LINE AND GRADE
Civil Engineering

SPECIAL USE PERMIT (SP202400023)

TO: Syd Shoaf
Senior Planner
Albemarle County Community Development

FROM: Kendra Moon, PE
Line and Grade Civil Engineering

DATE: *September 16, 2024*
Revised January 6, 2025

RE: CBI Forest School - Dudley
Special Use Permit Application

PROJECT DETAILS

Applicant:	CBI Forest School
Consultant:	Line and Grade Civil Engineering | Kendra G. Moon, PE
Name of Project:	CBI Forest School - Dudley
Short Description:	Special Use Permit for a private school in a Rural Area
Proposed Site:	1648 Dudley Mountain Road, Charlottesville VA, 22903

PROPERTY DETAILS

Parcel ID Number:	08900-00-00-06400
Short Parcel ID:	89-64
Total Acres:	155.96 acres
Owner:	Julie & Jeffrey Morrill, Trustees of the Julie Aileen Barron Morrill Living Trust
Current Tenant:	Vacant
Magisterial District:	Samuel Miller
Zoning:	Rural Areas
Proffered:	No
Overlays:	None
Comprehensive Plan Area:	Rural Area 4
Comprehensive Plan Use:	Rural Area
Land Use:	Agricultural
Surrounding Uses:	North – Forest zoned RA and single-family zoned RA East – Single-family zoned RA and agricultural zoned RA South – Single-family zoned RA West – Single-family zoned RA

EXECUTIVE SUMMARY

Congregation Beth Israel (CBI) would like to formally request a Special Use Permit (SP) to allow for a private school with a maximum enrollment of 144 students, ages 18 months through 5th grade, on a rural area parcel (TMP 89-64) in Albemarle County, Virginia. The location of the Forest School within a large, natural site like this one is essential to their operations, as is their purposeful integration with the existing landscape. This proposed use is consistent with the Comprehensive Plan in that it is a supportive use within the community, it is a low impact and reversible use, conservation efforts are implemented throughout, and the rural character of this property is preserved. The Forest School helps to serve a huge need for childcare in the Charlottesville and Albemarle area, including the rural areas, especially for the 18 month – kindergarten age range. The location of this property so close to the center of Albemarle makes it more accessible to all.

LINE AND GRADE
Civil Engineering

Site Mapping

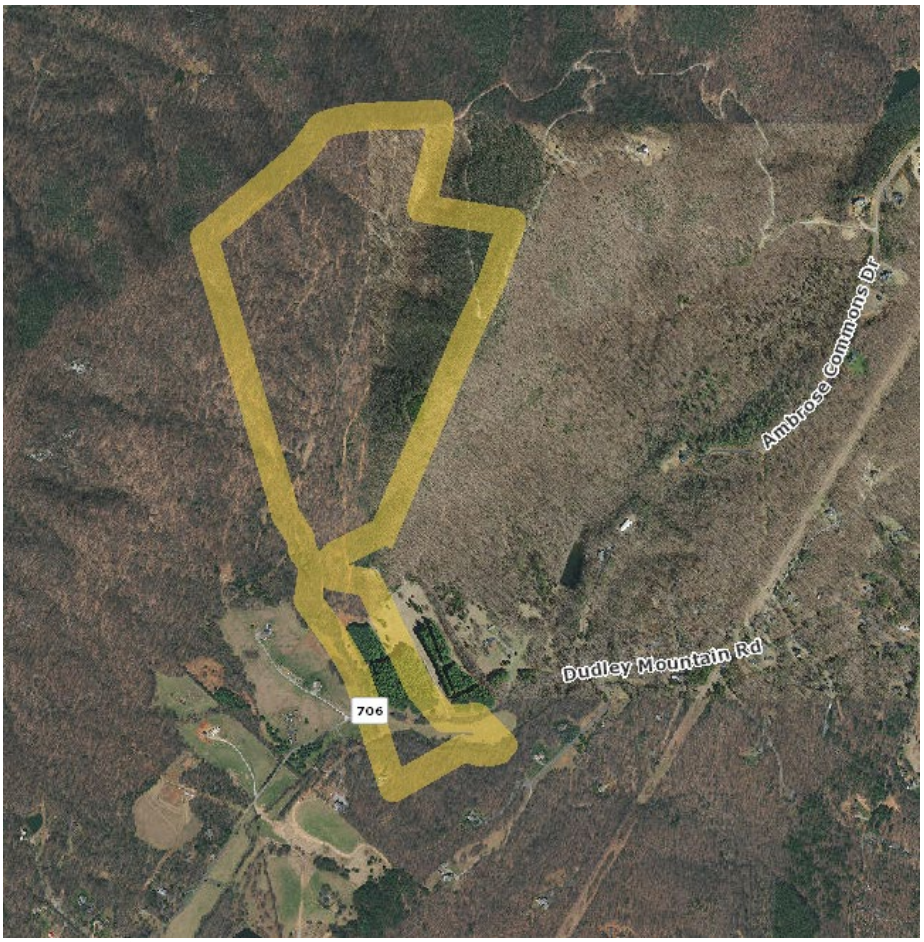


Image 1 – Subject parcel, source: Albemarle County GIS

Image 2 – Subject parcel, looking northwest from near Dudley Mountain Road, source: JCLA Studio

LINE AND GRADE
Civil Engineering

BACKGROUND

In March 2020, CBI Preschool and Kindergarten closed its doors along with the rest of the world and embarked on virtual learning. They created the Forest School from a need to support children and the community. By inviting the older siblings to attend, they ensured the school would remain a tight-knit community and stay in-person during the pandemic.

The outdoors provides the perfect tapestry for innovative learning experiences. CBI Forest School supports children through a developmental, constructivist approach which recognizes and addresses individual growth and needs of students and creates opportunities for children to grow at their own pace. The Elementary Program continues to support students as they develop life skills and have ample opportunities for collaboration, exploration, and independent play. The natural world is their springboard for building a strong foundation of academic, social, and problem-solving skills. Students learn how to set goals, research, and collaborate. All of these endeavors help to foster a love of learning rooted in questions, listening, observation, synthesis and connection. By participating in outdoor, experiential learning, students become active participants in their educational journey, learning with agency, interconnectedness, and responsibility to their greater community.

In response to the overwhelming success and demand for early childhood education in the community, CBI Forest School has been in need of a permanent site to host their program since its conception. During the pandemic, the school was hosted at Camp Holiday Trails as facilities were already in existence there to meet their needs as an outdoor school. Cabins were transformed into classrooms, fulfilling the needs of indoor space. The school submitted for a special use permit in 2023 for an existing developed property off of Owensville Road to convert it to a school, but ran into prohibitive costs due to site access issues coupled with a 10 year lease that caused them to withdraw that application. CBI Forest School is currently hosted at MACAA in Charlottesville, a site at which they will be unable to remain due to the construction of new housing units in 2025. The current property owner of TMP 89-64 has offered to donate this land off of Dudley Mountain Road to the CBI Forest School so that they may establish roots in a permanent location to continue serving young children and families in Albemarle County.

EXISTING SITE CONDITIONS

The parcel is 156 acres and is currently vacant, with no existing buildings or infrastructure on site aside from a driveway and farm road (see Appendix A). It has three distinct areas, the property south of Dudley Mountain Road which is largely within the WPO stream buffer, the immediate 15 acres north of Dudley Mountain Road which has previously been disturbed with cleared areas of open meadow and a pine tree plantation, and the remainder of the parcel north which is more mountainous and heavily forested. Large portions of the northern-most part of the property are within critical slopes and mountain protection areas.

The property currently has 4 development rights, though there were previous concepts to subdivide this parcel and the adjacent parcel TMP 89-64A into 12 total lots by utilizing the theoretical achievable lots with a Rural Preservation Development.

It should be noted that the existing parcel boundaries between TMP 89-64 and 89-64A vary drastically from what is shown on Albemarle County's GIS platform. Based on a survey from Bell Land Surveys, the driveway to the residence on TMP 89-64A was actually built on this subject property. A new driveway was recently constructed at TMP 89-64A to rectify that.

PROPOSAL

This special use permit proposes the development of a private school with a maximum enrollment of 144 students, including a main basecamp for classroom and administrative spaces, three classroom cabins, and a small security building in the first phase of development. There is a second phase that is envisioned for two additional cabins with support functions such as art or library spaces and a by-right religious assembly building that may host some functions for the Congregation Beth Israel in the future. The religious assembly building will be the largest of the buildings on site, with a maximum footprint of 11,000 square feet[1]. The basecamp is proposed to be 6,415 square feet maximum[2], the classroom cabins have a

[1] The exact needs of this building are not yet known, but it is included to give the full picture of potential site buildout. This building is not to be part of the school's program.

[2] Refers to enclosed building area.

maximum area of 1,200 square feet each, and the security building is 144 square feet maximum. Buildings are to be less than 35 feet in height as is consistent with Rural Areas zoning. All proposed development on this site will be within the 15 acres of the parcel just north of Dudley Mountain Road, and the entire property will be placed in a conservation easement which will limit future development and ensure the property is protected (see Appendix B).

A summary table of the proposal is included below.

Table 1 - Summary of Proposal

Summary of Proposal	
Maximum Enrollment	144 students
Maximum Enclosed Building Area	23,600 SF
Yearly Use of Site	Nearly Year Round, School Year + 8 Weeks Summer
Daily School Operation Hours	8 am to 5 pm
School Drop Off Period	8 am to 9 am
Water and Sewer	Private, On Site
Food Preparation on Site?	No
Proposed Side Building Setbacks	50 ft (increased from 25 ft in Rural Areas)
Lighting	Full Cut-Off Fixtures, Limited Hours
Traffic Alleviation	Shuttle to be Offered

Site Operations

The proposed Forest School would operate roughly between the hours of 8 am to 5 pm Monday through Friday during the regular school year, with day camps operating in the summer within that same time frame. Dropoff for all students is to be expanded to one hour between 8 and 9 am to alleviate peak morning traffic, and regular pickup is between 3-3:15, with some students staying until 5 for after-school care. The school has a maximum enrollment of 144 students and traffic flow is expected to be heaviest in the mornings, with around 112 vehicles during the peak morning hour according to ITE Trip Generation data.

There are approximately 29 staff members expected to be on site during school hours, including a security guard. Typically only staff will be parked on site, as parents will utilize the drop off lanes to pick up and drop off students. Up to 5 times per year larger events may be held at the school where parents or grandparents are invited to join in activities with the students. In a future phase, the Religious Assembly Building may be used for gatherings for Congregation Beth Israel, with less than 200 attendees as to be allowable by-right in rural areas. The Congregation's use of the property would be weekends only and would not coincide or conflict with the school's use. Please see Appendix C for additional parking information related to the two site uses.

There will be bathrooms located on site in most of the buildings, with a private septic and well system to serve the site as public water and sewer are not available. There is no food preparation proposed on site. As the site is proposed to be used during the daytime, lighting is only anticipated to be needed seldomly and will therefore have limited hours. Lighting will be full-cutoff as to be dark sky compliant.

