



WAGS & WHISKERS

January 29, 2024

Planning & Zoning Commissioners
Village of Innsbrook
1835 Highway F
Innsbrook, MO 63390

Dear Commissioners:

We present to you our revised site plan which includes the wastewater lagoon already in place. Our original site plan included a proposed septic system in a different location but in discussions at P&Z meetings prior to the original site plan being approved, we stated that the final location of the septic system would be based on soil samples and professional recommendations. Wags & Whiskers was not aware that moving the system from the proposed location required notification to P&Z as the Village's procedure manual does not clearly define a process for making changes to an approved Special Use Permit Site Plan. We relied on contractors to handle permits and changes to the site through all local and state agencies. We consider this a "minor" change to our site plan as it does not change the concept or use of the property.

In response to the memo from Todd Streiler dated September 27, 2023, Katie Joyce stated at the October 4, 2023 P&Z meeting that Wags & Whiskers would provide responses to this memo when the revised site plan was submitted. Responses to this memo are included in this packet.

As the attached email from Leasue Meyers at the Missouri Department of Natural Resources (DNR) dated August 16, 2023, "lagoons serving industrial facilities which includes animal kennels and animal shelters are under the Department of Natural Resources (DNR) jurisdiction, not the county. If the property is located within the city limits, then city ordinances could restrict the presence of a commercial lagoon, same with county ordinances."

At your August, 2023, meeting, you received a letter from DNR dated July 31, 2023 (the "July 2023 Letter") stating that our facility at 13620 State Highway M is "exempt from operating permit requirements, at this time, under 10 CSR 200-6.015(3) (B)12." At the request of the P&Z Commissioners, we requested an updated exemption letter correcting some mistakes in the July 2023 Letter. We received an updated letter dated November 29, 2023 (the "November 2023 Letter"). In the November 2023 Letter, DNR states "Based on the information provided, the use and operation of the lagoon as a pump and haul lagoon is allowed."

Wags & Whiskers has a contract with B&J Septic to pump and haul wastewater to a permitted wastewater treatment plant per the included contract. Wags & Whiskers will maintain records on when the system is pumped out, lagoon gauge levels, and review regularly the amount of water used to help keep the system operating properly.

After receiving the July 2023 Letter from DNR, we contacted Leasue Meyers with DNR and asked what our other options might be. Please refer to the attached August 16, 2023 email stating that other



WAGS & WHISKERS

options would be a drip system or a second holding tank. After receiving her email, we spoke with a local septic provider, Butch at B&J Septic for a professional opinion on all of these options.

B&J provides septic pumping of the lagoon at PALS animal shelter in Hawk Point. They also provide services to two large dog kennels. Butch stated that a drip system is at high risk of clogging due to pet hair. Wags & Whiskers engaged Paul Ganey of Ganey Engineering to provide an evaluation of the septic system and other options for this site. Attached is the letter dated January 22, 2024 from Paul Ganey concluding that the existing septic tank and lagoon is the best form of wastewater treatment for Wags & Whiskers' use of the property.

In addition, B&J Septic and Ganey Engineering have advised us that hauling in a layer of topsoil and placing it on top of the current soil (as described in the included soil report) would lead to a situation wherein wastewater would seep between the two soil layers and cause septic field failure. In addition, if water usage at the shelter exceeds what is currently estimated, a drip system field may need to be larger than the amount of land we have available. Butch at B&J also stated that adding a larger tank without a lagoon would also not be a viable option as it would need to be pumped every 7-14 days.

Review of the Village of Innsbrook ordinances, zoning codes and procedure manual finds no ordinances or regulations prohibiting a lagoon on property zoned C-H. Based on the findings and advice of septic professionals, Wags & Whiskers respectfully requests that the Planning & Zoning Commissioners approve our revised site plan showing the lagoon as it is presently constructed.

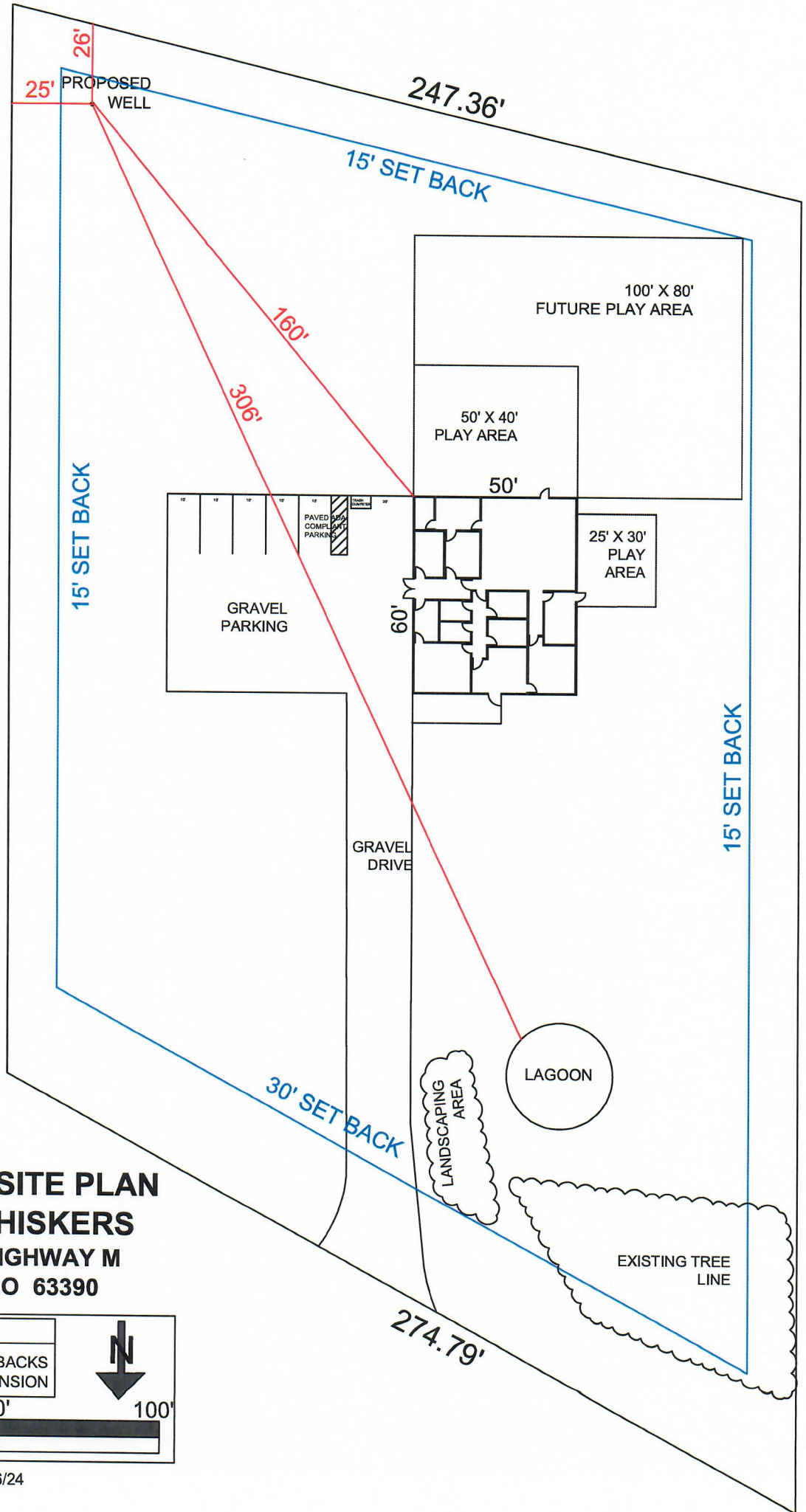
As a condition to approve the use of the septic lagoon:

- Wags & Whiskers would agree to connect to a public sewer system within 12 months after sewer infrastructure is extended to the Wags & Whiskers property.



We thank you in advance for your consideration.



