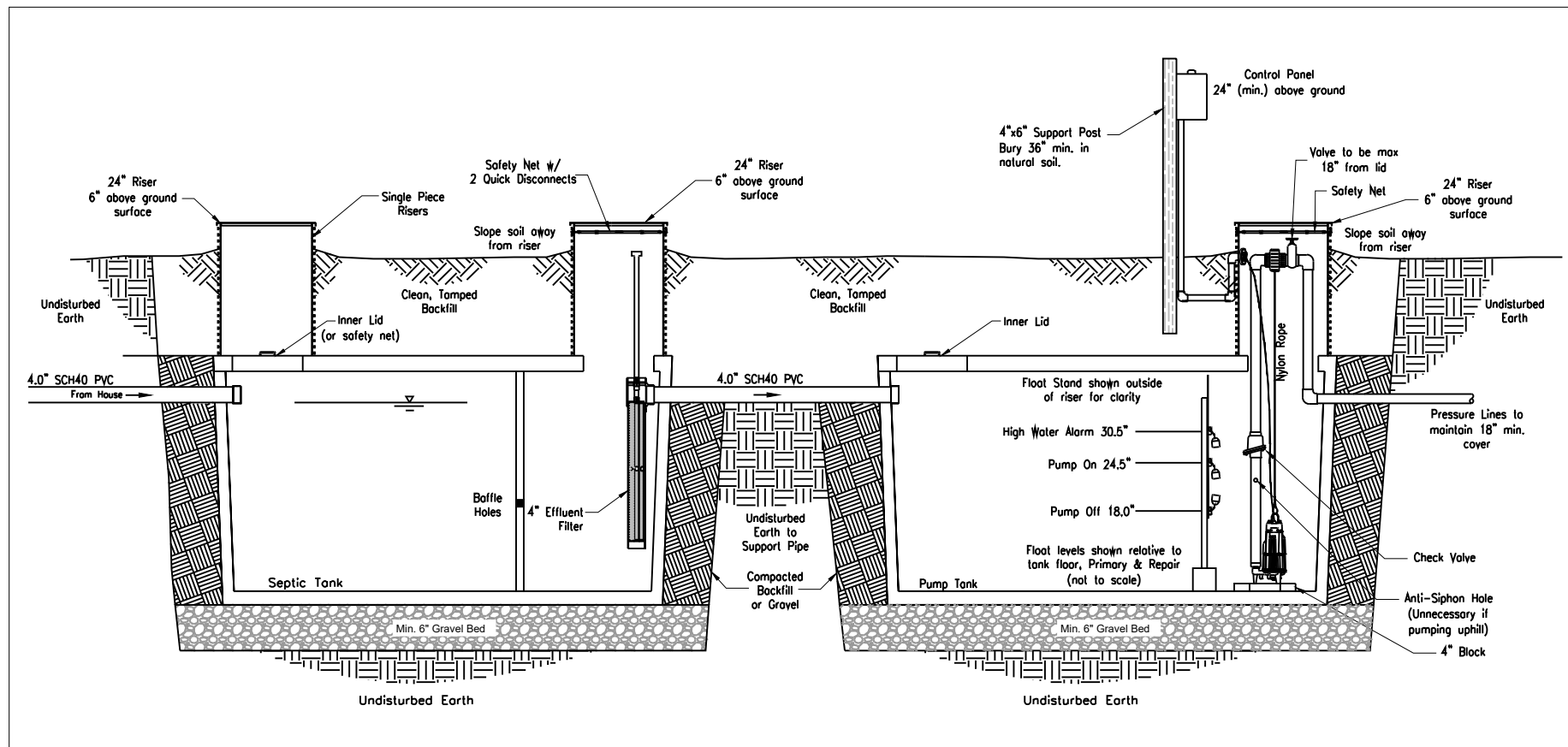
3 Riser Installation

NOTES

- Installation to follow all NC DHHS and Harnett County applicable rules and regulations.
- Harnett County Health Department to perform construction inspections and final system certification.
- Septic Tank to have approved effluent filter.
- Contractor to abide by all safety regulations during system installation.
- Contractor shall backfill around all access areas such that storm water is shed away from potential entry points.
- Invert elevations of all components to be verified in field by contractor to insure proper operation.
- All system piping to be SCH40 PVC (except where noted).
- All gravity elbows to be long radius or long sweeping type elbows.
- Actual installation and placement of treatment system to be overseen by Contractor.
- Tanks to be set on 6" minimum gravel base. Use #5 or #57 stone for base.