Site Layout

The existing entrance to the site is proposed to be relocated towards the center of the site to provide adequate access with proper sight distance and generally better visibility than the existing entrance (see Appendix E). The internal travelway from the site parking lot area to the point of drop-off provides over 700 feet of internal queuing space, allowing for up to 30 vehicles to queue safely within the site. The drop-off loop and ADA parking are located close to the basecamp, and there are ADA paths between each school building. The school buildings are strategically located to keep younger students closer to the core of campus in the basecamp/administrative building, while older students are slightly farther away in separate classroom cabins. A minimum 50 ft side setback is proposed to provide a typical commercial setback from adjacent properties, although the religious assembly building is by-right in the rural areas.

There is a main parking area proposed to serve everyday needs for the school, with an overflow parking lot and parallel parking available for larger, infrequent events located off the old driveway between the overflow parking and drop-off loop. See Appendix C for additional parking information. There is fire access along the main road, with additional fire access on an unpaved farm road to reach within 150 ft of the cabin buildings. Fire access will be provided within 150 ft of all buildings. Vegetated screening will be located near the main fire access road adjacent to the religious assembly building to mitigate any negative effects to the neighbor at TMP 89-80B whose house is approximately 600 ft to the east. While as much of the pine plantation is to be preserved as possible, some buildings will be situated within the pines. There are unpaved trails through the site and a meadow with a small gathering area for rare school events. CBI owns approximately 10 acres opposite Dudley Mountain Road to the south, but no development is proposed here.

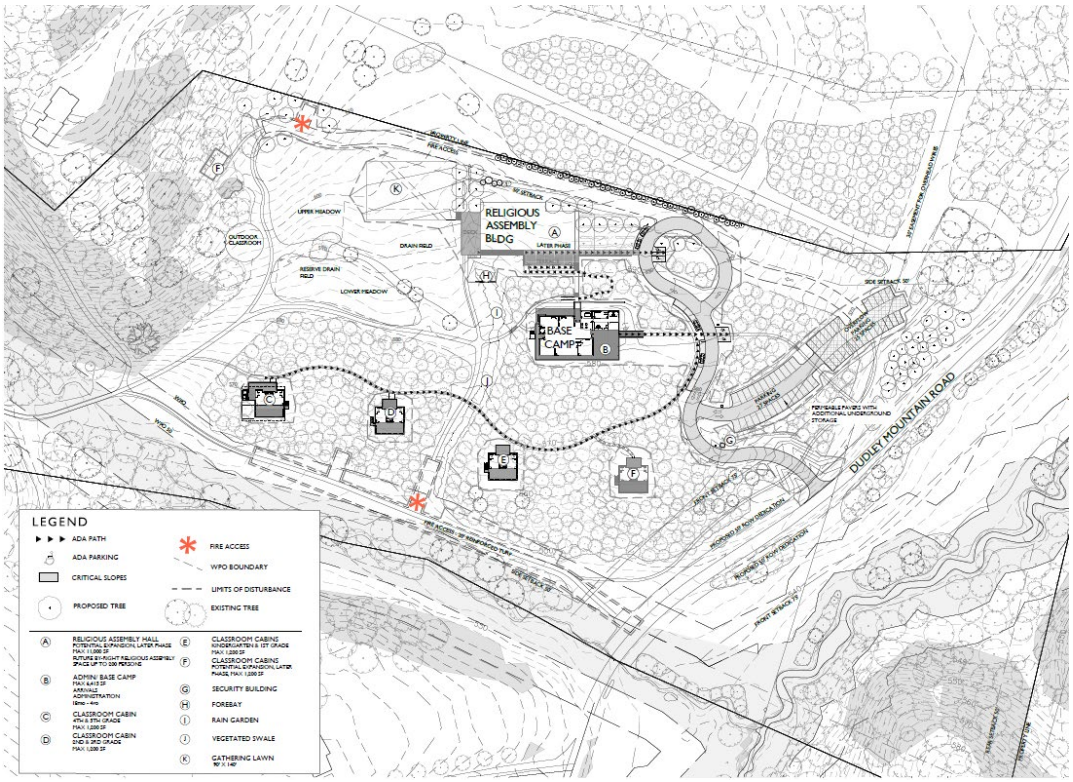


Image 3 - Concept Plan

Special Exceptions

One special exception request has been submitted alongside this special use permit to request deviation from surfacing and curb and gutter requirements within the parking lot. A brief description is included below.

EXCEPTION TO PARKING LOT DESIGN REQUIREMENTS (SE202400027)

One of the main objectives of this development is to keep a light footprint on the site and retain as much of its natural properties as possible. Curb and gutter, and asphalt to some degree, are all indicative of a more urban site. CBI Forest School would prefer gravel travelways and parking with drainage channels as opposed to asphalt, curb, gutter, and underground piping. Please see the Special Exception Request for more information.

CONSISTENCY WITH THE COMPREHENSIVE PLAN

This proposal is consistent with the Comprehensive Plan and meets the criteria for New Uses in the Rural Area. These criteria are stated below with an explanation of how this proposal meets each standard.

1. "Relate directly to the Rural Area and need a Rural Area location in order to be successful, (e.g., a farm winery has to be located in the Rural Area and would be unlikely to succeed in the Development Areas)."

The Forest School needs a Rural Area to be successful because its curriculum is centered around the natural environment and outdoor learning. The site has a number of environmental features that are not readily available within development areas and that are necessary for the type of educational experiences the Forest School aims to provide, including opportunities to observe wildlife, forests with abundant plant species and diverse terrain, and waterways that feed this ecosystem – all within a large unbroken ecosystem. This setting allows children to learn about the environment from the environment itself, not just through textbooks and carefully manicured parks.

Per the Comprehensive Plan, the preferred uses for the Rural Area include "supportive uses for agriculture, historic preservation, tourism, crossroads communities, and strengthening land conservation initiatives" (page 7.4). The Forest School is open to all students, regardless of their background; it is not exclusive to CBI members or Jewish families. The Forest School would support the existing community by offering educational opportunities closer to home that reflect the Rural Area's goals of land conservation and resource protection. The school itself also plays a role in strengthening land conservation initiatives; by placing the property into a conservation easement, the school minimizes the risk of habitat fragmentation and protects an important forest ecosystem that is supporting wildlife and providing clean water.

2. "Be compatible with, and have a negligible impact, on natural, cultural, and historic resources."

The proposal for this 156-acre parcel puts the land into a conservation easement, with only a small portion being used for development. CBI has already enrolled in the Department of Forestry Hardwood Initiative, with the first phase of activity focused on removing invasive species along the stream bisecting the property. CBI has also enrolled in the James River Buffer Program to remove invasive species and plant hardwoods in the riparian areas along either side of Dudley Mountain Road.

The owner, Jeff Morrill, has reached out to Attorney Lee Rasmussen to ensure that there would not be any difficulties in finding an easement holder for the property. Mr. Morrill has also reached out to Kim Biasiolli, who has experience working with the Department of Forestry in administering its easement program. Both conversations indicated that the educational use would not be in conflict with a conservation easement and that, in their belief and experience, most easement holders would accept the plan as is. This easement would extinguish all remaining development rights and limit any construction to what is proposed in the CBI Master Plan.

3. "Not in conflict with nearby agricultural and forestal uses."

This proposal does not conflict with nearby agricultural and forestal uses.

4. "Reflect a size and scale that complements the character of the area in which they will be located."

This is a very large parcel, and total development will be limited to a few modest buildings and dependencies. All proposed development on this site will be within the 15 acres of the parcel just north of Dudley Mountain Road, and a conservation easement will limit development to the CBI master plan in perpetuity. Appendix B shows the area's natural features and where development will be situated in relation to the site as a whole.

The buildings are situated to have minimal impact on surrounding residences. The religious assembly building has a 50 foot setback from the property line, which is double the required setback in this location. The classroom cabins are spread out and situated within the forest so that they are less visible and blend into the natural environment. The basecamp is also situated in the forest and, like the classroom cabins, does not abut any property lines or setbacks. The use of trails through the forest as the main connector between buildings helps to reflect the scale and character of the rural area and the inherent connections to nature that the school offers.

The scale of the proposed buildings is not out of proportion with existing surrounding residences, which are between 2,500-3,500 sf.

5. "Be reversible so that the land can easily return to farming, forestry, conservation, or other preferred rural uses."

This proposal keeps most of the land undisturbed and uses only a small fraction for development, within the general areas of previous site disturbance. Developed areas have a low impact on the surrounding environment and minimal footprint to preserve as much of the pine forest as possible. The buildings are built into the existing grade to minimize disturbance, rather than having one large building requiring mass grading and a greater disturbance area (see the proposed site sections). The majority of the proposed site disturbance and grading is for the proposed entrance and travelway, which contributes to better accessibility of the site regardless of the future use.

6. "Be suitable for existing rural roads and result in little discernible difference in traffic patterns."

The increased morning traffic on Dudley Mountain Road will likely be discernible as it is a very low volume road currently. That said, CBI is proposing to extend their morning drop off window to one hour long to spread out the peak volume during that time. They are also going to offer a shuttle service as an option, though the utilization of this is likely to be low considering the majority of their students are very young and in carseats. See the Traffic section below for more information.

7. "Generate little demand for fire and rescue and police service."

This proposal for a private school will generate little demand for fire rescue and police service as it is for young children with adult supervision, during the day only, and there will be a security guard on site while school is in session. Additional water will be stored on site in a cistern for fire and rescue services.

This site is served by the Monticello Fire Station located at 1515 Founders Place, which is about 6.3 miles away from TMP 89-64.

8. "Be able to operate without the need for public water and sewer."

This site will not be served by public water and sewer. Preliminary soils investigations have been conducted to identify suitable soils for an onsite drainfield, and a Tier 3 Groundwater Study and Fracture Trace Analysis have been performed (Appendix D).

9. "Be sustainable with available groundwater."

A Tier 3 Groundwater Study has been conducted to provide guidance on available groundwater in the area and any impact this development may have. Its findings suggest that the anticipated groundwater use on the site is sustainable given the watershed. More information on proposed water use is included in the Impacts section below. The site will be put into a conservation easement, which helps protect the groundwater supply. The majority of the site is forested and "forest cover is the most effective land cover for minimizing soil erosion and protecting water quality" (Comprehensive Plan page 4.35).

Additionally, the developed portion of the site includes green infrastructure throughout to provide natural stormwater management and address groundwater quality. This also provides educational opportunities for kids to learn about sustainability and environmental stewardship.

10. "Be consistent with other Rural Area policies."

This proposal maintains the plan's desire for an unfragmented landscape, and the conservation easement will protect the land in perpetuity.

Objective 2 of the Rural Areas is to "protect and preserve natural resources, which include mountains, hills, valleys, rivers, streams, groundwater, and retain continuous and unfragmented land for agriculture, forestry, biodiversity, and natural resource protection."

As previously stated, the Forest School will preserve most of the site's natural resources and limit all development of the 156-acre parcel to a small 15-acre tract. Within these 15 acres, the proposed development is intentional in its minimal impact on the natural environment. Buildings are built into the existing grade to avoid mass grading and supportive infrastructure makes use of existing natural systems, instead of built out gray infrastructure, which further minimizes disturbance.