Respectfully,

Tracy Sator
Wags & Whiskers Board President

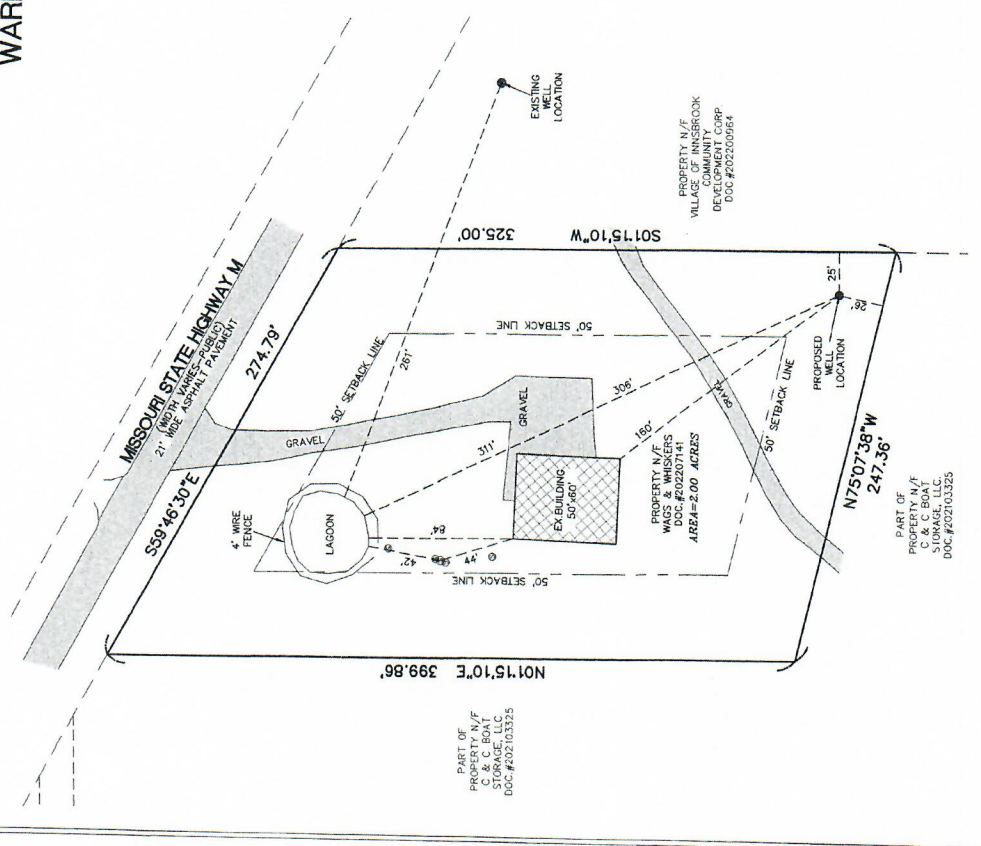


**AMENDED SITE PLAN
WAGS & WHISKERS
13620 STATE HIGHWAY M
INNSBROOK, MO 63390**

LEGEND	
	SET BACKS
	DIMENSION

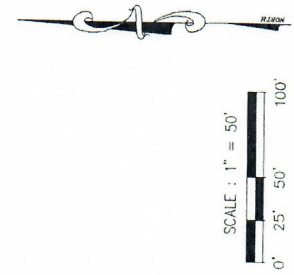



AS-BUILT SURVEY-WAGS AND WHISKERS SITE
A TRACT OF LAND BEING PART OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 33,
TOWNSHIP 47 NORTH, RANGE 1 WEST OF THE FIFTH PRINCIPAL MERIDIAN,
WARREN COUNTY, MISSOURI



PART OF
PROPERTY N/F
C & C BOAT
STORAGE, LLC
DOC #202103325

PART OF
PROPERTY N/F
STORAGE, LLC
DOC #202103325



PROPERTY DESCRIPTION
A TRACT OF LAND BEING PART OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 33, TOWNSHIP 47 NORTH, RANGE 1 WEST OF THE FIFTH PRINCIPAL MERIDIAN, WARREN COUNTY, MISSOURI AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF THE AFORESAID SECTION 33, THENCE ALONG THE SOUTH LINE OF SAID SECTION 33, NORTH 75 DEGREES 15 MINUTES 10 SECONDS EAST 180.04 FEET TO THE SOUTHWEST CORNER OF SAID SECTION 33, THENCE SOUTH 89 DEGREES 09 MINUTES 04 SECONDS EAST 680.80 FEET TO THE POINT OF BEGINNING, THENCE SOUTHWEST ALONG THE WEST LINE OF SAID SECTION 33, NORTH 01 DEGREES 15 MINUTES 10 SECONDS EAST 180.04 FEET TO THE POINT OF BEGINNING OF THE TRACT OF LAND DESCRIBED HEREIN, THENCE NORTH 75 DEGREES 15 MINUTES 10 SECONDS EAST 399.86 FEET TO A POINT ON THE SOUTH RIGHT-OF-WAY LINE OF MISSOURI STATE HIGHWAY "M", THENCE ALONG THE SOUTH RIGHT-OF-WAY LINE OF MISSOURI STATE HIGHWAY "M", SOUTH 59 DEGREES 46 MINUTES 50 SECONDS EAST 150 FEET TO THE POINT OF BEGINNING OF THE TRACT OF LAND DESCRIBED HEREIN, THENCE SOUTH 01 DEGREES 15 MINUTES 10 SECONDS WEST 325.00 FEET TO THE POINT OF BEGINNING AND CONTAINING 2.00 ACRES ACCORDING TO A SURVEY BY FRAZIER LAND SURVEYING DURING MARCH OF 2022.

GENERAL NOTES:
1. BASIS OF BEARINGS FOR THIS SURVEY WAS ADAPTED FROM THE MISSOURI COORDINATE SYSTEM OF 1983--EAST ZONE--GRID NORTH.

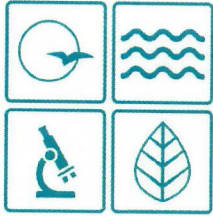
SURVEYOR'S CERTIFICATE
THIS IS TO CERTIFY THAT WE HAVE, DURING THE MONTH OF JANUARY 2024, BY THE ORDER OF WAGS AND WHISKERS, EXECUTED AN AS-BUILT SURVEY ON A TRACT OF LAND BEING PART OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 33, TOWNSHIP 47 NORTH, RANGE 1 WEST OF THE FIFTH PRINCIPAL MERIDIAN, WARREN COUNTY, MISSOURI AND THE RESULTS ARE CORRECTLY SHOWN HEREON.

Dennis Frazier 01/25/2024
DENNIS C. FRAZIER
FRAZIER LAND SURVEYING SERVICES, INC.
MISSOURI PROFESSIONAL LAND SURVEYOR #2002000247
CORP.# 2008003911

DATE: 01/23/24		SCALE: 1"=50'	
PROJECT NO: 21-7105		FILE: 21-7105.DWG	
REV-1:	DENNIS C. FRAZIER	REV-1:	FRAZIER LAND SURVEYING SERVICES, INC.
REV-2:	MISSOURI PROFESSIONAL LAND SURVEYOR #2002000247	REV-2:	116 E. PEARCE BLVD., P.O. BOX 65
REV-3:	FRAZIER LAND SURVEYING SERVICES, INC.	REV-3:	MENTAVILLE, MO 63365
REV-4:	CORP.# 2008003911	REV-4:	PHONE 636-332-0610
			FAX 636-332-0710



AS-BUILT SURVEY



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Michael L. Parson
Governor

Dru Buntin
Director

November 29, 2023

Michael Bohm
Wags & Whiskers
13620 Highway M
Village of Innsbrook, MO 63390

RE: Lagoon Pump and Haul System – Wags & Whiskers Wastewater Treatment Facility,
ACT1469, Warren County, Construction and Operating Permit Determination

Dear Michael Bohm:

The Missouri Department of Natural Resources has reviewed the Wags and Whiskers construction permit determination request submitted by American Oasis LLC on July 11, 2023. This letter supersedes the July 31, 2023 letter previously sent to you. The facility is planning on pumping wastewater from the lagoon and hauling to a permitted wastewater treatment facility. The department is not requiring a construction permit or an operating permit for the lagoon and the proposed pump and haul activities. This exemption is from permitting requirements of the Missouri Clean Water Law only and does not apply to or affect any county or other local ordinances or restrictions that may apply. Based on the information provided, the use and operation of the lagoon as a pump and haul lagoon is allowed.