- Contractor to seed and/or mulch disturbed areas to coincide with existing landscape. Area shall not be left with uncovered soil.
- Mount Control Panel a minimum of 24" above grade.
- Power to panel to be installed by licensed electrician per code. One 15-amp circuit and one 20-amp circuit with individual neutrals to be run from house to control panel.
- All risers to have cast-in-place tank adapters and be single-piece riser. Risers to extend 6" above soil surface and be designed to prevent surface water inflow.
- Backfill around tank(s) shall be gravel or tank hole shall be over-excavated a minimum of 2' in all directions to allow for mechanical tamping of backfill.
- All penetrations to be sealed.
- All pressure lines to maintain 18" min. cover.
- Contractor to adjust tank placement to meet site constraints.





REV.	ISSUED DATE	DESCRIPTION
SHEET TITLE		
Detail Sheet 2		
DRAWN BY: H. Clapp		CREATED ON: 10/6/2025
REVISED BY: #####		REVISED ON: #####
RELEASED BY: #####		RELEASED ON: #####
DRAWING NUMBER		

Septic System Design - Summary Page



Agri-Waste Technology, Inc.
501 N Salem Street, Suite 203, Apex, NC 27502
agriwaste.com | 919.859.0669

Project Manager:

Heath Clapp, LSS
hclapp@agriwaste.com
919-629-6404

Designer:

Heath Clapp, LSS
hclapp@agriwaste.com

Project: Birchwood Trails - Lot 71
Property: 53 Thunderbird Lane,
Fuquay Varina, NC 27526

Subdiv.: Birchwood Trails
Lot #: 71

Owner: KB Home

Address: 1800 Perimeter Park Drive, STE 100
Morrisville, NC, 27560

Phone: 919-768-7960

Email: enpollock@kbhome.com

EHS:

Date: 10/6/2025

County: Harnett

Permit #:

Type of System: III b

PIN: 0642-84-4681

Soil Parameters

Soil Evaluation By:

Heath Clapp, LSS

Special Conditions/Notes:

LTAR: 0.40 gpd/ft²

Design Parameters

Type of Establishment: Dwelling Units, no more than 2 persons per bedroom

Unit: Bedroom

of Units: 4

Septic Tank Specifications

Min. Tank Capacity: 960 gal

Actual Tank Volume: 1,250 gal

Tank Manufacturer: Shoaf

Tank Model: TS 1250 STB

	Exterior	Interior
Length:	125.5	119.5 in.
Width:	65.5	59.5 in.
Depth:	61.5	54.5 in.

Primary Drainfield Specifications

Type of Distribution: Parallel Pressure Manifold

Trench Media: EZflow

Trench Width: 3 ft

Trench Depth: 23 in.

(or as specified on permit)

Trench Bottom Area: 1200 ft²

Minimum Drain Line: 300 ft

Actual Drain Line: 300 ft

Number of Lines: 5

Minimum Line Spacing: 9 ft O.C.

Wastewater Treatment System Design Calculations

Project: Birchwood Trails - Lot 71

Location: 53 Thunderbird Lane,
Fuquay Varina, NC 27526

County: Harnett

Septic Tank Sizing

Daily Flow Estimate:

Unit	# of Units	Flow/Unit	Flow/Day
Bedroom	4	120	480
Q=			480 gpd

Septic Tank Minimum Capacity:

Per NCAC T15A:18A .1952(b)(2)(A):

For large residences, multiple dwelling units, or places of business or public assembly with $Q \leq 600$,

Minimum Liquid Capacity (V)= 960 gal

Septic Tank Specs:

Manufacturer: Shoaf
Model: TS 1250 STB
Volume: 1,250 gal
Weight: 11,000 lbs

	Exterior	Interior	
Length:	125.5	119.5	in.
Width:	65.5	59.5	in.
Depth:	61.5	54.5	in.

Shape of Risers: Circular

Diameter: 2.00 ft

Pump Tank Storage & Float Settings

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
Fuquay Varina, NC 27526
County: Harnett

Tank Manufacturer
Tank Model

Shoaf
TS 1275 PT

Interior Height (in.)	60.5 in.
Avg. Storage	21.07 gal/in.