LINE AND GRADE
Civil Engineering

IMPACTS ON PUBLIC SAFETY FACILITIES, PUBLIC TRANSPORTATION, PUBLIC SCHOOLS, PUBLIC PARKS, ENVIRONMENTAL FEATURES, AND ADJACENT PROPERTIES

The proposed uses and future uses for this site are not expected to have a negative impact on public facilities or surrounding properties beyond the baseline impacts that are involved in almost any development (e.g., increased traffic, land disturbance). Potential impacts are evaluated in turn below.

Impact on public facilities and infrastructure

Public facilities and infrastructure evaluated include parks, schools, emergency services, and roads (traffic).

PUBLIC PARKS

Walnut Creek Park is located approximately 2.5 miles south of this site off of Old Lynchburg Road. The proposed development is not anticipated to have any impact on this park.

PUBLIC SCHOOLS

Nearby public schools include Red Hill Elementary School and Leslie H Walton Middle School. There are no impacts anticipated on either of these schools as they are approximately 2.5 miles or more away and are each accessed predominantly by different main roads. This private school may actually *reduce* impacts by removing students from public school enrollment.

EMERGENCY SERVICES

No specific impacts to emergency services are identified. This is a proposed day school only, with no overnight use on the property. There will be a security guard on site during school hours which should reduce the need for police services. For firefighting operations, buildings will be located such that all sides of the building can be accessed with a 150' hose length. Sprinkler systems are not required for the proposed buildings, because they are to be designed within the building code limits for size and exit travel distance that is acceptable for non-sprinklered buildings. Additionally, all preschool classrooms will have direct access to the exterior. As a water source for firefighting operations, there will be some volume of water stored on site to supplement the supply of the tanker trucks. This volume of water is to be determined based on final building sizes and materials, but based on the current concept will be a maximum of 13,000 gallons.

TRAFFIC

Dudley Mountain Road is a state-maintained road that currently has substandard widths, shoulders, and according to neighbor comments, insufficient maintenance. It is a 35-mph road with no striped centerline. Sixty-four percent (64%) of the neighbor comments received were related to the existing conditions of this road being dangerous and unsuitable for an increase in concentrated traffic. The Forest School has therefore proposed to extend the morning drop-off period to one hour between 8 and 9 am to spread out peak morning traffic. A shuttle will also be offered in the mornings as an effort to reduce the number of trips to and from the site. Additionally, the road widths were checked to ensure adequate spacing for vehicles to pass one another, see Appendix F.

In the afternoon, there is a smaller "peak" between 3:00-3:15 for afternoon pick up, then there is staggered pickup for the after-school session ending at 5 pm.

Table 2 - ITE Trip Generation data for proposed uses

ITE TRIP GENERATION:

11TH EDITION TRIP GENERATION DATA				WEEKDAY TRAFFIC										
USE DESCRIPTION	ITE CODE	UNITS	QTY OF UNITS	VEHICLES PER DAY	AM PEAK HOUR ADJACENT STREET					PM PEAK HOUR ADJACENT STREET				
					% IN	% OUT	IN	OUT	TOTAL TRIPS	% IN	% OUT	IN	OUT	TOTAL TRIPS
Day Care Center	565	Per Student	144.00	**589**	53%	47%	60	52	**112**	47%	53%	53	61	**114**

**Note: This is a private school, however ITE data for day care center most closely aligned with the use.*

According to ITE Trip Generation data from the 11th edition, shown in Table 1 above, the proposed private school at its maximum enrollment will generate approximately 589 vehicles per day to and from the site. This estimate is likely high, as it would require almost every student riding separately to generate this number of trips. In reality, there are multiple students from the same family attending school, or students of teachers who ride together. Therefore, the number of trips per day is less than four trips per student. In the morning peak hour, there are 112 total trips to and from the site anticipated. The configuration of the site travelway and drop-off loop will ensure that traffic is not queuing onto the road (see Site Layout above).

For comparison, trip generation estimates for other by-right uses on this parcel are included in Table 2 below.

Table 3 - Peak day traffic of theoretical site uses

ITE TRIP GENERATION:

11TH EDITION TRIP GENERATION DATA				**PEAK DAY TRAFFIC
USE DESCRIPTION	ITE CODE	UNITS	QTY OF UNITS	VEHICLES PER DAY
Day Care Center*	565	Per Student	144.00	**589**
Church	561	1000 SF GFA	11.00	**346**
Detached Dwelling	210	Dwelling Unit	4.00	**52**
Wine Tasting Room	970	1000 SF GFA	5.00	**1,017**
Brewery Tap Room	971	1000 SF GFA	5.00	**610**

**This is a private school, however ITE data for day care center most closely aligned with the use.*
*** Peak Day varies according to use*

A turn lane warrant analysis was performed for this site and found that neither a right nor left turn lane is warranted for the proposed use. The applicant has elected to dedicate a 50 ft right of way along Dudley Mountain Road as a part of this application.

Impact on public transportation

This development will have no impact on public transportation.

Impact on environmental features

A key component of this development is to respect and protect the environment. As has been discussed, the site will be put into conservation easement, and there are already restoration efforts that have begun to remove invasive species and restore the stream buffer. The proposed areas of conservation coincide with the County's Mountain Protection Areas, areas of Critical Slopes, and a large portion of the Water Protection Ordinance Buffer through the site. Within the developed portion of the site, design will be thoughtful and detailed to preserve the existing trees. Stormwater management controls will be designed not only to contain the stormwater, but to improve the quality on site before it is released.

The proposal is not anticipated to have a noticeable impact on available groundwater supply, based on a Tier 3 Groundwater study that was conducted and based on the relatively low water use proposed for this site. Based on conservative estimates by the Virginia Department of Health, the water use (assumed roughly equal to sewage flows) expected of a school with no showers is 10 gallons per day per person[3].

[3] This estimate is for schools with or without cafeterias – since there is no cafeteria or food preparation on site and low flow fixtures are to be used, water demand is likely substantially less.

This equates to a peak use of 1,730 gallons per day by the school at maximum enrollment. By comparison, the four single family homes that would be allowable by-right with this property's development rights, assuming 3 bedrooms each, are estimated to use 1,800 gallons per day. Comparisons of other potential uses for this property and their projected water consumption are included in the table below.

Table 4 - Water demands per theoretical site use

WATER DEMANDS:			
			PEAK DAY
USE DESCRIPTION	UNITS	QTY OF UNITS	FLOW (GAL PER DAY)
*Schools w/o showers	Per Person	173.00	**1,730**
*Church (Theaters, auditorium type)	Per Seat	200.00	**1,000**
*3 BR Dwelling	Per Dwelling	4.00	**1,800**
[1]Winery, 5 acres Vines	Per Person	500.00	**2,582**

**Information per State Code 12VAC5-610-670, water use assumed to equal or exceed sewage flows*

[1] Assumes 300 cases wine per acre, 6 gal water used per gal water produced, not including irrigation. Assumes 5 gpd per visitor in tasting room . Number of visitors assumed based on trip generation for size of building assumed.

Impact on adjacent properties

Beyond impacts that have already been discussed such as traffic and environmental impacts, there will be minimal visual and noise impact on the adjacent properties given the size of this parcel compared to the size of the proposed developed area. The closest residence is on TMP 89-64A, which is currently unoccupied. The existing vegetated buffer at the border of the subject property is to remain to shield proposed development from this residence. The residence at TMP 89-80B is also near the development, though slightly downhill. The proposed Religious Assembly Building is to be screened with new plantings along that property boundary to shield its view. The next immediate neighbor is TMP 89-63D, which is separated from the development by considerable distance, topographic variation, a stream buffer, and significant visual screening offered by dense mature pines. As mentioned, any proposed lighting on site will be dark sky compliant so as to be minimally impactful on the ecosystem and neighbors. Maximum sound levels for rural and residential areas set forth within the zoning ordinance will be adhered to.

CONCLUSION

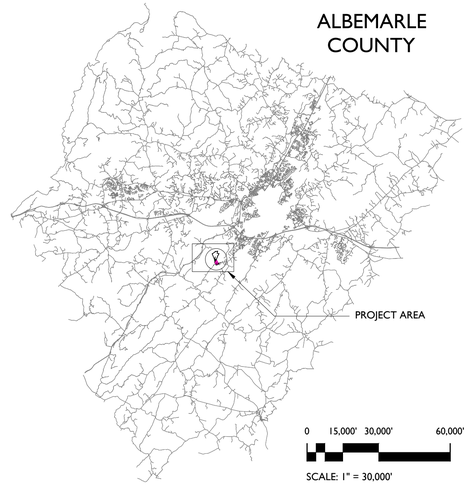
This property is a great location for the proposed private school, as it is centrally located within Albemarle County. It is a large site that will remain mostly in its existing condition or will be improved upon by removal of invasive species. The development footprint will be as light and "green" as possible, and it will provide young children with a direct connection to nature on a daily basis. Care for the environment comes from integration with the natural environment, and this is most important to start at a young age.

List of Appendices:

Appendix A: Existing Conditions Plan
Appendix B: Draft Conservation Area and Easement Language
Appendix C: Parking Needs Assessment
Appendix D: Tier 3 Groundwater Study
Appendix E: Sight Distance Exhibit
Appendix F: Road Width Assessment

Appendix A

Existing Conditions Plan



TM 89-65
Julie A B Morrill Living Trust
DB 4621-573
DB 611-497 plat

TM 89-72
Julie A B Morrill Living Trust
DB 4621-573
DB 1712-453 plat

TM 75-41
Britts Mountain Land Trust
DB 1470-175
DB 1011-089 plat

WPO
WPO 50'

SURVEYED AREA
2' CONTOUR INTERVAL
ALBEMARLE GIS OUTSIDE OF SURVEY AREA
4' CONTOUR INTERVAL

TM 89-80
William Edgar Spigle
Susan W. Davenport
DB 3103-001
DB 483-496 plat

TM 89-80B
David A. Harris
Julia H. Harris
DB 1659-434
DB 467-137 plat

TM 89-81J6
Barbara M Bingham
DB 1887-099
DB 1366-642 plat
Lot 6

TM 89-81J5
Gary U Tingler
Jeri L. Davis
DB 1765-333
DB 1366-642 plat
Lot 5

TM 89-64
155.96 AC

TM 89-64A
Bagdan A. Bindea
DB 5229-205

EXISTING TREELINE, TYP.

DUDLEY MOUNTAIN ROAD

40'

TM 89-81J4
Elizabeth C. Cobham
Revocable TA et al
DB 2384-450
DB 1366-642 plat
Lot 4

REAR SETBACK 35'

TM 89-13A
Wayne W. Furrow
DB 1345-382
DB 1345-384 plat

TM 89-63
Helen Evans
DB 1958-339
DB 750-700 plat

CRITICAL SLOPES, TYP.