Wags and Whiskers, its consultants and contractors provided information on how the facility will operate. The facility is a not-for-profit, no-kill animal shelter. The facility will have a maximum capacity of 29 animal residents with 2 volunteers/employees on site to take care of the animals. Solid animal waste and litter will be disposed of as solid waste to a landfill or other permitted solid waste disposal area. The disinfection process will utilize hydrogen peroxide cleaner, brand name “Rescue”. The building has a restroom, an office, reception area, delivery intake for supplies, intake area for animals, and animal play areas, with the potential for a small vet office for adoption events and a laundry area. The only grooming of animals will be if it needs to occur when an animal comes to the shelter.

The proposed activities are exempt from construction permitting requirements per 10 CSR 20-6.010(5)(B)8 and -14, because, at the time it was constructed, the Warren County Health Department initially performed oversight. However, during the final inspection, the county referred Wags & Whiskers to the Department of Natural Resources for approval of the lagoon, because the county’s wastewater process does not cover lagoons if they are being constructed for



process wastewater flows, which includes animal shelters. The department has determined not to require an after-the-fact construction permit for the lagoon that was constructed under the county's process. See the discussion below about the lagoon's construction details.

The facility is exempt from Missouri Clean Water Law operating permit requirements at this time, under 10 CSR 20-6.015(3)(B)12, because the facility has a contract with All Star Pumping & Sewer Service or B&J Septic to pump and haul wastewater to a permitted wastewater treatment plant, as necessary. The permitted wastewater treatment facility must be able to accept wastewater and/or solids from animal shelters. If Wags & Whiskers changes haulers or adds additional haulers, copies of the contracts with the haulers must be maintained at the site and be available for review, if requested by the department. To keep this exemption, Wags & Whiskers must maintain records on when the system is pumped out and lagoon gauge levels, and review regularly the amount of water used to help keep the system operating properly. When pumping out the lagoon, it is standard practice to leave at least a few inches of water in the bottom of the lagoon to protect the seal. Because this lagoon is a compacted clay/soil lagoon, it is necessary to protect the lagoon bottom.

It is recommended that the facility establish an operations and maintenance manual to provide guidance to the volunteers on checking the lagoon level, who to call if the lagoon needs pumped, and to contact the department's St. Louis Regional Office if there is an emergency with the lagoon system. Additionally, in the event of a discharge from the lagoon, the facility will need to contact the St. Louis Regional Office at 314-416-2960 during business hours or contact the Emergency Response line at 573-634-2436 after hours.

The property was annexed into the Village of Innsbrook in late 2022, however, based on the information available, the closest connection point is more than 2,000 feet, meeting the requirements of 10 CSR 20-6.010(2)(C)3. The facility is approximately one mile from Wright City's municipal boundary, but is approximately two miles from the closest connection point, again meeting the requirements of 10 CSR 20-6.010(2)(C)3. As the Village of Innsbrook or Wright City grow and extend their wastewater collection system, Wags & Whiskers should continue to evaluate and consider connecting to one of the municipal lines, as the lines become available.

Potable water will be supplied to the site per an onsite well. The well will be drilled by Flynn Drilling and will be not less than 300 feet from the lagoon, meeting the requirements of 10 CSR 20-8.140(2)(C)1. Because this site is just starting operations and building, it is recommended the facility be diligent in reviewing their monthly water usage, because the amount of water used will impact their wastewater treatment system and how often pumping will have to occur.

The treatment system has a design average flow of 480 gallons per day, with the 1-in-10 year precipitation amount increasing the wet weather flow to 535 gallons per day. The current wastewater treatment system is 4-inch PVC pipe from the building to the 1,000 gallon septic tank followed by a single cell lagoon.

- The facility obtained a Geohydrologic Evaluation on March 14, 2023, as required per 10 CSR 20-8.200(2) and 10 CSR 20-8.110(5)(E)6.G.
 - The site received a slight collapse potential and slight overall geologic limitation.

- If the system was to overflow and discharge, the receiving stream would be the Tributary to Peruque Creek and was classified as gaining.
- The lagoon is not located in the flood plain and is approximately:
 - 65 ft from the property line, meeting the requirement of 10 CSR 20-8.140(2)(C)2;
 - 430 ft from the neighboring residence, meeting the requirement of 10 CSR 20-8.140(2)(C)2; and
 - More than 500 ft from the closest potable water well off property, meeting the requirement of 10 CSR 20-8.140(2)(C)1. Geostrat does show there is an abandoned well approximately 260 feet from the lagoon that was plugged in 2015.
 - The new potable well for Wags & Whiskers will be installed 300 feet from the lagoon, meeting the requirements of 10 CSR 20-8.140(2)(C)1.
- The 1,000 gallon septic tank provides 2 days of detention time at design average flow, and meets the requirements of 10 CSR 20-8.180(2)(A) and 10 CSR 20-8.140(4)(B). The septic tank will help settle solids out of the system.
- The single cell lagoon is approximately 6 feet deep with an operating level of 4 feet and 3:1 slopes in the lagoon and 4:1 slopes for the outer berms.
 - Using the one foot of freeboard the system was designed with from the bottom of the emergency overflow, the system has the capacity of 45,220 gallons, which is 94 days at design average flow or 84.5 days at wet weather flow.
 - Using the 2 feet of freeboard required by 10 CSR 20-8.200(4)(A)3, the lagoon has storage capacity of 25,433 gallons, providing 47.5 days of storage at wet weather flows or 53 days at dry weather flow of 480 gpd.
 - While this is less than the 105 days required in 10 CSR 20-8.200(6)(C) for systems in Warren County that are land applying, this system is pumping and hauling flows to a permitted treatment plant and if necessary, Wags & Whiskers could have the system pump more frequently to maintain capacity.
 - The berms were constructed to 6 feet wide, which is less than the requirement of 8 feet in 10 CSR 20-8.200(4)(A)2; however, the system was not set up to allow maintenance vehicles to drive on the berms with how the fence is located around the lagoon.
 - The facility is removing the overflow discharge pipe that was installed, as it has an emergency swale area.
 - The facility is in the process of installing a lagoon gauge to monitor levels within the lagoon and to schedule pumping.
 - The lagoon is surrounded by a fence, as required in 10 CSR 20-8.140(4)(A)2.

Wags & Whiskers is registered and in good standing with the Missouri Secretary of State's office as a nonprofit corporation, with charter number: N01422116, meeting the requirements of 10 CSR 20-6.010(2)(B)4 for a valid continuing authority with complete control of, and responsibility for the water contaminant source, point source, or wastewater treatment system. In the event Wags & Whiskers connects to another treatment facility or changes treatment types, or ceases operations, it is the responsibility of Wags & Whiskers to properly close the lagoon. Contact the department's St. Louis Regional Office for information regarding lagoon closure.

Wags & Whiskers

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In the event Wags & Whiskers decides to discontinue pumping and hauling and wants to pursue other options, the company will need to contact the Engineering Section to discuss possible paths forward. If the facility wants to pursue a subsurface dispersal system, the facility will need another soils report, Geohydrologic Evaluation, and may have to evaluate the cost of importing soils. If the facility wants to pursue a discharging option, Antidegradation will be required and the facility would need to meet effluent limits that are protective of the receiving streams, but it would be unlikely for this lagoon to meet those requirements because it drains to Peruque Creek and ultimately Lake St. Louis. In the event the facility ceases to pump and haul wastewater, an operating permit will be required.

Any changes to the facility or modifications to operations from what was described in the submittal and summarized above may result in a different permitting determination. Contact the Engineering Section if you have questions.

For questions related to technical issues, please contact Leasue Meyers, review engineer, by phone at 573-751-7906, by email at leasue.meyers@dnr.mo.gov, or by mail at Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102. If there are questions on the operation of the lagoon, maintaining records, or questions on the system, please request a Compliance Assistance Visit with the St. Louis Regional Office, who can be reached at 314-416-2960. Thank you.