Primary System

Elevations, measured from bottom towards top (0 = Interior Bottom of Tank):

Top of pump (including 4" block)	16.1 in.	(Pump height = 12 1/16")
Pump Off	18.0 in.	
Pump On	24.5 in.	(set for dose volume)
Alarm On	30.5 in.	(6 in. above On Float)

Emergency Storage Available

Pump Tank	632 gal
-----------	---------

Days of Storage	1.32 days
-----------------	-----------

(determined from "interior top of tank" - "High Water Alarm")

Repair System

Elevations, measured from bottom towards top (0 = Interior Bottom of Tank):

Top of pump (including 4" block)	16.1 in.	(Pump height = 12 1/16")
Pump Off	18.0 in.	
Pump On	24.5 in.	(set for dose volume)
Alarm On	30.5 in.	(6 in. above On Float)

Emergency Storage Available

Pump Tank	632 gal
-----------	---------

Days of Storage	1.32 days
-----------------	-----------

(determined from "interior top of tank" - "High Water Alarm")

ELEVATIONS

Project: Birchwood Trails - Lot 71

Location: 53 Thunderbird Lane,
Fuquay Varina, NC 27526

County: Harnett

Benchmark 0
BM Elev 0 ft

Septic Tank	1,250 gal	
Ground Surface		292.80 ft
Depth of Soil Cover	12 in.	1.00 ft
Overall Ht of Tank	61.5 in.	5.13 ft
Elev, Base of Tank		286.68 ft
Ht to 4" Inlet Invert	50 in.	4.17 ft
Elev, 4" Inlet Invert		290.84 ft
Ht to 4" Outlet Invert	48 in.	4.00 ft
Elev, 4" Outlet Invert		290.68 ft
Gravel Base	6 in.	0.50 ft
Elev, Bot of Excavation		286.18 ft

Pump Tank	1287 gal	
Ground Surface		292.75 ft
Depth of Soil Cover	16 in.	1.33 ft
Overall Ht of Tank	67.5 in.	5.63 ft
Elev, Base of Tank		285.79 ft
Ht to 4" Inlet Invert	57 in.	4.75 ft
Elev, 4" Inlet Invert		290.54 ft
Ht to 2" Outlet Invert	54.5 in.	4.54 ft
Elev, 2" Outlet Invert		290.33 ft
Gravel Base	6 in.	0.50 ft
Elev, Bot of Excavation		285.29 ft

ST Inlet Pipe		
Grade @ Stub-out		293.4 ft
Depth of Stub-out, top		1.5 ft
Elev, Stub-out Invert		291.55 ft
Elev @ ST Inlet Invert		290.84 ft
Length		21 ft
Slope		3.4 %

Pipe, ST to PT		
ID	4 in.	0.33 ft
OD	4.5 in.	0.38 ft
Elev, ST Outlet Invert		290.68 ft
Elev, PT Inlet Invert		290.54 ft
Length		2 ft
Slope		6.7 %
Cover over inlet pipe		1.60 ft

Pump Reqmt.		
Floor Thickness	4 in.	0.33 ft
Elev, Pump Tank Floor		286.13 ft
Pump Block Ht.	4 in.	0.33 ft
Elev, Pump Intake		286.46 ft

Grade @ Primary Manifold		293.90 ft
Grade @ Repair Manifold		295.70 ft
Min. Cover	18 in.	1.50 ft
Max Elev, Primary		292.40 ft
Max Elev, Repair		294.20 ft
Elev Diff, Primary		5.94 ft
Elev Diff, Repair		7.74 ft

Drainfield Design

Project Birchwood Trails - Lot 71
Location 53 Thunderbird Lane,
Fuquay Varina, NC 27526
County Harnett

Drainfield Sizing

Primary			
LTAR	0.4 gpd/ft ²		
Daily Design Flow	480 gpd	Type of Drainfield Media	EZflow
Req. Drainfield Area	1,200 ft ²	Required Drainline	
Trench Width, Eff.	3 ft	After 25% Reduction	300 ft
Required Drainline	400 ft	Minimum Line Spacing	9 ft (O.C.)
Repair			
LTAR	0.4 gpd/ft ²		
Daily Design Flow	480 gpd	Type of Drainfield Media	EZflow
Req. Drainfield Area	1,200 ft ²	Required Drainline	
Trench Width, Eff.	3 ft	After 25% Reduction	300 ft
Required Drainline	400 ft	Minimum Line Spacing	9 ft (O.C.)