TM 89-63D
Kevin Lee Evans
Melanie Allen Evans
DB 2246-500
DB 2246-505 plat
Parcel D

TM 89-63A
Leonid V. Zingler
Angelica A. Zingler Parcel A
DB 2092-143
DB 2009-724 plat

JCLA STUDIO
jenny@jclastudio.com

thrive architecture

CBI FOREST SCHOOL
DUDLEY MOUNTAIN ROAD
SP202400023

EXISTING CONDITIONS

0 100' 200' 400'

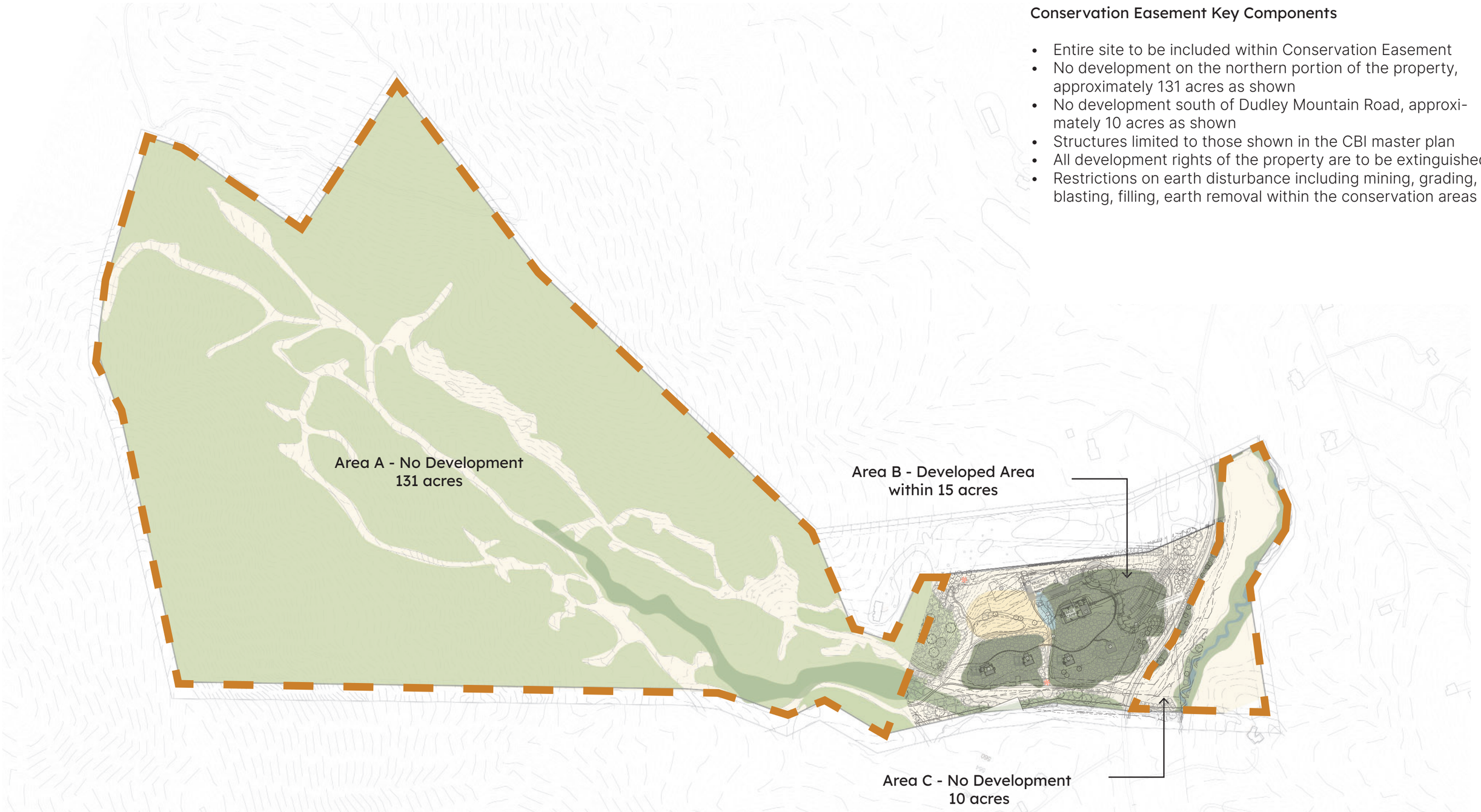
SCALE: 1" = 200'
DATE: September 16, 2024
DATE: January 6, 2025

Appendix B

Draft Conservation Area and Easement Language

Conservation Easement Key Components

- Entire site to be included within Conservation Easement
- No development on the northern portion of the property, approximately 131 acres as shown
- No development south of Dudley Mountain Road, approximately 10 acres as shown
- Structures limited to those shown in the CBI master plan
- All development rights of the property are to be extinguished
- Restrictions on earth disturbance including mining, grading, blasting, filling, earth removal within the conservation areas



CONSERVATION EASEMENT EXHIBIT

CBI FOREST SCHOOL - DUDLEY

Appendix C

Parking Needs Assessment

LINE AND GRADE
Civil Engineering

PARKING NEEDS ASSESSMENT

TO: Syd Shoaf
Senior Planner
Albemarle County Community Development

FROM: Kendra Moon, PE
Line and Grade Civil Engineering

DATE: *September 16, 2024*
Revised January 6, 2025

RE: CBI Forest School - Dudley
Parking Needs Assessment

EXECUTIVE SUMMARY

This document is meant to accompany the Special Use Permit (SP202400023) submission for CBI Forest School to detail the specific parking needs of the proposed private school and future religious assembly building at TMP 89-64 in the rural areas. The proposed school is to serve a maximum enrollment of 144 students, ages 18 months up to 5th grade. There are a maximum of 29 staff members expected for the school, including teachers, administrators, and one security guard. The school and religious assembly building will not be in use at the same time, and though the seating capacity of the future religious assembly building is not yet known, it can serve up to a maximum of 200 attendees by-right. It is anticipated that approximately 30 parking spaces are sufficient for daily operations, with unpaved areas on site to be used for occasional overflow parking for the school or religious assembly uses.

PROPOSED SITE OPERATIONS

This site has been designed with the intent to keep impervious area as low as possible. Therefore, the school does not want under-utilized parking lots. Because this school serves only ages 18 months through 5th grade, all students will be dropped off and picked up and will not be contributing to additional vehicles parked on site during the day. The internal travelway on the site is long enough that it can fit 30 vehicles at a time during drop off and pick up without interfering with access to the parking area. This should limit the need for additional daily parking beyond typical staff use. The drop-off loop is intended to be one-way access that is sufficient in width for vehicles to pass one another (20 ft sized for fire rescue, plus a pull-off area).

The school has occasions up to 5 times per year where parents or grandparents are invited to accompany their children at school. The congregation also plans to have services at the religious assembly building on site at some point in the future, though these will not occur during school hours. The maximum required parking for the religious assembly use would be 67 spaces should it be designed to seat 200 people.

PROPOSED PARKING

Per Section 4.12.6 of Albemarle County's Zoning Ordinance, the number of required parking spaces for a school shall be determined by the zoning administrator based on peak parking demands and other relevant information. Currently 31 spaces are proposed for daily use. This includes a main parking area of 27 spaces, with 4 spaces located closer to the main buildings for better accessibility. These spaces are intended to serve the staff and occasional visitors. An unpaved overflow parking lot is proposed with 25 parking spaces, and there is space available for an additional 20 parallel spaces off of the old driveway, connecting the overflow lot to the drop-off loop, to be used infrequently during larger events. A total of 76 spaces are available for use on site should they be needed, refer to Figure 1 below.

LINE AND GRADE
Civil Engineering

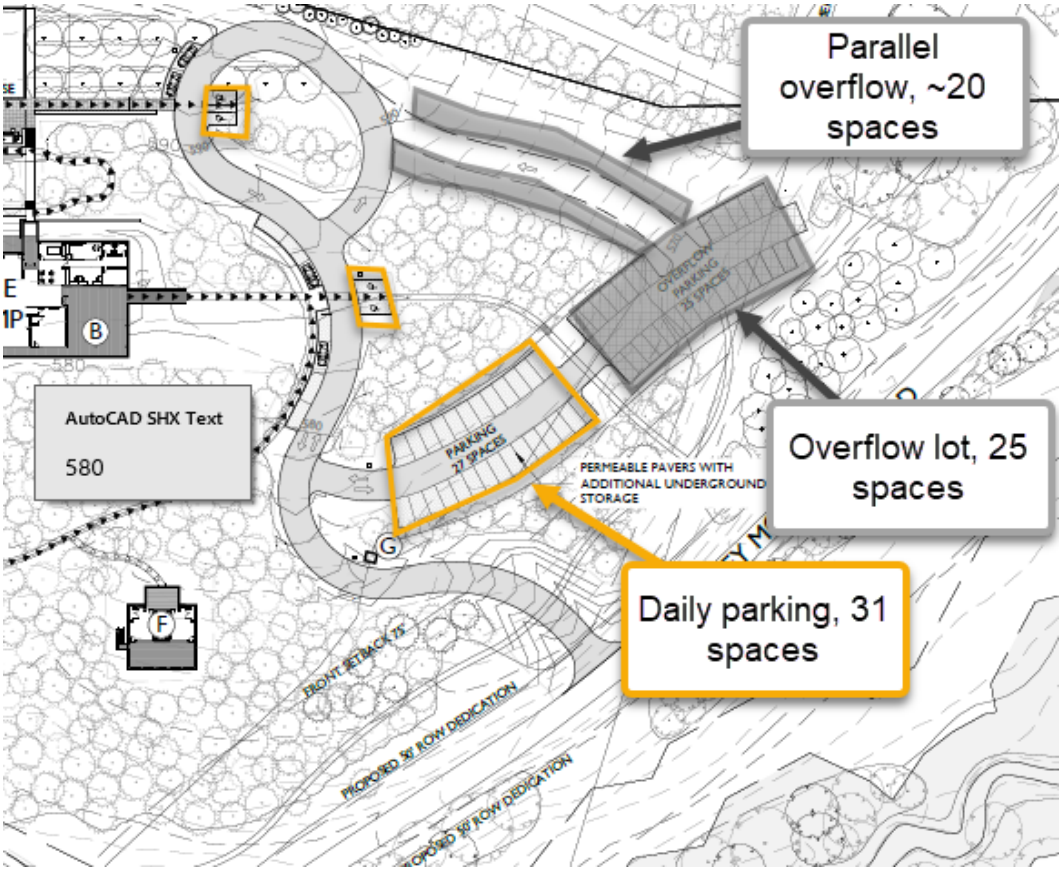


Figure 1 - Site Parking Diagram

Appendix D

Tier 3 Groundwater Study

Tier III Groundwater Assessment:
Congregation Beth Israel Forest School
Albemarle County Parcel 89-64

for

Congregation Beth Israel

Jill Abbey-Clark
301 East Jefferson Street
Charlottesville, VA 22902
(434) 295-6382

prepared by

HydroGeo Environmental, LLC
5155 Three Notch'd Road- Suite F
Crozet, Virginia 22932

HydroGeo Project #24-956

Issued: August 28, 2024

HydroGeo ENVIRONMENTAL

Ernest Beasley, MS, CPG
Principal Geologist

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

Key Findings

Albemarle County hydrogeologic units: Predominantly Ragged Mountain (Hydrogeologic Unit V); small lens of Lynchburg (Hydrogeologic Unit IV) in southeastern corner of the Site

Groundwater availability zone: Predominantly Class 2 (medium relative groundwater availability); minorly Class 3 (highest relative groundwater availability) in the southeast corner of the Site.