Sincerely,

WATER PROTECTION PROGRAM



Cindy LePage, P.E., Chief
Engineering Section

CL:lmj

c: Marcella Holiway, American Oasis LLC
Robert Lewis, PE, Lewis-Bade, Inc.
Todd Streiler, Village of Innsbrook
William Austin, All Start Pumping & Sewer Services
Butch Menne, B&J Septic
St. Louis Regional Office

Date: January 29, 2024

To: Todd Streiler, Village Planner (via email – todd.streiler@gmail.com)

cc: Carla Ayala, Village Administrator/Clerk (via email – admin@villageofinnsbrook.org)

From: Michael R. Caton

Subject: Wags & Whiskers – 13620 State Highway M

As a member of the Wags & Whiskers Advisory Board, I have been asked to respond to your memo to Kathleen Joyce dated September 27, 2023. Ms. Joyce was appointed by Governor Parsons as an Associate Circuit Judge for the 12th Judicial Circuit as of December 4, 2023 and is no longer a Board Member of Wags & Whiskers. As Ms. Joyce stated at the October 2023 P&Z meeting, she received your memo after submitting a packet for the October meeting and that responses would be included in the packet with an updated amended site plan.

The numbered responses below correspond to the items in your memo. If you have any questions after your review, please call me on my cell 314-223-5642.

Before addressing the specific items in your memo, I want to highlight the following information for your reference.

- The wastewater treatment system consists of a 1,000 gallon septic tank and a non-discharge post treatment holding basin or lagoon.
- Solid animal waste will be picked up, bagged and disposed of in the trash dumpster.
- The septic tank will hold human solid waste. Unlike a system without a septic tank, there will be no sludge in the lagoon and as a result little or no smell will be generated from the lagoon.
- The animal facility will generally be staffed by two volunteers/employees for approximately 12 hours per day.
- Based on the amount of time the facility will be occupied by volunteers/employees, the use of the system will be less intensive than a residence with a lagoon.

1. You reference Section 9.2.2.12.2 and Section 9.7.2 of the Zoning Regulations. These Sections are contained in the Subdivision Regulations. The Wags & Whiskers property was annexed into the Village as a separate parcel and conveyed by a metes and bounds legal description. The Wags & Whiskers property is not subject to any Plat or Subdivision Declaration so the Subdivision Regulations including, but not limited to these Sections do not apply. In addition, the Village has no ordinances that prohibit a lagoon on commercial property.

1.A. Wags & Whiskers has worked with Leasue Meyers at the Missouri Department of Natural Resources (“MDNR”) to address the issue you raised concerning the location of the Wags & Whiskers well. Attached is a copy of the November 29, 2023 letter from MDNR the “MDNR Letter”). As noted on page 2 of the MDNR Letter the well will be drilled by Flynn Drilling. As shown on the attached Amended Site Plan and As-Built Survey, the well will be located not less than 300 feet from the lagoon in compliance with MDNR regulations.

As you note, Appendix A of the Zoning Regulations concerning Sewage Disposal Systems in the Village of Innsbrook states that the Village “recognizes the State of Missouri as the experts in the design, installation, inspection and operation of such systems. As such these experts have will have full authority to issue permits, inspect, enforce regulations and standards, investigate complaints and collect fees for their services.”

1.B. Pursuant to the MDNR Letter, Wags & Whiskers is required to have a contract to pump and haul wastewater to a permitted wastewater treatment plant as necessary and to maintain records on when the system is pumped out, lagoon gauge levels and to regularly review the amount of water used to help keep the system operating properly. Attached is a copy of the contract with B&J Septic to pump and haul wastewater to a permitted wastewater treatment plant. B&J Septic will cap the overflow discharge pipe and install a lagoon gauge to monitor levels within the lagoon as stated in the attached October 19, 2023 letter (the “B&J Septic Letter”). The B&J Septic Letter also notes that a lagoon is the best option for an animal shelter based on B&J Septic’s experience with other animal shelters and kennels. Wags & Whiskers will comply with MDNR’s requirements noted above. As you note, a requirement to hold the Village harmless from any costs incurred resulting in a failure to carry out pump and haul operations or failures to the lagoon is not required by MDNR. If Wags & Whiskers failed to carry out the pump and haul operations or the lagoon failed, the Village would have no liability since MDNR is the governing authority and Wags & Whiskers would be liable.

2. As required by the Special Use Permit, Wags & Whiskers will apply for and provide the Village with a copy of the license from the Missouri Department of Agriculture before the shelter opens. Based on a conversation with Olivia Bennett at the Missouri Department of Agriculture, Wags & Whiskers cannot apply for a license until construction of the shelter is complete, animal enclosures are ready to inspect and veterinary protocols are in place.

3. Wags & Whiskers has maintained liability insurance on the property since its purchase in October 2022. Attached are copies of certificates of liability insurance covering the period from 11/12/2022 through 11/12/2023 and 11/12/2023 through 11/12/2024. As required by the Special Use Permit, Wags & Whiskers will provide an updated certificate of liability insurance as requested.

4. As previously noted, the Subdivision Regulations are not applicable. Even though Section 9.6.1.1 is not applicable, the well will be located 25 feet from the property lines. Based on a site visit by Flynn Drilling Company and as shown on the Amended Site Plan and As-Built Survey, the well will be located not less than 300 feet from the lagoon.

5. Wags & Whiskers will provide five parking spaces as shown on the attached Amended Site Plan submitted with this memo.

6. Lighting will be installed as provided on the previously approved plan.

7. A pipe from the gutter has been installed that will allow storm water to flow under the sidewalk to be installed.

8. A compacted gravel parking lot and drop off area will be installed. Parking stops will be installed in the parking spaces. Two fenced play areas will initially be installed. A future play area as noted on the Amended Site Plan will be installed when needed. There is existing landscaping on the north property line along Highway M. Landscaping will be added on the east side of the lagoon as shown on the

attached Amended Site Plan. A photo rendering from Lochness Lawns & Landscaping is also attached.

9. It is the position of Wags & Whiskers that the changes on the Amended Site Plan constitute Minor Changes since the changes do not alter the concept of the special use in regard to conditions and restrictions imposed by the Village Board.

B&J Septic Pumping
755 Mary Jo Road
Silex, MO 63377
(573) 384-5536 FAX (573) 384-6333

Name: Wags and Whiskers Phone: (314) 477 4239

Address: 13620 State Hwy M
Innsbrook, MO 63390

Date: 11/8/2023

To whom it may concern,

This is a pumping contract for :

Will provide pumping services for their septic and lagoon waste. And will haul as needed, when notified to our dumping facilities and land discharge as provided in our DNR contract MOG821103.

This pumping contract will provide assurance that B&J Septic Pumping will pump the tank at this property as needed.

Return with signature below authorizing B&J Septic to perform the work as needed.

AUTHORIZED REPRESENTATIVE
SIGNATURE

DATE 11-8-23

Thank you


Butch Menne
B & J Septic Pumping
DNR Land Discharge Permit #: MOG821103

B&J Septic Pumping , L.L.C.

Butch Menne, State Inspector - Septic & Wells
755 Mary Jo Road
Silex, MO 63377

phone (573) 384-5536
fax (573) 384-6333
web www.BJSeptic.com
e-mail BJSeptic@hotmail.com

October 19, 2023

Board of Directors
Wags & Whiskers
13620 State Highway M
Innsbrook, MO 63390

Dear Board Members:

This is to confirm that B&J Septic is able to pump the lagoon on your property and haul wastewater to our lagoon and dispose of the waste water according to our DNR waste water permit number MOG821103.

We can contract with your organization to cap the overflow discharge pipe and install a lagoon gauge to monitor levels within the lagoon. Gate for pumping and warning sign keep out.

Because our trucks have 250 feet of hose, we are able to pump from the existing drive after an access gate is installed. Tank is approximately 90' and lagoon is approximately 55' from driveway.

It is my recommendation that a lagoon is the best option for an animal shelter. The lagoon on your property is situated for water to flow naturally downhill into the lagoon. In my experience with other animal shelter and kennel operations that I currently service, a drip system requires more maintenance and is at high risk of failure due to dog hair, waste and uneven water usage.