Drainfield Layout

Line	Use	Flag Color	Elevation (ft)	Line Length (ft)	Used as Primary (ft)	Used as Repair (ft)
1	Layout Line	interp		60	60.0	
2	Layout Line	interp		60	60.0	
3	Layout Line	interp		60	60.0	
4	Layout Line	interp		60	60.0	
5	Layout Line	interp		60	60.0	
6	Layout Line	interp		60		60.0
7	Layout Line	interp		60		60.0
8	Layout Line	interp		60		60.0
9	Layout Line	interp		60		60.0
10	Layout Line	interp		60		60.0
Total				600	300	300
Count				10	5	5

Line lengths shown in drawings include 2' for endcaps.

PRESSURE MANIFOLD DESIGN (Primary)

Site Information

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
Fuquay Varina, NC 27526
County: Harnett

Design Information

Estimated Daily Flow	480 gal/day
L.T.A.R. (from Harnett Co.)	0.4 gal/day/ft ²
L.T.A.R. + 5%	0.420 gal/day/ft ²
Trench Width	3 ft.
Line Length Required	400 ft.
Length after 25% Reduction	300 ft
L.T.A.R. Reduced	0.533 gal/day/ft ²
L.T.A.R. Reduced + 5%	0.560 gal/day/ft ²

DRAINFIELD INFO. - Primary						
Proposed Type of System/Distribution: Pump to Pressure Manifold using EZflow						
Line No.	Flag Color	Line Length (ft)	Tap	Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
1	interp	60	1/2in SCH 80	5.48	0.091	0.533
2	interp	60	1/2in SCH 80	5.48	0.091	0.533
3	interp	60	1/2in SCH 80	5.48	0.091	0.533
4	interp	60	1/2in SCH 80	5.48	0.091	0.533
5	interp	60	1/2in SCH 80	5.48	0.091	0.533
Total		300	Total	27.40	Avg.	0.53
<i>Note: Line lengths are calculated in 5' increments to reflect use of EZflow product.</i>						
Total Run Time	17.52 min.					
Drainfield Capacity	195.9 gal					
% of Drainfield Cap	69.9% (Req. Range 66-75%)					
Dose Volume	136.9 gal/dose					
Run Time/Dose	5.0 minutes Range 5-7 minutes unless uphill, checked					
Volume/depth	21.07 gal/in. (Per tank manufacturer's specifications)					
Estimated Drawdown	6.50 in.					
Manifold Box						
Number of Taps	5	with	0	Split(s)		
Manifold Length	4.0	ft.	(approximate)			

PRESSURE MANIFOLD SYSTEM DESIGN (Repair)

Site Information

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
Fuquay Varina, NC 27526
County: Harnett

Design Information

Estimated Daily Flow	480 gal/day
L.T.A.R. (from Harnett Co.)	0.4 gal/day/ft ²
L.T.A.R. + 5%	0.420 gal/day/ft ²
Trench Width	3 ft.
Line Length Required	400 ft.
Length after 25% Reduction	300 ft
L.T.A.R. Reduced	0.533 gal/day/ft ²
L.T.A.R. Reduced + 5%	0.560 gal/day/ft ²

DRAINFIELD INFO. - Repair						
Proposed Type of System/Distribution: Pump to Pressure Manifold using EZflow						
Line No.	Flag Color	Line Length (ft.)		Flow (gpm)	Flow/Foot (gpm/ft)	Line L.T.A.R.
6	interp	60	1/2in SCH 80	5.48	0.091	0.533
7	interp	60	1/2in SCH 80	5.48	0.091	0.533
8	interp	60	1/2in SCH 80	5.48	0.091	0.533
9	interp	60	1/2in SCH 80	5.48	0.091	0.533
10	interp	60	1/2in SCH 80	5.48	0.091	0.533
Total		300	Total	27.40	Avg.	0.53
<i>Note: Line lengths are calculated in 5' increments to reflect use of EZflow product.</i>						
Total Run Time	17.52 min.					
Drainfield Capacity	195.9 gal					
% of Drainfield Cap	69.9% (Req. Range 66-75%)					
Dose Volume	136.9 gal/dose					
Run Time/Dose	5.0 minutes Range 5-7 minutes unless uphill, checked					
Volume/depth	21.07 gal/in. (Per tank manufacturer's specifications)					
Estimated Drawdown	6.50 in.					
Manifold Box						
Number of Taps	5	with	0	Split(s)		
Manifold Length	4.0	ft.	(approximate)			