Hydrogeologic conditions favorable to proposed use? Yes. See attached calculations for pre- and post-development groundwater surplus estimates. Precise well yields will remain unknown prior to drilling. Virginia Department of Health (VDH) provided well completion reports for nearby properties (FOIA request submitted 8/13/24). Virginia Department of Health (VDH) returned thirty-five (35) of the requested sixty-one (61) parcel records within the required 1000-foot search radius, of those only seventeen (17) had well logs on record. The average yield for the seventeen (17) wells on record within a 1000-foot radius of the property boundary, and in the same hydrogeologic units as the Site, is seventeen (17) gpm.

Site within groundwater sensitivity zone? No. Review of the VADEQ Environmental Data Mapper (EDM) viewer and Albemarle County GIS did not identify any open pollution complaint cases within the required 1000-foot search radius.

Groundwater flow pattern:
Groundwater recharge areas include undeveloped vegetated/wooded land located upgradient (northern portion) of the Site; and vegetated/wooded areas of the Site. Groundwater discharge areas occur along the center of the northern portion of the Site, where runoff flows south-southwest along the headwaters to Biscuit Run, which is located in the southern tip of the Site and flows in a net east- to southeast direction towards its confluence with Moores Creek. General localized groundwater flow in the vicinity of the Site is assumed to be influenced by topography and likely flows in a predominant southeast direction. There is a localized drainage swale oriented southwest in the center of the Site**,** feeding into Biscuit Run, which flows on in a net east- to southeast direction towards Moores Creek.

Contamination threats on record: Zero (0) contamination threats were located using DEQ Environmental Data Mapper (EDM) and Albemarle County GIS within the required 1000-foot search radius from the parcel boundaries.

Additional contaminant threats observed in field reconnaissance? No additional contaminant threats were observed at the time of field reconnaissance.

Impacts of proposed use on existing users: Proposed groundwater use should be adequate for the development's needs without unreasonably affecting users offsite.

BMP recommendations: Maintain vegetated stream buffer as much as possible during development; implement runoff-neutral site plans insofar as practicable.

Recommendation:

- Implement onsite mapping, including resistivity imaging, to locate optimal well drilling targets.
- Install groundwater well(s) prior to commencement of other onsite construction activities.
- Abide by Virginia Department of Health standards in developing a new water source onsite.
- We recommend that the County approve this proposed development plan as contaminant potential appears to be very low, and hydrogeologic conditions appear favorable for proposed use.

1.0 Introduction

This Tier III Groundwater Assessment Report (Tier III) was prepared by HydroGeo Environmental, LLC (HydroGeo) for Congregation Beth Israel, who proposes to use groundwater supply for the proposed Congregation Beth Israel Forest School development in Albemarle County, Virginia. The purpose of this report is to provide an assessment of the potential groundwater resources in the vicinity of the proposed development. This Tier III Report was completed in accordance with the requirements outlined in Section I.2.D of the Albemarle County Design Standards Manual for Engineering.

2.0 Site Overview

The proposed development is located approximately 2.5 miles southwest of the City of Charlottesville, Virginia (**Figure 1**). The property is comprised of a single parcel identified as Albemarle County Parcel #89-64 (the "Site"), owned by Jeffrey Morrill. The Site and surrounding parcels are zoned "rural areas" with land use consisting of primarily residential, agricultural, conservation, and open/forested undeveloped land. Site elevation ranges from approximately 550 feet above mean sea level (amsl) in the southern end of the property to 1400 feet amsl in the northwestern area of the Site. The Site is located in the Rivanna River regional watershed and locally the Hydrologic Unit Code (HUC) 10 Upper Rivanna/Moores Creek watershed, which lies within the Hydrologic Unit Code (HUC) 8 Rivanna River Watershed. Biscuit Run, a tributary to Moores Creek, flows along the center and southern tip of the Site. (**Figure 2**).

Phase I of the Congregation Beth Israel Forest School development consists of the construction of three (3) classroom cabins, one (1) large multipurpose event building, three (3) administration buildings, a fire-access road, and two (2) large parking areas. Access to the Site will be available via the main gate located off Dudley Mountain Road in the southeast corner of the property. The Site will be served by private wells and an onsite subsurface drainfield and reserve drainfield. Groundwater supply wells developed in Albemarle County must be permitted and adhere to Virginia Department of Health (VDH) regulations. A copy of the preliminary Site layout is included as **Attachment A**.

3.0 Subject Property/Vicinity Description

HydroGeo personnel conducted a Site reconnaissance visit on August 23, 2024. The Site visit included geologic observations and visual inspections for hydrologic features and potential contaminant sources.

3.1 Site Description

The Site comprises approximately 171 acres, which appears to be predominantly forested land with a gravel driveway along Dudley Mountain Road. It should be noted that the neighboring residence located on Albemarle County Parcel 89-64A has a driveway that meanders over the Subject Property boundary in the lower southeast corner of the Site. Site topography generally slopes to the southeast and southwest. Surface water drainage and shallow groundwater flow likely follow Site topography, discharging along the center of the northern portion of the Site, where runoff flows south-southwest towards Biscuit Run.

3.2 Geologic Observations

According to 1:24,000-scale geologic mapping (Johnson, T. A., Hollis, J. S., Bailey, C. M., Jensen, A., Hahn, M., Quinlan, K., Owens, B. E., & Marshall, A. (2014). *Geologic map of the Alberene quadrangle, Virginia* (Virginia Division of Geology and Mineral Resources Publication 180). Virginia Division of Geology and Mineral Resources.) the Site is predominately underlain by Mesoproterozoic-age Biotite-bearing Granitoid Gneiss in the northwest and the Neoproterozoic-age Lynchburg Group 1- Meta-arkose wacke and Meta-conglomerate in the southeast area of the Site. Quaternary-age Alluvium is mapped along the floodplain of Biscuit Run along the Southern tip of the property. A thin intrusion of the Jurassic-age Diabase crosscuts the aforementioned geologic formations in the center of the Site (**Figure 3**). The Biotite-bearing Granitoid Gneiss is described as a light tan-to dark-gray, medium-to coarse-grained granitoid gneiss. The Lynchburg Group, Group 1 is described as light gray-to tan, coarse-to medium-grained meta-arkose wacke with minor meta-conglomerate – this is the most favorable rock unit for groundwater yields that is mapped onsite. The Alluvium is described as deposits along modern drainages of clay, silt, sand, and rounded cobbles of vein quartz, greenstone, and granitoid gneiss. The Diabase is described as dark grey-to black, fine-grained massive diabase.

A single rock outcropping was observed during Site reconnaissance on the western neck of the Site and along the gravel access road. The observed outcrop is believed to be of diabase origin. Due to previous Site activity, the outcrop has been worn down, but appeared to be orientated north-northeast, similarly to the depiction of the Geologic Map (**Figure 3**). Float- or out-of-place/transported bedrock broken into boulders and cobbles was observed in abundance throughout the Site. Boulder and cobble sized Lynchburg Group, Diabase, and Granitoid Gneiss float were all observed during the Site visit. Although exact locations cannot be determined due to these observed rocks being float, the attached geologic map is assumed to be an accurate representation of the underlying bedrock (**Figure 3**). Site reconnaissance, online GIS review, and high-resolution geologic maps, in conjunction with the adequate well yields documented nearby suggest apparent bedrock fracturing in the Site vicinity. This would be expected to be favorable for potential groundwater resources at the Site, but particular attention needs to be paid to the specific locations of future wells drilled onsite. A successful well will only result if sufficient bedrock fracturing is encountered by the borehole at its specific location- for this reason HydroGeo recommends geophysical imaging to locate water-bearing fractures before drilling any wells onsite. We strongly recommend attempting to site future wells within the Lynchburg Group rock unit in the southeastern area of the Site.

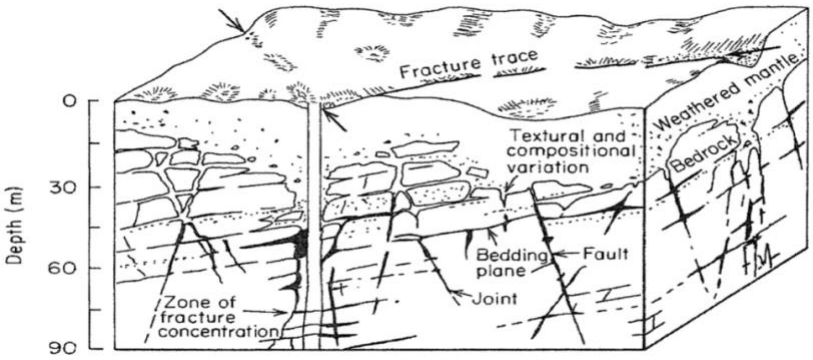
3.3 Nearby Features of Interest

Precise residential well and septic locations on nearby parcels were difficult to pinpoint during site reconnaissance due to access limitations, so for the purposes of this assessment most well and septic locations are inferred based on the presence of homes. No contaminant threats were identified during field reconnaissance activities. See **Figure 5** for nearby features of interest identified during site reconnaissance, records review, and GIS mapping activities.

4.0 Hydrogeologic Assessment and Review

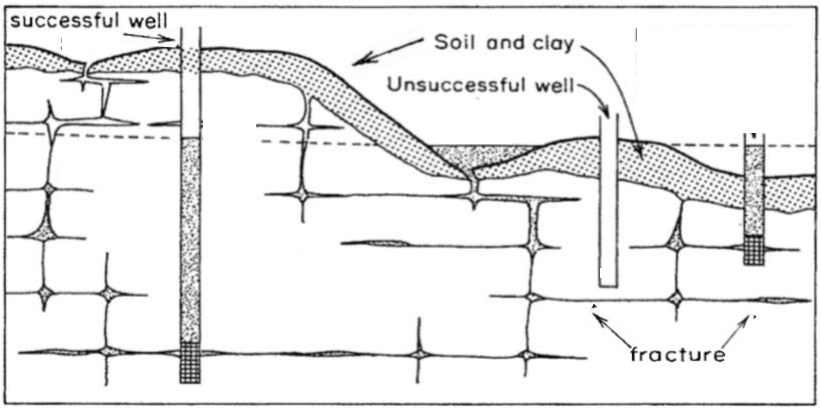
4.1 Hydrogeologic Setting

The Site lies within the Piedmont geologic Province, a region dominated by fractured bedrock aquifer systems, consisting of a relatively thick mantle of soils and saprolite (or overburden) overlying metamorphosed igneous and sedimentary bedrock. Groundwater in the Piedmont province of Virginia is stored in the porous overburden zone. Unlike overburden, the bedrock in the Piedmont province has minimal primary porosity, so deeper groundwater flow relies largely on the secondary porosity provided by the bedrock fracture network:



(Lattman and Parizek, 1964)

Standard practice for development of water supply wells involves drilling into water bearing zones in the fractured bedrock and sealing off the overburden with a solid well casing. Thus, the ultimate performance of individual water wells in the Piedmont Province typically depends on the borehole encountering sufficiently interconnected bedrock fractures:



(Davis and De Wiest, 1966; Edited 2024)

A dry hole results if a well is drilled into bedrock with insufficient fracturing. Fracture occurrence and density depend on a number of factors including specific location, rock type, and site-specific geologic conditions. Because groundwater occurs in discrete fractured zones, it is not unusual to find variability in yields for wells in close proximity to each other. Because the regolith provides groundwater storage, a thicker mantle of overburden usually suggests more favorable conditions for sustainable long-term groundwater withdrawals.