Respectfully,



Butch Menne
Mo License Inspector #50165

From: Kathy Caton kmc_mrc@yahoo.com
Subject: Re: Wags & Whiskers
Date: Aug 16, 2023 at 6:48:42 PM
To: Meyers, Leasue leasue.meyers@dnr.mo.gov
Cc: LePage, Cindy cindy.lepage@dnr.mo.gov, Young, Chia-Wei chia-wei.young@dnr.mo.gov

Thank you so much for your prompt and very thorough response, as always. We appreciate all of your assistance with this process!

Kathy

On Aug 16, 2023, at 5:34 PM, Meyers, Leasue <leasue.meyers@dnr.mo.gov> wrote:

Hello Kathy,

As mentioned in the exemption letter, lagoons serving industrial facilities, which includes animal kennels and animal shelters, are under the Department of Natural Resources (DNR) jurisdiction, not the county. If the property is located within the city limits, then city ordinances could restrict the presence of a commercial lagoon, same with county ordinances.

I looked at the soils report that was prepared by Doug Gaines with Gaines Soil Consulting to see if a subsurface system could be put in. Looking at the numbers and the pits he dug, we have serious concerns that the site could handle a subsurface system, without some additional information or some design changes. For subsurface drip systems, the lines are typically put in 6 to 8 inches deep, and then our regulations require 12 inches separation if proceeded by advanced treatment or 24 inches with a septic tank to the limiting layer, which would be 18 to 32 inches. In reviewing the soils report, all 3 pits show that the area is not suitable in the 18 to 32 inch range.

One option to consider is to import soil over the proposed site. Looking at the design flow of 480 gallons per day, if you import a foot of soil for the drip dispersal area of soil pit #1, that would get you the necessary separation distance. Then the loading rate would be 0.3 gallons per day per square foot, so you would need 1,600 square feet for the subsurface system. The 0.3 gallons per day per square foot is half of the 0.6 gallons per day in Mr. Gaines soils report as he stated that alternative systems would have ½ the loading rate listed.

$$\frac{480 \text{ gallons per day}}{0.3 \text{ gallons per day per sq ft}} = 1,600 \text{ square feet}$$

While that is a significant amount of soil to import, it is an option to get consider and evaluate. We have had systems do that, especially in areas where they were restricted due to setbacks, land availability, soil conditions, or limited by how the site was used.

An option to consider is to hire Mr. Gaines or another soils scientist available to dig additional pits around the site to see if there is an area where they think a subsurface system can go in. If they locate an area for a subsurface system, then your engineer would use the information from the soil scientist to design the system. An issue we have seen with animal kennels and subsurface systems is that the amount of hair from the animals can lead to clogging. A geohydrologic evaluation from Missouri Geological Survey would be required if the system is to go subsurface. As the geologist have been out on site previously when a discharge option was previously considered, I would recommend calling the geologist, Fletcher Bone, to discuss what additional information he may need to update the site evaluation for a subsurface system.

If you close the lagoon, and only have a subsurface system, no construction permit from DNR is required because it is an industrial facility, however, an operating permit would be required with an annual fee and the engineer would need to certify with the operating permit application that system was constructed per DNR's regulations in 10 CSR 20-8, specifically 10 CSR 20-8.200(7)-(9). It appears the annual fee for the operating permit would be \$1,800. The operating permit forms would be Form A and Form R, I believe. If you want to pursue this option, I can help get you in contact with the correct person to answer questions on the operating permit process.

Another option to consider is to install another large septic tank, such as a 5,000 gallon or larger tank and still pump and haul. Continuing to pump and haul will allow the facility to be exempt from DNR's construction and operating permitting requirements.

If the Village of Innsbrook forces a decision, we would recommend you do a cost analysis of the additional engineering work and soils work, possibly importing soils, plus permitting requirements for a subsurface system or the cost to install additional septic tanks and continue with the plan to pump and haul. We have seen facilities install the larger tanks and pump and haul for a period of time, while they do the engineering and soils work to put in a subsurface system. They often do that so facility can begin operations while they work through the permitting process.

January 22, 2024

Ganey Engineering LLC

3405 Old State Road M, 63052, MO 63052
314-973-0377 ganeyengineering@yahoo.com

- septic system design
- septic system evaluations
- Aeration Unit Supplier
- sewer system design
- onsite wastewater consulting
- storm water consulting

System Evaluation

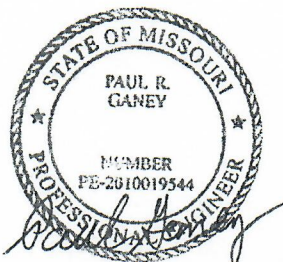
Location: 13620 Highway M
Wright City, MO 63390

An evaluation of the lagoon installed at 13620 Highway M was made on January 17, 2024. The lagoon has a potential water surface area of approximately 1750 sf with a 1000-gallon tank for pretreatment/solids holding. The lagoon's location allows for the required 300-foot setback from the proposed well and allows for required setbacks from neighboring wells. The location of the lagoon is at the lowest point of the property to allow for proper drainage from the building to the tank and lagoon. The required setback of 50 feet has been met. The lagoon as installed will function properly per MODNR requirements as a treatment facility.

Alternative subsurface systems such as drip irrigation or similar are not recommended for these types of facilities. Animal waste and/or hair can cause treatment issues resulting in odors from treatment tanks used for subsurface drip fields. The waste generated can also lead to clogged filters and field failure leading to possible surfacing effluent and/or discharge. Lagoons with pretreatment are usually recommended and installed.

Relocating the lagoon to the back of the property will cause multiple issues. The well setback will not be able to be met from the proposed well and from any potential future wells on the neighboring properties. Other required setbacks will also be very challenging to meet. A pump tank will need to be installed to pump the water to the back of the property. The potential for clogging the pump is high and could cause over flow and/or discharge if it occurs. The best form of waste water treatment for the property to protect public health is the use of the existing lagoon in place.

Sincerely,
Paul R. Ganey, P.E.





CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
11/21/2023

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 Scott Agency, Inc. 408 N. Sturgeon St. P.O. Box 87 Montgomery City MO 63361		CONTACT NAME: Amanda Hawkins Mary Ann Feise PHONE (A/C, No, Ext): (573) 564-2237 FAX (A/C, No): (573) 564-2569 E-MAIL ADDRESS:																						
INSURED Wags and Whiskers 13620 State Hwy M Innsbrook MO 63390		<table border="1"> <thead> <tr> <th colspan="2">INSURER(S) AFFORDING COVERAGE</th> <th>NAIC #</th> </tr> </thead> <tbody> <tr> <td>INSURER A :</td> <td>Evanston Insurance Company</td> <td></td> </tr> <tr> <td>INSURER B :</td> <td></td> <td></td> </tr> <tr> <td>INSURER C :</td> <td></td> <td></td> </tr> <tr> <td>INSURER D :</td> <td></td> <td></td> </tr> <tr> <td>INSURER E :</td> <td></td> <td></td> </tr> <tr> <td>INSURER F :</td> <td></td> <td></td> </tr> </tbody> </table>		INSURER(S) AFFORDING COVERAGE		NAIC #	INSURER A :	Evanston Insurance Company		INSURER B :			INSURER C :			INSURER D :			INSURER E :			INSURER F :		
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COVERAGES CERTIFICATE NUMBER: 23-24 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	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:			3AA727967	11/12/2023	11/12/2024	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ Excluded \$
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<input type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		N/A				<input type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 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		CANCELLATION	
Village of Innsbrook 1835 Highway F Innsbrook MO 63390		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 <i>Mary Ann Feise</i>	



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
11/21/2023

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INSURED Wags and Whiskers 13620 State Hwy M Innsbrook MO 63390		INSURER(S) AFFORDING COVERAGE INSURER A: Evanston Insurance Company INSURER B: INSURER C: INSURER D: INSURER E: INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** CL23112105077 **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	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR			3AA618671	11/12/2022	11/12/2023	EACH OCCURRENCE \$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:						DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ Excluded
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		N/A				PER STATUTE OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$

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LOCHESS
LAWNS & LANDSCAPING, L.L.C.