PUMP DESIGN

System (initial/repair): **Primary**

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
 Fuquay Varina, NC 27526
County: Harnett

Friction Losses

Suction Head	0 ft	(submersible 0)
Elev. Difference (highest point from pump)	5.94 ft	
Design Pressure At Outlet	2 ft	
Supply Line - 2" Schedule 40 PVC		
Pipe Diameter, Nominal	2 in.	
Pipe Diameter (ID)	2.047 in.	
Pipe Length	55 ft	Flow 27.4 gpm Velocity 2.67 ft/sec
Pipe Length for Fittings	5.5 ft	Meets requirement that $2 \text{ ft/s} < v < 5 \text{ ft/s}$.
Equivalent Length	60.5 ft	
Estimated Friction Loss in Supply Line	0.83 ft	
Friction Loss - Taps/Special Fittings	3.5 ft	
TOTAL	12.28 ft.	

Flow for Anti-Siphon Hole

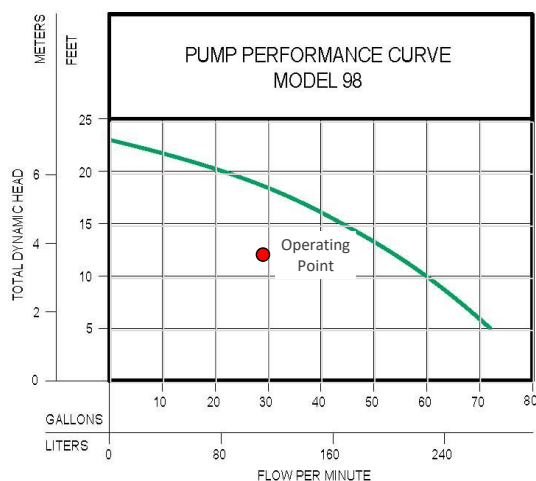
Hole Diameter 3/16 in.
 Hole Flowrate 1.45 gpm

Pump Efficiency 0.7 (assumed, typical)
 Motor Efficiency 0.9 (assumed for electric pumps)
Flow 28.85 gpm

Required Horsepower 0.14 hp
TDH 12.28 ft

Pump Selection

Manufacturer:	Zoeller
Model:	N98
Horsepower:	0.5



PUMP DESIGN

System (initial/repair): **Repair**

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
Fuquay Varina, NC 27526
County: Harnett

Friction Losses

Suction Head	0	ft	(submersible 0)
Elev. Difference (highest point from pump)	7.74	ft	
Design Pressure At Outlet	2	ft	
Supply Line - 2" Schedule 40 PVC			
Pipe Diameter, Nominal	2	in.	
Pipe Diameter (ID)	2.047	in.	
Pipe Length	104	ft	
Pipe Length for Fittings	10.4	ft	
Equivalent Length	114.4	ft	
Estimated Friction Loss in Supply Line	1.58	ft	
Flow	27.4	gpm	
Velocity	2.67	ft/s	
Meets requirement that 2 ft/s < v < 5 ft/s.			
Friction Loss - Taps/Special Fittings	3.5	ft	
TOTAL		14.82	ft.

Flow for Anti-Siphon Hole

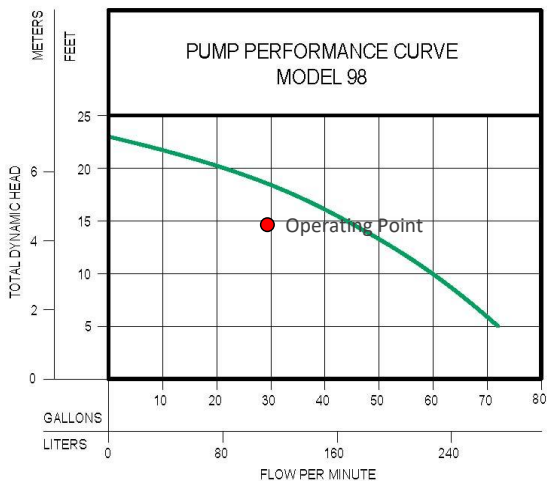
Hole Diameter 3/16 in.
Hole Flowrate 1.60 gpm

Pump Efficiency 0.7 (assumed, typical)
Motor Efficiency 0.9 (assumed for electric pumps)
Flow 29.00 gpm

Required Horsepower 0.17 hp
TDH 14.82 ft.