4.2 Site Geology, Geomorphology, and Soils

As described in *Section 3.2* Site bedrock consists of Biotite-bearing Granitoid Gneiss, Lynchburg Group 1-Meta-arkose wacke and Meta-conglomerate, Alluvium, and a Diabase intrusion. Onsite observations confirmed the presence of all aforementioned geologic formations **(Figure 3)**. At the Site, the metamorphic and igneous bedrock is overlain by soils that have been weathered in place from the underlying bedrock ("residuum"), as well as those formed from alluvial processes. According to Natural Resource Conservation Service (NRCS) soils mapping, soils underlying the Site consist primarily of the Parker, Philomont, Hayesville, and Meadowville Series. The Parker Series is described as very deep, somewhat excessively drained, residual soils weathered from granitic gneiss rock. The Philomont Series is described as very deep, well drained, residual soils weathered gneissic or granitic rock. The Hayesville Series is described as very deep, well drained, residual soils weathered primarily from igneous and high-grade metamorphic rock, and minorly from thickly-bedded metagraywacke and metasandstone. The Meadowville Series is described as very deep, moderately well- to well drained, alluvial (water transported) soils weathered from acidic and basic rocks. See **Attachment B** for NRCS soils mapping.

4.3 Hydrogeologic Unit

Certain geologic landscapes in Albemarle County are known to possess more favorable characteristics for the development of groundwater resources than others. A 2003 Groundwater Assessment study completed by ENSAT Corporation for Albemarle County ranked different hydrogeologic units across the County based on their potential as groundwater resources. Factors such as degree of bedrock fracturing, overburden thickness, and saprolite permeability were considered in determining the relative groundwater availability potential of different units.

According to the Albemarle County Hydrogeologic Assessment Summary (2003), the Site is located predominantly within the Hydrogeologic Unit V (Ragged Mountain) with a lens of Unit IV (Lynchburg) in the southeastern corner of the property. Unit V (Ragged Mountain) is described as a unit with medium relative groundwater availability compared to other landscapes in Albemarle County. Landscapes are dominated by mountainous terrain and rolling hills with gradual to steep slopes. Soils in this hydrogeologic unit are residual and weathered in place from granite and granitic gneiss. Unit IV (Lynchburg) is described as a unit with high relative groundwater availability compared to other landscapes in Albemarle County. Landscapes are dominated by gently rolling piedmont topography. Soils in this hydrogeologic unit are residual and weathered in place from sandstone, metasandstone, and micaceous metamorphic rocks. State geologic mapping, NRCS soils mapping, and onsite observations for this work support this interpretation of Site hydrology.

4.4 Groundwater Flow, Recharge, and Discharge

The general groundwater flow direction in the vicinity of the Site is assumed to be influenced by topography. Shallow, localized groundwater flow within the overburden is interpreted to follow a pattern similar to that shown on **Figure 6**. Groundwater flow on a more regional scale, more representative of net flow through the deeper bedrock fracture network, is interpreted to follow a pattern similar to that shown on **Figure 7**. Based on this assessment, **general localized groundwater flow in the vicinity of the Site likely flows predominately southeast, with a localized swale orientated southwest in the center of the Site,** feeding into Biscuit Run, which flows in a net east- to southeast direction towards Moores Creek. See **Figure 8** for a map of the Upper Rivanna/Moores Creek Watershed.

Groundwater recharge areas include undeveloped vegetated/wooded land located upgradient (northern portion) of the Site; and vegetated/wooded areas of the Site. Groundwater discharge areas occur along the center of the northern portion of the Site, where runoff flows south-southwest along the headwaters to Biscuit Run, which is located in the southern tip of the Site and flows in a net east- to southeast direction towards its confluence with Moores Creek.

4.5 Existing Well Records

On August 13, 2024 HydroGeo submitted a request to the Environmental Health (EH) division of the Virginia Department of Health for well and septic records from the Site and from parcels located up to 2000-feet beyond property lines as outlined in Section I.2.D of the Albemarle County Design Standards Manual for Engineering. It must be noted that the records for any dry wells in the Site vicinity, or wells installed prior to the 1980s, were not available for review. Of the sixty-one (61) parcels requested, only thirty-five (35) records were returned, and of those only seventeen (17) had well logs on record. A summary of available information is included in **Table 1** below.

Table 1: Summary of Available Well Records

Parcel ID	Total Depth (ft)	Depth to Bedrock (ft)	Yield (gpm)	Water Bearing Zones (ft)
89-61A	205	40	60	143-145; 152-154; 169-170
89-61B	105	16	50	60-62; 78-80; 95-100
89-62A	151	18	25	
89-62B2	125	30	20	
89-62D	125	30	20	
89-63A	160	60	7	50-51
89-63B1	405	15	1	
89-73F	405	84	4	120-122; 370-373
89-73F1	505	34	3	87-88
89-81J	225	45	8	
89-81J1	165	75	25	
89-81J2	185	30	30	
89-81J3	210	15	15	
89-81J4	305	12	1	

89-81J5	350	15	4	
89-81J6	220	30	3	
89-81R	125	97	20	
Minimum	105	12	1	50
Maximum	505	97	60	373
Average	**234**	**38**	**17.41**	**N/A**

These wells are believed to be located within the same hydrogeologic units as the Site based on NRCS soils mapping and Virginia Division of Mineral Resources geologic mapping. The average yield of wells on record within a 2000- foot radius of the property is ~17 gpm.

4.6 Groundwater Sensitivity and Contaminant Threats
Based on a review of Virginia Department of Environmental Quality (VADEQ) Environmental Data Mapper Web Portal, Albemarle County GIS, and observations made during field reconnaissance, **the Site does not appear to be located in an area of groundwater sensitivity**. See **Attachment C** for a map from the DEQ online database.

Zero (0) Virginia Pollution Discharge Elimination System (VPDES) permitted outfalls were identified within the required 1,000-foot search radius from property boundaries.

HydroGeo does not consider the Site to be located in an area of groundwater sensitivity when considering the proposed land usage, nearby average well yields, and lack of reported contamination events in a 1000-foot radius.

4.7 Water Budget Calculations
Quantitative analysis helps evaluate the impact to local groundwater resources due to the creation of impervious surfaces and increased groundwater pumping as a result of Site development. See **Attachment D** for calculations relating to current groundwater recharge to Site and pre- and post-development estimated groundwater withdrawals.

Based on these calculations the proposed usage of groundwater post-development, overall recharge post-development will be more than adequate to supply groundwater usage without long-term degradation of groundwater resources.

5.0 Groundwater Management Plan

The proposed development will attempt to minimize degradation of groundwater recharge, and groundwater and surface water quality, by preserving existing vegetation where practicable and by implementing stormwater strategies to minimize offsite runoff. The development plan includes standard stormwater Best Management Practices and sediment and erosion control measures.

5.1 Contingency Plan
Actual yield of future onsite supply wells cannot be known until wells are drilled and tested. Based on actual yield of newly drilled wells, a groundwater pumping and management plan may be developed to meet the demands of the proposed onsite water use. If a newly drilled well does not produce sufficient yield to meet the user's demands, a supplemental well may be drilled to augment the user's onsite groundwater supply.

New Site wells must be constructed to meet Virginia Department of Health (VDH) standards and wellhead protection measures should be implemented to prevent the wells from becoming contaminated in the event of a future spill or release.

6.0 Assessment of Well Drilling and Testing

New onsite wells will be permitted by the Virginia Department of Health Office of Drinking Water, located in

Lexington, Virginia.

Based on this study, the Site lies in an area capable of producing groundwater yields sufficient to meet the demands of the proposed Site development; however, the actual yields of future onsite supply wells cannot be known until the wells are drilled and properly tested.

7.0 Conclusions

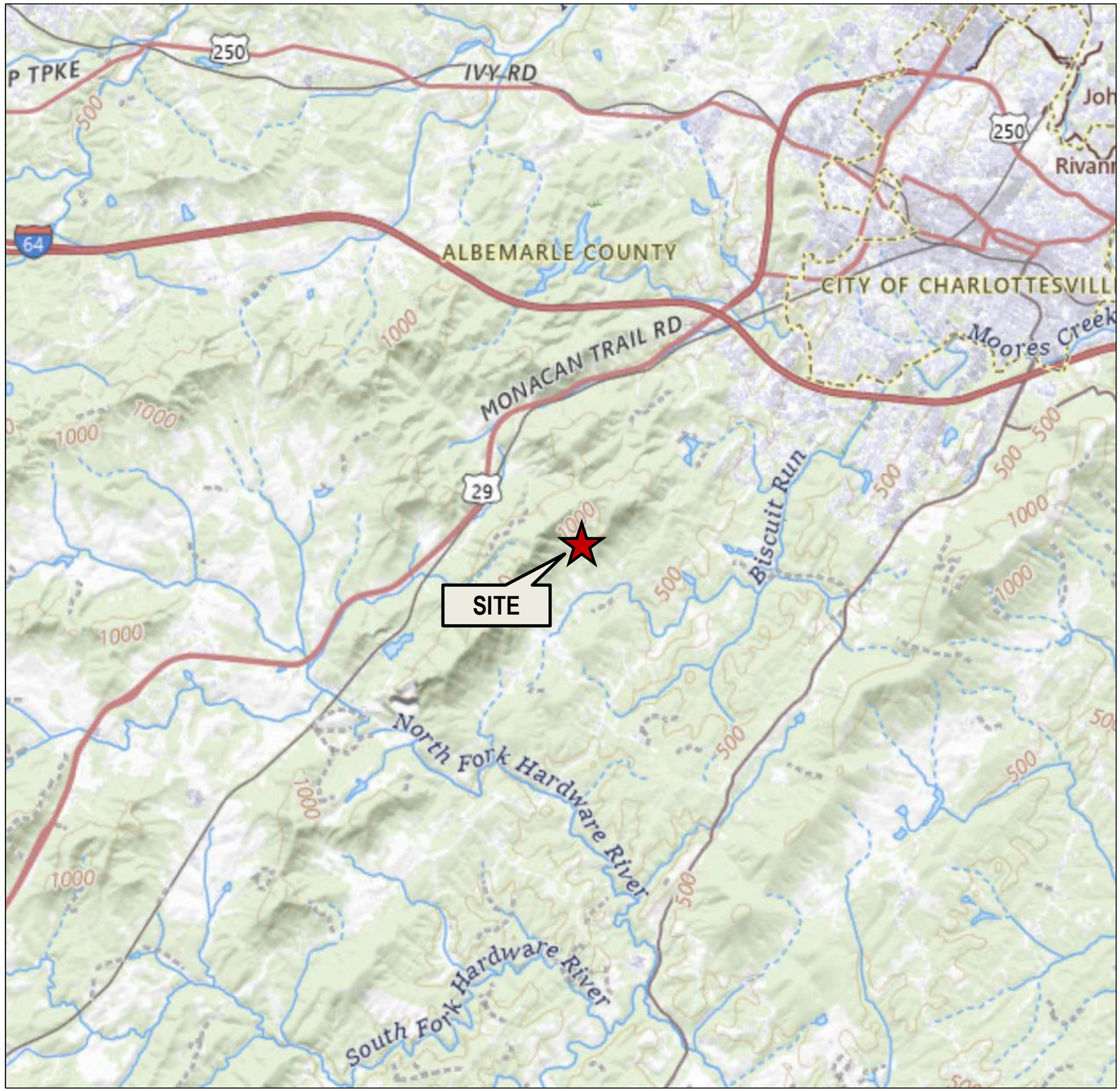
This Tier III Groundwater Assessment was prepared on behalf of Congregation Beth Isreal by HydroGeo Environmental, LLC for the proposed development on an approximately 171-acre Site in Albemarle County to be identified as Congregation Beth Israel (CBI) Forest School. The Site is located in the Class 2 (medium ranked) and Class 3 (highest ranked) hydrogeologic units for relative groundwater availability in Albemarle County based on the Albemarle County Hydrogeologic Assessment Summary Report (2003); however, Site reconnaissance, VDH records of nearby wells, and online GIS review indicate the potential for favorable groundwater availably.