Lewis-Bade, Inc.

Registered Land Surveyors & Professional Engineers

101 East Walton, Warrenton, Mo 63383

Ph. (636) 456-2615. Fax (636) 456-7252

ENGINEER'S REPORT (FACILITY PLAN)/SUMMARY OF DESIGN

Wags and Whiskers

Lagoon Evaluation

File Number: 23173

Prepared by Lewis-Bade, Inc --July 6, 2023


Wags and Whiskers is an animal shelter located in Innsbrook, MO near the intersection of Missouri State Highway "F" and Highway "M" in the NW ¼ Section 33, T47N, R1W Warren County, Missouri. The area drains into an unnamed tributary to Skunk Creek and then to Peruque Creek.

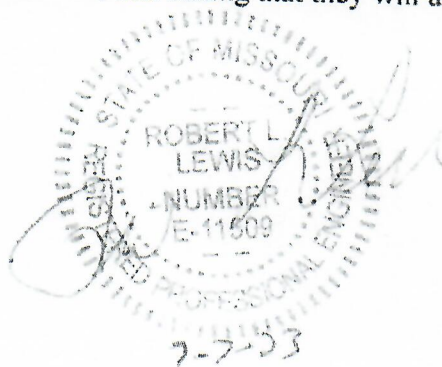
The facility will utilize a septic tank and lagoon for wastewater storage and a pump and haul contractor for final treatment. A one-cell lagoon system is located in the northeast portion of the site. The design average daily flow designed for this lagoon is 480 gpd at full capacity. The current sewer collection system is a gravity 4" diameter PVC pipe and a 1000 gallon septic tank prior to entering the lagoon. The septic tank will allow for collection of solids to keep sludge from filling the lagoon.

Potable water to the site is currently served by St. Charles Public Water Supply District #2. It is recommended to monitor water usage to help minimize usage and to reduce treatment costs.

Using a maximum capacity of 29 animal residents at 15 gpd and 2 volunteers/employees at 10 gpd on the site each day have a total of 480 gpd. This usage can be significantly reduced if a sawdust/woodchip waste collection is used for animal waste removal and cleaning with water is used less than a daily basis. The animal waste and litter will be discarded through solid waste disposal. Since the operations have not been fully established and could change using 15 gpd/animal should cover cleaning with low-pressure water on a daily basis. The disinfecting process will utilize "Rescue" disinfectant with active ingredient Hydrogen Peroxide 4.25%. The grooming/cleaning of animal residents will only occur if needed.

The lagoon has a berm with a top elevation of 826.1', width of 6' and backslope of 4:1 or flatter. The capacity of the lagoon storage system has been evaluated (see attached calculation sheet). The lagoon has the storage capacity of approximately 94 days of design flows to elevation 824.6' which is 1' below the emergency overflow spillway and 143 days to the emergency spillway. The lagoon will need to be modified by removing the discharge piping and adding a measuring post to remind the facility operators to have the lagoon pumped and hauled if needed more than a scheduled pump and haul. The facility should contract with an authorized wastewater pump and hauler with a regularly scheduled pump and haul for the lagoon effluent. The septic tank should be pumped at least once a year minimum. See attached letter from Contract hauler, All Star Pumping and Sewer Service, Inc. stating that they will accept the waste.


Robert L. Lewis, E-11509



Project: Wags and Whiskers (Lagoon Modifications) - 23173

File: Lagoon Modifications revised 6-30-23.xls

6/7/2023 <Start date
7/6/2023 <Print date
3:38 PM <Print Time

Ref Handbook of Applied Hyd. - Davis - 2nd Edition - McGraw-Hill - p892
Hazen-Williams - Circ. pipe formulas $h = kQ^{1.85}$ $h = \text{head loss in ft}$ $k = \text{constant}$
 $Q = \text{quan gpm}$, $k = (3.55 / C)^{1.85} \cdot (L/d^{4.87})$ $L = \text{pipe length in ft}$ $d = \text{pipe dia. in inches}$

SOURCE	Units	Persons/ Unit	Gal./ Person	Total gpd	BOD/ Person	BOD lb	BOD mg/L
Employees /Volunteers	2	1.0	10	20	0.17	0.34	2037.1
Animal Residents (maximum capacity)	20	1.0	15	435	0.17	4.93	1358.0
Food Prep Area	1	1.0	25	25	0.17	0.17	814.8
SEWAGE TOTALS (for Lagoon Storage Calcs)=			480			5.44	1358.0

Annual Rainfall (in)	Estimated Rainfall minus Evap. Rate (in)	Daily (in)	Lagoon Surf. Area (sf)	Volume cf/day	gal/day
20	0.055	1611	7	55	0
FLOW TOTALS (for Land Application Calcs)=				535	5.44

Max. for 90 day Period (in)	10	0.111	1611	15	112	0	0.00	0.0
-----------------------------	----	-------	------	----	-----	---	------	-----

Note: Total flow includes the 1-in 10 yr rainfall minus evaporation per the Operating Permit (assumed no BOD added)

QUANTITIES TO BE USED.

(If other method is used for ADF & BOD, insert values below)
7/6/2023 <Print date

ADF Small Plant gpd	BOD lb.	POP. EQUIVALENT		Dry Sludge ton/year	Flow Peak Factor
		by BOD	by ADF		
480	5.44	32	5	0.48	4.00

100 gpd/person used to determine pop. equiv.
0.17 lb. BOD/person to calc. pop. equiv. (203.7 mg/l)
0.015 ton/yr dry sludge/pop equiv.
0% BOD reduction of filtered effluent from septic tank

Project: Wags and Whiskers (Lagoon Modifications) - 23173
7/6/2023 <Print date

Sewage Flow: 480 gal/day with 120 days required detention for Land Application (central Missouri)
 Lagoon Storage Requirement: 57,600 gal = 7,701 cf (for 120 days)
 Annual Sewage Generated: 175,200 gal = 23,422 cf (365 days)

Lagoon Volume Provided:
Cells #2 (proposed)*:

Elevation	Area (sf)	Volume (cf)	Elevation Desc.	Storage Volume (cf)	Cum. Storage Volume (cf)
820	0	0			
821	1	1	Bottom Pond	1	1
821.1	224	22.4		23	24
822	392	352.8		376	401
823	638	638		1014	1,415
824	971	971		1985	3,400
824.6	1100	660	1 below Em. Ovrflw	2645	6,045
825	1249	499.6	Emerg. Overflow	3145	9,190
825.6	1350	810	Top Beam	0	
826.1	1611	805.5		9190	

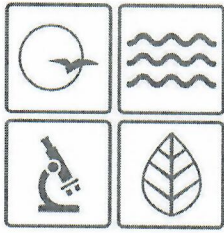
Cell #2 Total:

143 days

TOTALS:

9,190

143 days



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Michael L. Parson
Governor

Dru Buntin
Director

LWE23063
Warren County

March 14, 2023

Mitchell Turnpin
M. Turnpin Services, LLC
PO Box 321
Wright City, MO 63390

RE: Wags & Whiskers

Dear Mitchell Turnpin:

On January 25, 2023, the Missouri Geological Survey received a request to perform a geohydrologic evaluation for the above referenced project located in Warren County. Included with this letter is a report that details the geologic and hydrologic conditions at the site and the potential for groundwater contamination in the event of wastewater treatment failure.

Thank you for the evaluation request. If you are in need of further assistance or have questions regarding the report, please contact our office at P.O Box 250, Rolla, Mo 65402-0250, by telephone at 573-368-2100 or gspg@dnr.mo.gov.