Pump Selection

Manufacturer:	Zoeller
Model:	N98
Horsepower:	0.5



Septic Tank Buoyancy Calculation

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
 Fuquay Varina, NC 27526
County: Harnett

Tank Size (nominal) 1250 gal

Properties/Assumptions:

Min. liquid level to be maintained in tank at all times after initial installation.

Min. depth to water table	12.0 in.	from ground surface
Effluent Density	62.4 lb/ft ³	(Specific Weight of Water)
Concrete Density	142.6 lb/ft ³	
Soil App. Sp. Grav.	1.3	(typical value)
Soil Cover Over Tank	12 in.	(minimum)
Additional Cover	0 in.	for pipe grade
Unsubmerged wt of soil	81.1 lb/ft ³	
Submerged wt of soil	49.9 lb/ft ³	50% Porosity Assumed

Tank Dimensions (from supplier):

		<u>Exterior</u>		<u>Interior</u>	
		Top	Bottom	Top	Bottom
Tank	Length	125.5	122.0	119.5	116.0 in.
	Width	65.5	62.0	59.5	56.0 in.
	Height	58.5	(w/o lid)	54.5	in.
Lid	Length	125.5 in.			
	Width	65.5 in.			
	Height	3.0 in.			
Area of Riser Openings		6.28 ft ²			
Permanent Liquid Depth in Tank		0.0 in.		0.00 ft	
Tank Weight		11,000 lb		(per manufacturer)	

Buoyancy Force Calculation:

Buoyancy Force Specific Weight of Water x Displaced Volume

Displaced Volume	281.4 ft ³ *
Buoyancy Force	17,558 lb.

Weight Calculation:

Tank Weight	11000 lb		
Water Weight in Tank	0 lb	Volume	0.0 ft ³ *
Soil Weight Over Tank	4121 lb		
Soil Friction Force	4037 lb		
Total Weight	19,158 lb		

Factor of Safety = 1.09

Note: Total weight must be greater than buoyancy force so that tank will not float during high water table conditions.

* Volume calculated by the prismoidal formula.

Pump Tank Buoyancy Calculation

Project: Birchwood Trails - Lot 71
Location: 53 Thunderbird Lane,
 Fuquay Varina, NC 27526
County: Harnett

Tank Size (nominal) 1287 gal

Properties/Assumptions:

Min. liquid level to be maintained in tank at all times after initial installation.

Min. depth to water table	12 in.	from ground surface
Effluent Density	62.4 lb/ft ³	(Specific Weight of Water)
Concrete Density	142.6 lb/ft ³	
Soil App. Sp. Grav.	1.3	(typical value)
Soil Cover Over Tank	12 in.	(minimum)
Additional Cover	4 in.	for pipe grade
Unsubmerged wt of soil	81.1 lb/ft ³	
Submerged wt of soil	49.9 lb/ft ³	50% porosity assumed

Tank Dimensions (from supplier):

		<u>Exterior</u>		<u>Interior</u>	
		Top	Bottom	Top	Bottom
Tank	Length	108.0	104.0	102.0	98.0 in.
	Width	58.0	54.0	52.0	48.0 in.
	Height	64.5	(w/o lid)	60.5	in.
Lid	Length	108.0 in.			
	Width	58.0 in.			
	Height	3.0 in.			
Area of Riser Openings		3.14 ft ²			
Permanent Liquid Depth in Tank		0.0 in.		0.00 ft	
Tank Weight		10500 lb	(per manufacturer)		

Buoyancy Force Calculation:

Buoyancy Force Specific Weight of Water x Displaced Volume

Displaced Volume	233.5 ft ³ *
Buoyancy Force	14,573 lb

Weight Calculation:

Tank Weight	10500 lb		
Water Weight in Tank	0 lb	Volume	0.0 ft ³ *
Soil Weight Over Tank	3945 lb		
Soil Friction Force	4227 lb		
Total Weight	18,672 lb		

Factor of Safety = 1.28

*Note: Total weight must be greater than buoyancy force
 so that tank will not float during high water table conditions.*

* Volume calculated by the prismoidal formula.