Based on this study, the Site aquifer appears to have the potential of producing sufficient yields for the proposed use as long as water-bearing fractures are encountered during drilling. The estimated collective groundwater withdrawals post-development would not be expected to negatively affect the performance of offsite wells.

Future well locations should be sited on the Lynchburg Group rocks in the southern area of the Site. In conjunction with the fracture trace mapping included herein (Figure 4), resistivity imaging would be an invaluable tool to help site future wells in optimal locations for water quality and yield.

Finally, the Site is not located in a groundwater sensitivity zone.

Figures



Site Location

Figure 1

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

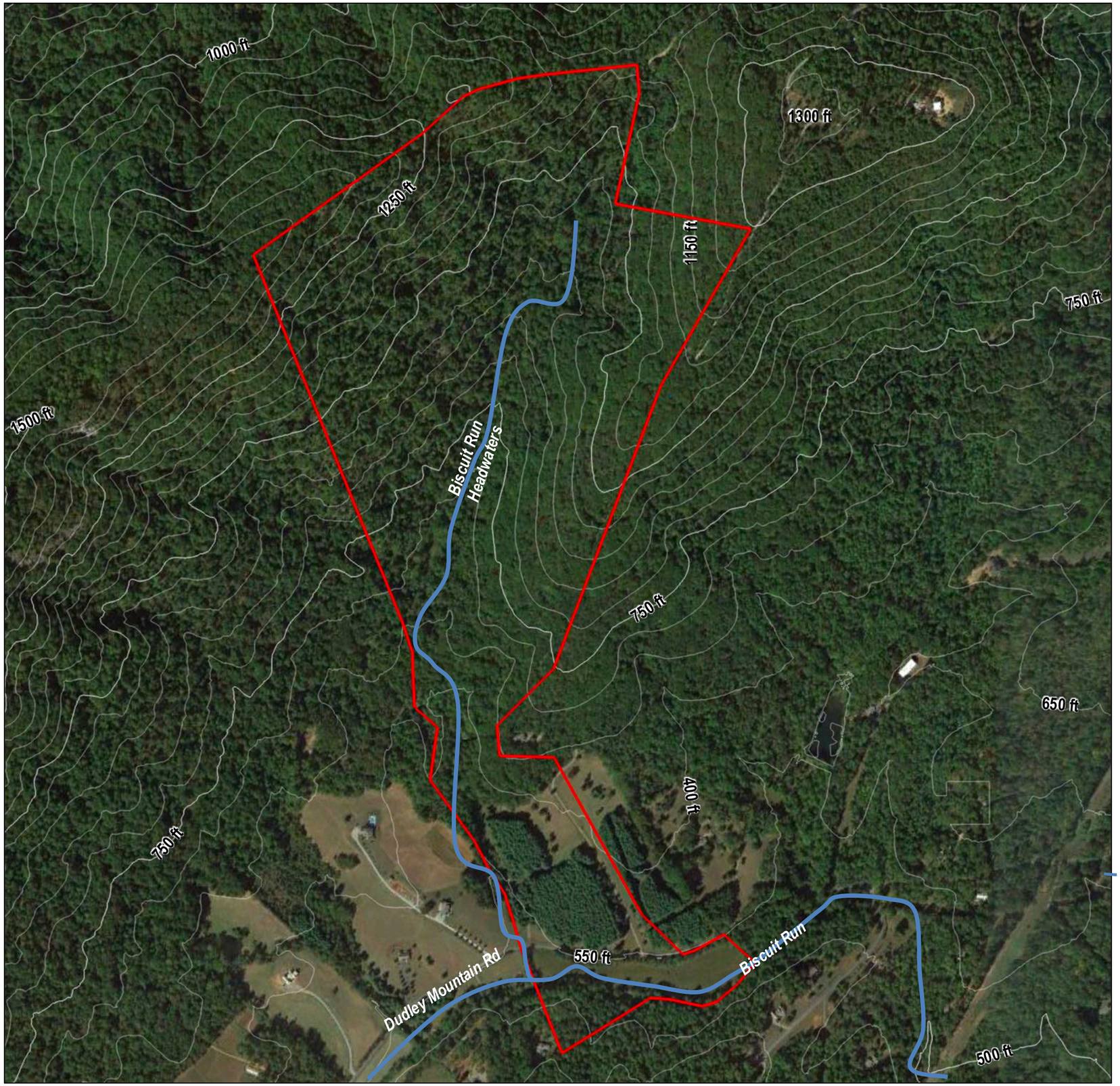
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale: ~1 mi

Date: 8/28/2024

BASEMAP: USGS – The National Map 2024



Site Layout

Figure 2

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Approximate Site Boundary

Biscuit Run

50 foot contour interval

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

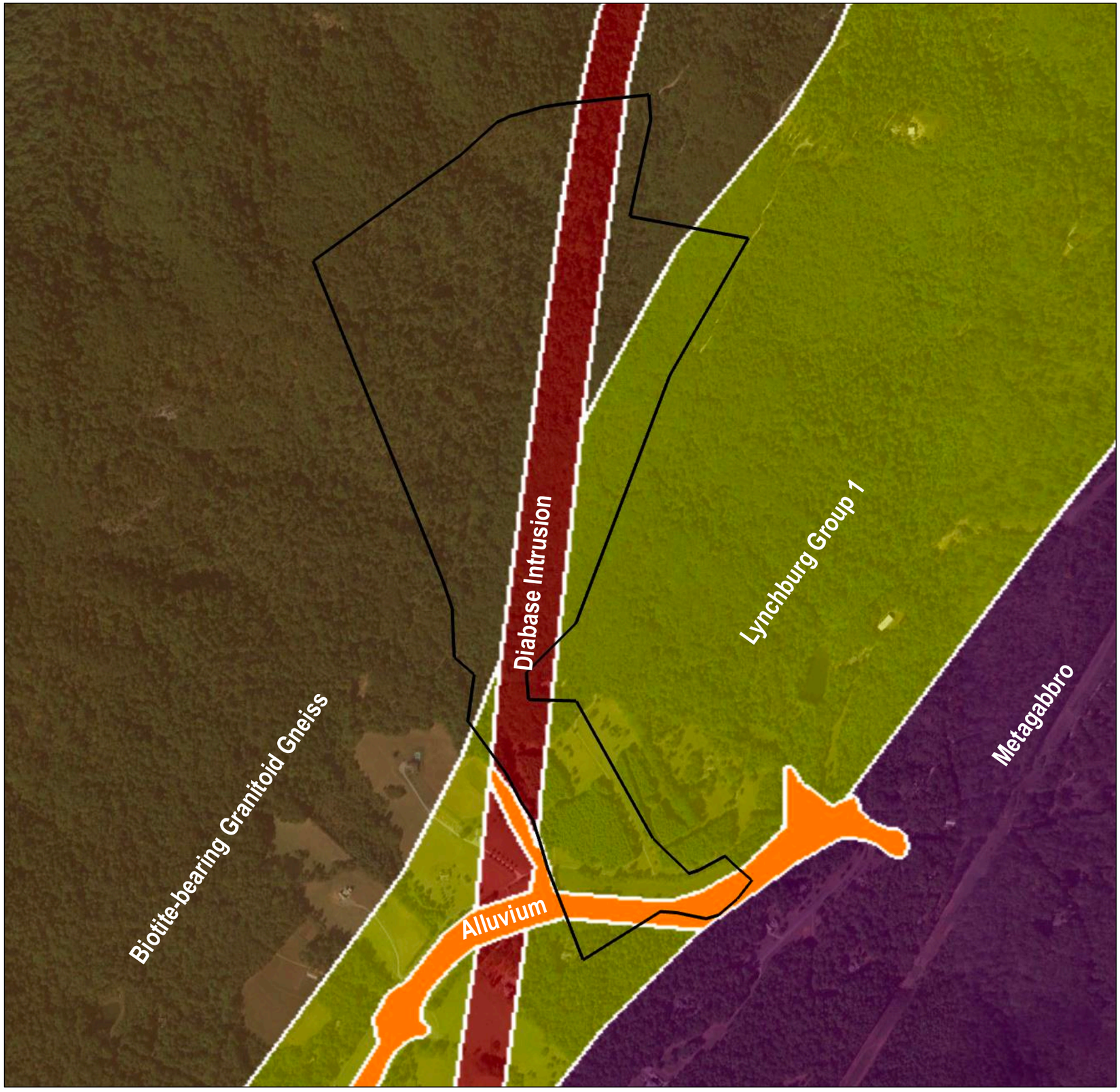
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale:
~500 ft