Sincerely,

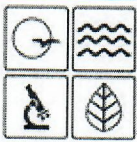
MISSOURI GEOLOGICAL SURVEY

Fletcher N. Bone
Geologist
Environmental Geology Section



c: Wags and Whiskers Wags and Whiskers
WPP
St. Louis Regional Office

03/14/2023



Request Details

Project: Wags & Whiskers

Legal Description: 33 T47N R01W

Quadrangle: WRIGHT CITY

Latitude: 38 47 30.72

Longitude: -91 1 49.5

Organization Official

Name: Wags and Whiskers Wags and Whiskers
 Address: 13620 Highway M
 City: Wright City
 State: MO Zip: 63390
 Phone: 636-262-6230
 Email: mbohm1969@gmail.com

Preparer

Name: Mitchell Turnpin
 Address: PO Box 321
 City: Wright City
 State: MO Zip: 63390
 Phone: 636-262-6230
 Email: mturnpinservicesllc@yahoo.com

Project Details

Report Date: 03/14/2023
Date of Field Visit: 03/13/2023

Previous Reports: Not Applicable

Facility Type

- Mechanical treatment plant
- Recirculating filter bed
- Land application
- Lagoon or storage basin
- Subsurface soil absorption system
- Lagoon or storage basin W/Land App
- Lagoon or storage basin W/SSAS
- Other type of facility

Type of Waste

- Animal
- Human
- Process or industrial
- Leachate
- Other waste type

Funding Source

- IWT
- WWL-SRF

Additional Information

- Plans were submitted
- Site was investigated by NRCS
- Soil or geotechnical data were submitted

Geologic Stream Classification: Gaining Losing No discharge

Overall Geologic Limitations

- Slight
- Moderate
- Severe

Collapse Potential

- Not applicable
- Slight
- Moderate
- Severe

Topography

- <4%
- 4% to 8%
- 8% to 15%
- >15%

Landscape Position

- Broad uplands Floodplain
- Ridgetop Alluvial plain
- Hillslope Terrace
- Narrow ravine Sinkhole

Bedrock:

The uppermost bedrock is Mississippian-age Kinderhookian Series and Devonian System Undifferentiated or Ordovician-age Kimmswick Limestone

Surficial Materials:

The surficial materials are silty loam and silty, clay loam.



Missouri Department Of Natural Resources
 Missouri Geological Survey
 Geological Survey Program
 Environmental Geology Section

Project ID Number
LWE23063
 County
Warren County

Recommended Construction Procedures for Earthen Facility

- Installation of clay pad and Compaction
- Diversion of subsurface flow
- Artificial sealing
- Rock excavation
- Limit excavation depth

Determine Overburden Properties

- Particle size analysis
- Atterberg limits
- 95% Max. dry density test method
- Overburden thickness
- Permeability coefficient-undisturbed
- Permeability coefficient-remolded

Determine Hydrologic Conditions

- Groundwater elevation
- Direction of groundwater flow
- 25-Year flood level
- 100-Year flood level

Remarks:

On March 13, 2023, a geologist from the Missouri Geological Survey conducted a geohydrologic evaluation for a newly constructed wastewater treatment facility (WWTF) for Wags & Whiskers in Warren County, Missouri. The storage basin is less than 1 acre in size and is proposed to be discharging. The purpose of the site visit is to observe the geologic and hydrologic elements and determine the potential for groundwater contamination in the event of liner or wastewater treatment failure.

Bedrock was not observed onsite, however, nearby geologic mapping indicates that the uppermost bedrock is Mississippian-age Kinderhookian Series and Devonian System Undifferentiated or Ordovician-age Kimmswick Limestone. Both of these bedrock-types can be karst, meaning it readily dissolves to form sinkholes, springs, and losing streams and has high permeability. Surficial materials consist of at least 20 feet of moderately permeable silt loam and silty, clay loam.

Surface water runoff from the site is north into a tributary of Peruque Creek. The tributary of Peruque Creek was evaluated during this site visit and classified as gaining for 2.0 miles downstream of the outfall.

There are no know sinkholes or geologic structures located within 1 mile of the site. However, there is an unnamed springs located 0.6 miles east of the facility. There is at least 2 drinking water wells located within 1/4 mile of the site.

Based on the characteristics observed, the site receives a slight overall geologic limitations rating and a slight collapse potential rating. In the event of wastewater treatment failure, the local, shallow groundwater, and surface waters of the tributary of Peruque Creek, may be adversely impacted.

GAINES SOIL CONSULTING

8611 Wieseman Road
 Worden, Illinois 62097
 618/459-8619 or 636/947-1221
 Email: doug@gainessoil.com

SOIL EVALUATION REPORT

Client: Mitchell Turpin
 M Turpin Services
 P.O. Box 321
 Wright City, Missouri 63390
 636/262-6230

Report: November 07, 2022

Site: Animal Rescue Facility
 13620 Highway M

County: Warren
 Date: November 04, 2022
 Job No: G221472

Sample Locations: see site sketch

Detailed Soil Description¹ / Interpretations - Pit 1

Depth (in)	Matrix Color ²	Texture	Mottles ²	Structure	Consistence	Coatings ²	Notes	Permeability & Loading Rate ³ in (G/D/Ft. ²)
0 - 8	10YR 3/2	Silt Loam -15 - 25% Clay	--	Moderate Fine Subangular Blocky	Friable	--	--	0.5 Group 3
8 - 13	10YR 4/2	Silt Loam -25 - 27% Clay	Many Very Fine Prominent 7.5YR 4/4	Weak Fine Subangular Blocky	Friable	--	Many Medium Fe & Mn Accumulations	0.6 Group 3
13 - 19	10YR 4/1	Silty Clay / Clay >40% Clay	Common Very Fine Prominent 2.5YR 5/4	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Extremely Firm	Very Few Faint 10YR 3/2	Common Medium Fe & Mn Accumulations	Not Suitable Group 4b
19 - 26	2.5Y 5/2	Silty Clay / Clay >40% Clay	Common Fine Prominent 10YR 4/4	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Extremely Firm	Very Few Faint 10YR 3/2	Common Medium Fe & Mn Accumulations	
26 - 34	2.5Y 5/1	Silty Clay / Clay >40% Clay	Common Fine Prominent 7.5YR 4/4	Moderate Medium Prismatic / Moderate Medium Subangular Blocky	Extremely Firm	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	
34 - 42	2.5Y 5/1	Silty Clay Loam -35 - 40% Clay	Common Coarse Prominent 10YR 5/6	Moderate Coarse Prismatic / Moderate Medium Angular Blocky	Very Firm	--	Common Medium Fe & Mn Accumulations	0.2 Group 3
42 - 60	2.5Y 5/1	Silty Clay Loam -27 - 30% Clay	Common Coarse Prominent 10YR 5/6	Moderate Coarse Prismatic / Moderate Medium Angular Blocky	Friable	--	Common Medium Fe & Mn Accumulations	0.5 Group 3

Soil profile was a somewhat poorly drained soil. Low chroma (2 or less) or iron/manganese accumulations signifying seasonal high groundwater level (seasonal saturation) was 8 inches. General landscape was of rolling topography. Soil pit site was a convex slope of 0-1% northwest. Bedrock greater than 72 inches.

Detailed Soil Description¹ / Interpretations - Pit 2

Depth (in)	Matrix Color ²	Texture	Mottles ²	Structure	Consistence	Coatings ²	Notes	Permeability & Loading Rate ³ in (G/D/Ft. ²)
0 - 10	10YR 3/2	Silt Loam -25 - 27% Clay	--	Moderate Coarse Subangular Blocky / Moderate Medium Subangular Blocky	Friable	--	--	0.5 Group 3
10 - 24	10YR 5/4	Silty Clay / Clay >40% Clay	Common Fine Distinct 10YR 4/2 Common Very Fine Prominent 2.5YR 5/4	Moderate Coarse Subangular Blocky	Extremely Firm	Few Faint 10YR 3/2	--	Not Suitable Group 4b
24 - 34	10YR 5/4	Silty Clay / Clay >40% Clay	Many Medium Prominent 2.5Y 5/1 Common Fine Prominent 7.5YR 5/6	Moderate Coarse Prismatic / Moderate Coarse Subangular Blocky	Extremely Firm	Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	
34 - 48	2.5Y 5/1	Silty Clay Loam -35 - 40% Clay	Common Medium Prominent 7.5YR 5/6 Common Medium Distinct 2.5Y 5/6	Weak Coarse Prismatic	Very Firm	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	0.15 Group 3
48 - 60	2.5Y 5/1	Silty Clay Loam -30 - 35% Clay	Common Medium Prominent 7.5YR 5/6 Common Medium Distinct 2.5Y 5/6	Weak Coarse Prismatic	Firm	--	Common Medium Fe & Mn Accumulations	0.3 Group 3

Soil profile was a somewhat poorly drained soil. Low chroma (2 or less) or iron/manganese accumulations signifying seasonal high groundwater level (seasonal saturation) was 10 inches. General landscape was of rolling topography. Soil pit site was a convex slope of 1% with runoff entering from the southeast. Bedrock greater than 72 inches.

Detailed Soil Description¹ / Interpretations - Pit 3

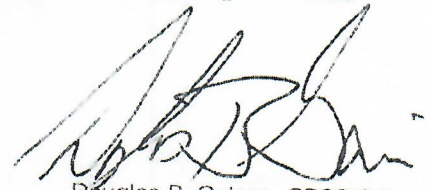
Depth (in)	Matrix Color ²	Texture	Mottles ²	Structure	Consistence	Coatings ²	Notes	Permeability & Loading Rate ³ in (G/D/Ft. ²)
0 - 8	10YR 3/2	Silt Loam -15 - 25% Clay	-	Strong Coarse Subangular Blocky / Strong Medium Platy	Firm	-	-	0.3 Group 3
8 - 13	10YR 4/2	Silt Loam -25 - 27% Clay	Common Very Fine Prominent 7.5YR 4/4	Weak Medium Subangular Blocky	Extremely Firm	-	Compacted Common Fine Fe & Mn Accumulations	0.2 Group 3
13 - 25	10YR 4/2	Silty Clay / Clay >40% Clay	Many Very Fine Prominent 2.5YR 5/4	Moderate Medium Prismatic	Extremely Firm	Very Few Faint 10YR 4/2	Few Medium Fe & Mn Accumulations	Not Suitable Group 4b
25 - 37	10YR 5/2	Silty Clay / Clay >40% Clay	Common Fine Distinct 10YR 5/4	Weak Medium Prismatic	Extremely Firm	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	
37 - 43	2.5Y 6/1	Silty Clay Loam -30 - 35% Clay	Many Medium Prominent 7.5YR 5/6	Moderate Coarse Prismatic / Weak Coarse Subangular Blocky	Firm	Very Few Faint 10YR 4/2	Common Medium Fe & Mn Accumulations	0.3 Group 3
43 - 60	2.5Y 5/1	Silty Clay Loam -27 - 30% Clay	Common Coarse Prominent 7.5YR 5/6	Moderate Coarse Prismatic / Weak Coarse Subangular Blocky	Friable	-	Common Medium Fe & Mn Accumulations	0.4 Group 3

Soil profile was a somewhat poorly drained soil. Low chroma (2 or less) or iron/manganese accumulations signifying seasonal high groundwater level (seasonal saturation) was 8 inches. General landscape was of rolling topography. Soil pit site was a convex slope of 0-1%. Bedrock greater than 72 inches.

Remarks:

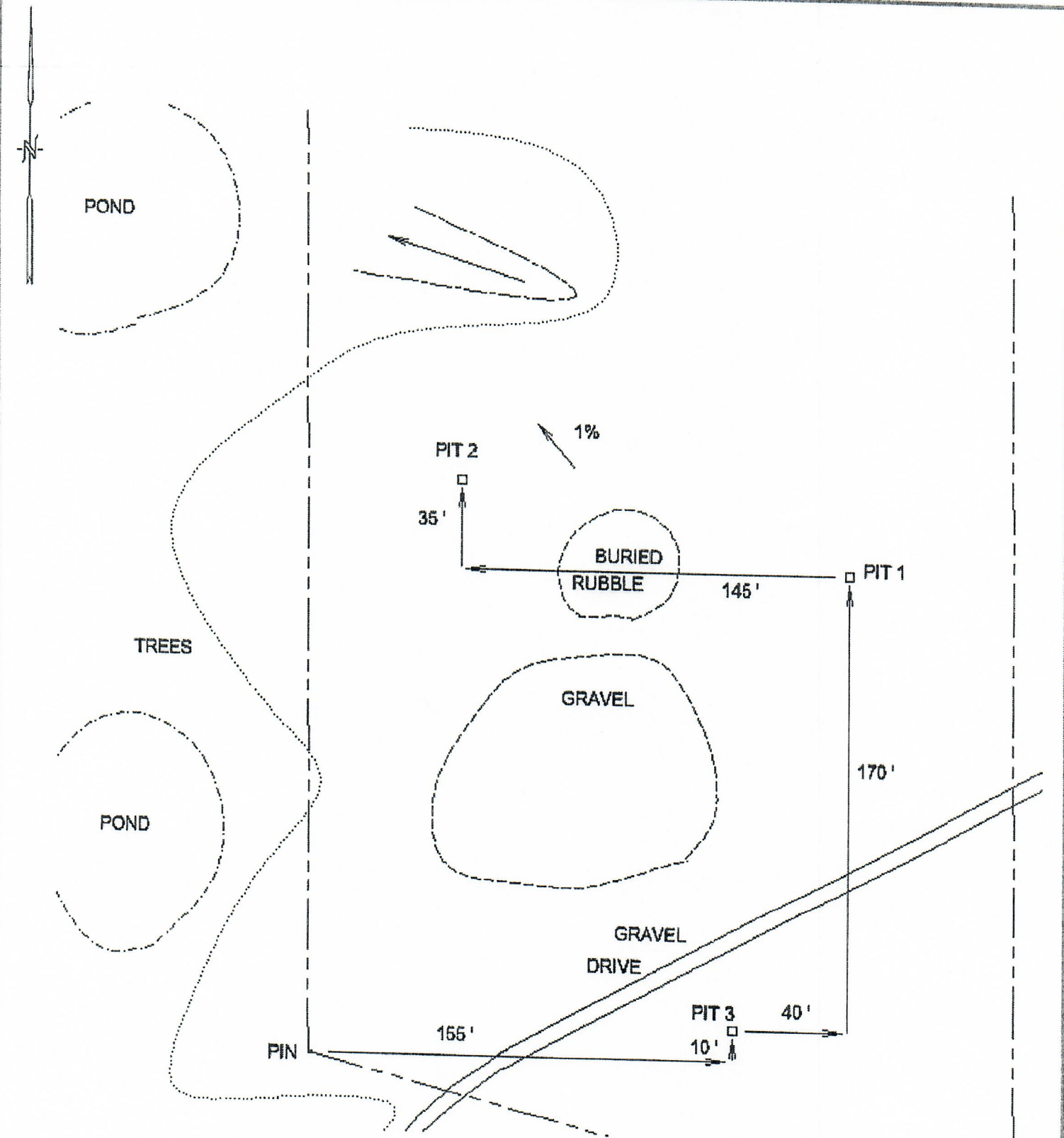
New construction for on-site septic system for an animal rescue facility.
 NOTE: For best results Do Not disturb, pasture, or drive heavy machinery on lateral field area at any time. The suitability of the soils will be affected and the inspector may not approve area if it has been disturbed prior to construction. Proposed drain field area should be fenced off to help prevent any disturbance.
 GAINES SOIL CONSULTING does not represent nor warrant the operation or proper functioning of installed system for any period of time.

cc: Warren County Office of Environmental Sanitation



Douglas B. Gaines, CPSS/SC
Principal

¹ USDA Soil Survey Manual, Ag Handbook N-18, (1993)
² Soil color designations, Munsell Soil Color Charts, (2009)
³ Missouri Laws accompanied by Department of Health Rules Governing On Site Sewage Systems (October 1995) Table 13 - Conventional; Table 14 - Alternative (use half of above listed loading rate)
 Loading Rate Estimated due to no listing in the Missouri Laws



NO SCALE
 DISTANCES APPROXIMATED

ANIMAL RESCUE FACILITY	
13620 Highway M Warren County, Missouri	
G221472	November 2022
GAINES SOIL CONSULTING	