Date:
8/28/2024

BASEMAP: Google Earth- October 2021
ELEVATION DATA: USGS 3DEP Elevation



Geologic Map

Figure 3

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Approximate Site Boundary

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

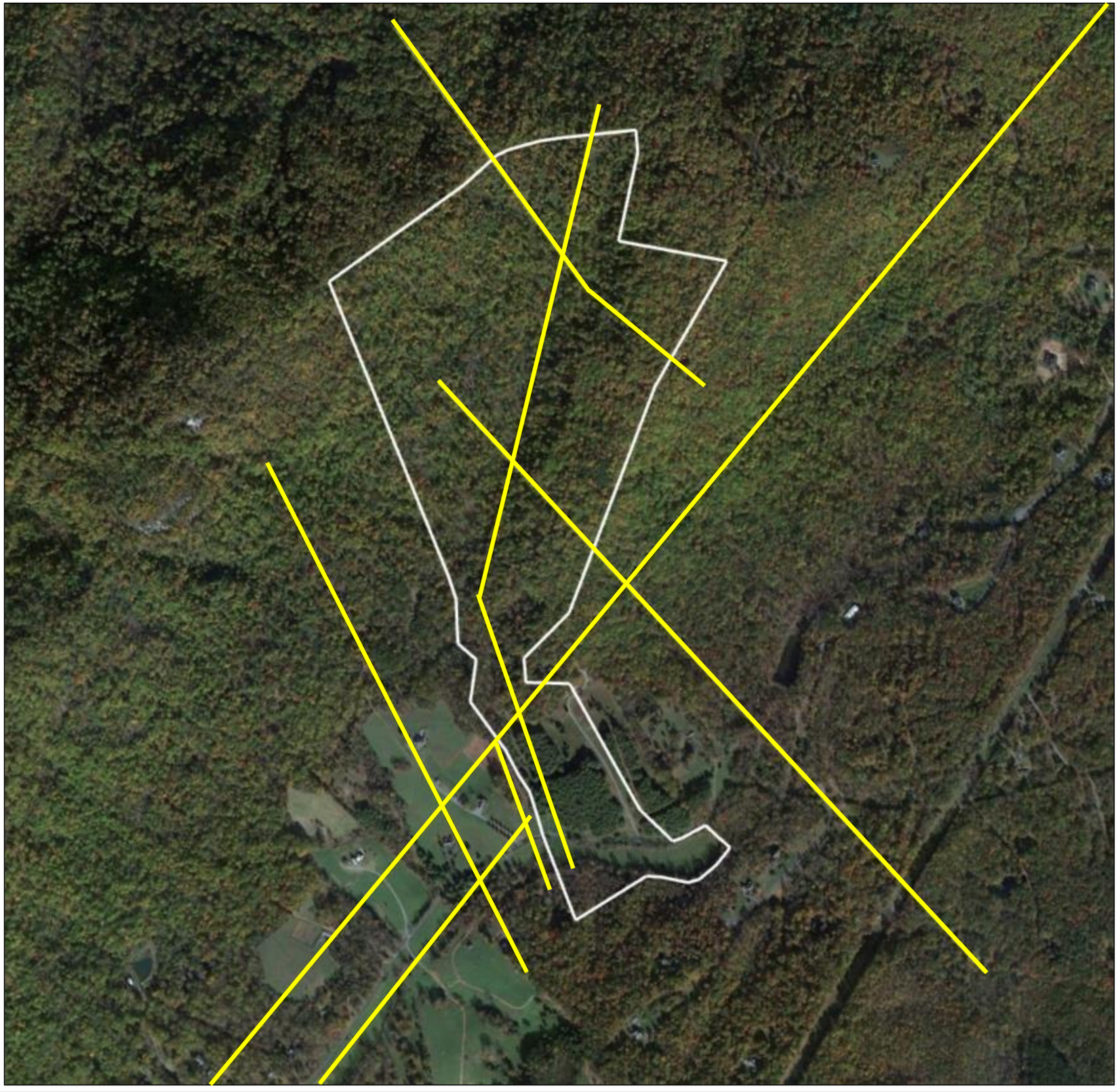
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale:
~500 ft

Date:
8/28/2024

BASEMAP: Google Earth- October 2021
GEOLOGY:VA DMR Geologic Map 1993 1:500,000 scale



Fracture Trace Map

Figure 4

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Fracture Trace Lineaments

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

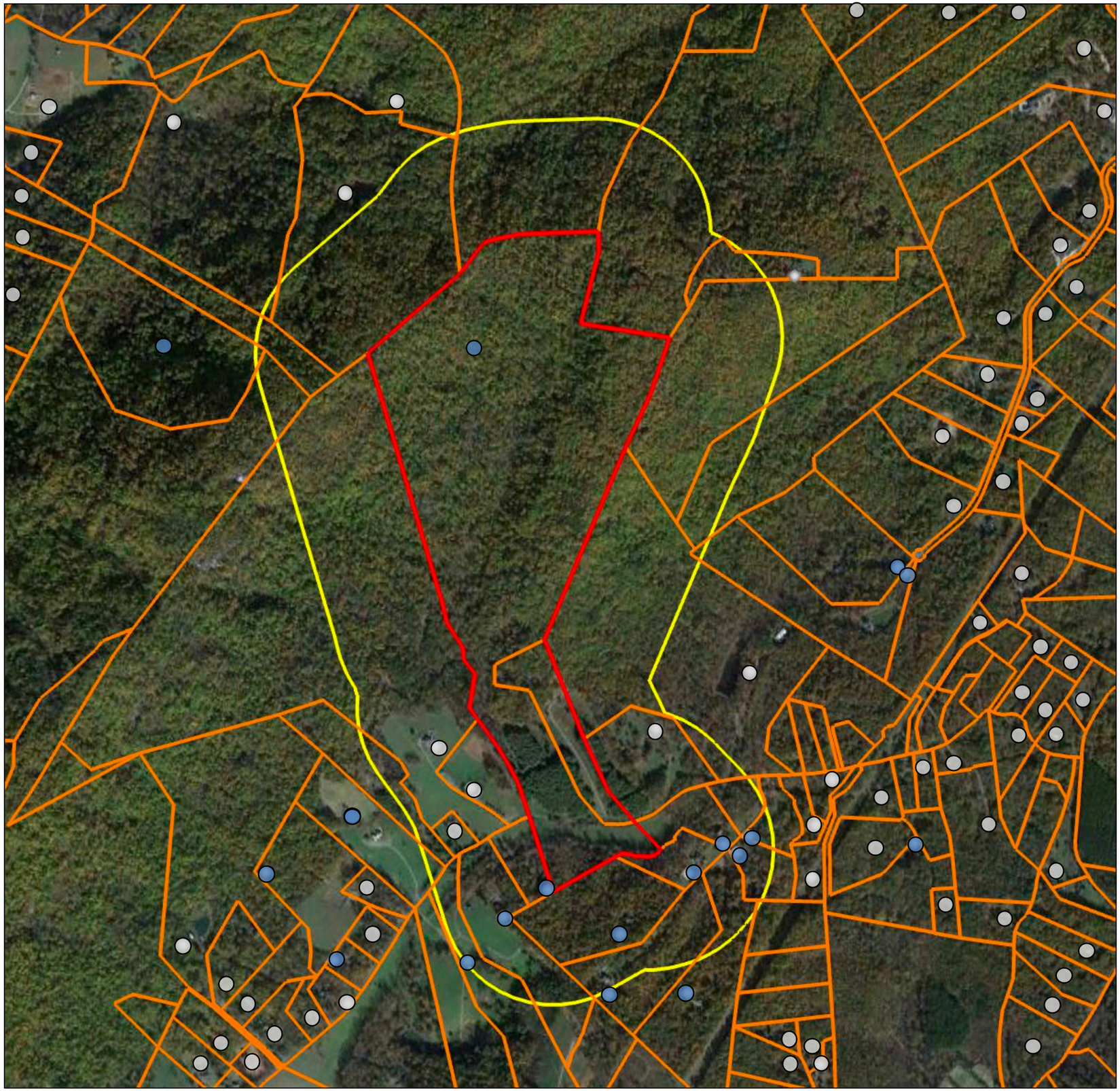
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale:
~500 ft

Date:
8/28/2024

BASEMAP: Google Earth- October 2021
GEOLOGY:VA DMR Geologic Map 1993 1:500,000 scale



Inferred Well and Septic Locations within 1000' of Site

Figure 5

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

- Approximate Site Boundary
- 1000-foot buffer beyond Site boundary
- Parcel with Well Record received from VDH FOIA request (locations inferred)
- Parcels Assumed to Posses Wells and Septic Systems (locations inferred)

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

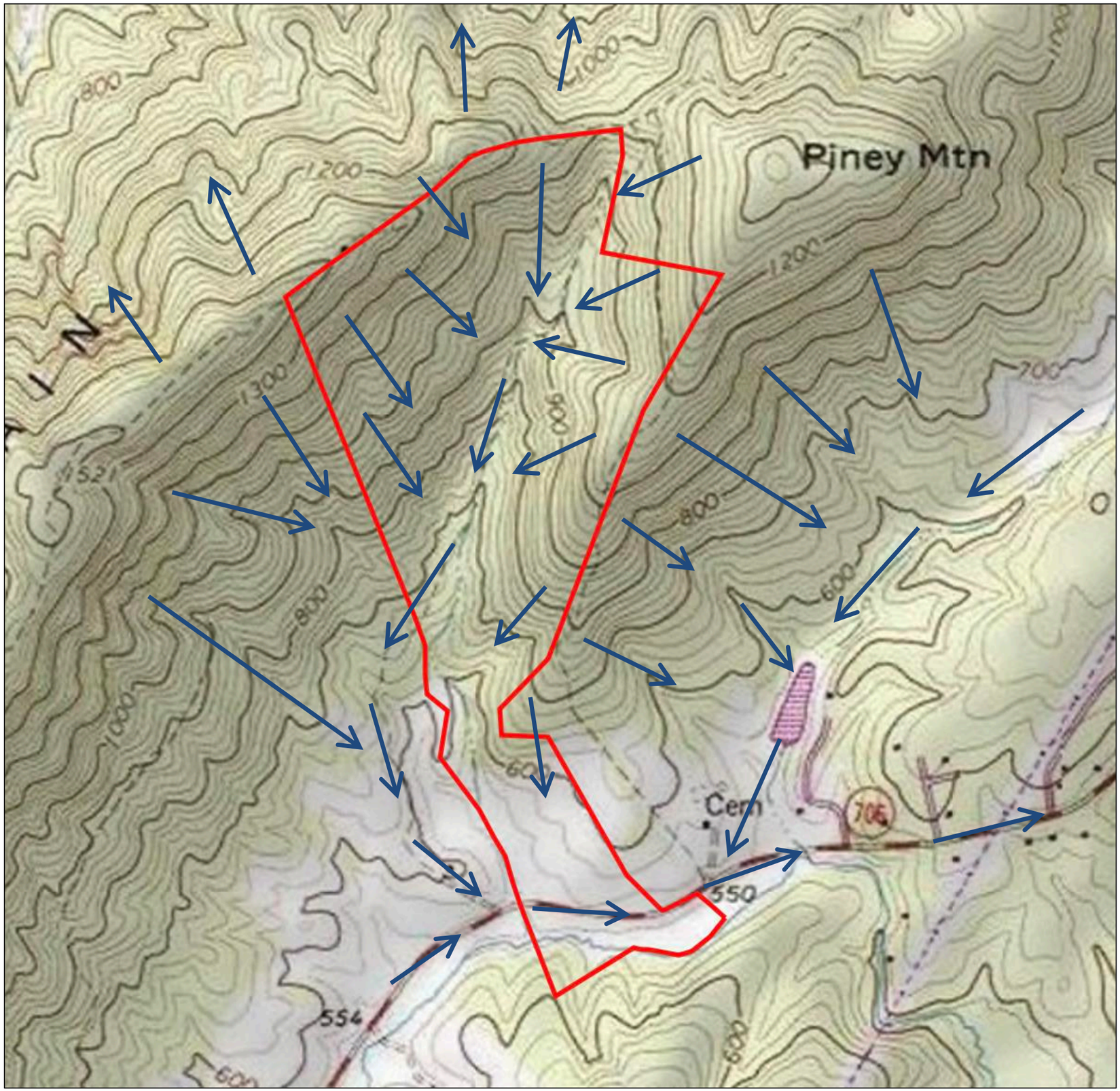
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale: ~1000 ft

Date: 8/28/2024

BASEMAP: Google Earth- November 2021
PARCEL DATA: Albemarle County GIS-Web



Inferred Groundwater Flow Map (Shallow)

Figure 6

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Approximate Site Boundary

Inferred Shallow Groundwater Flow Direction

20 foot contour interval

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

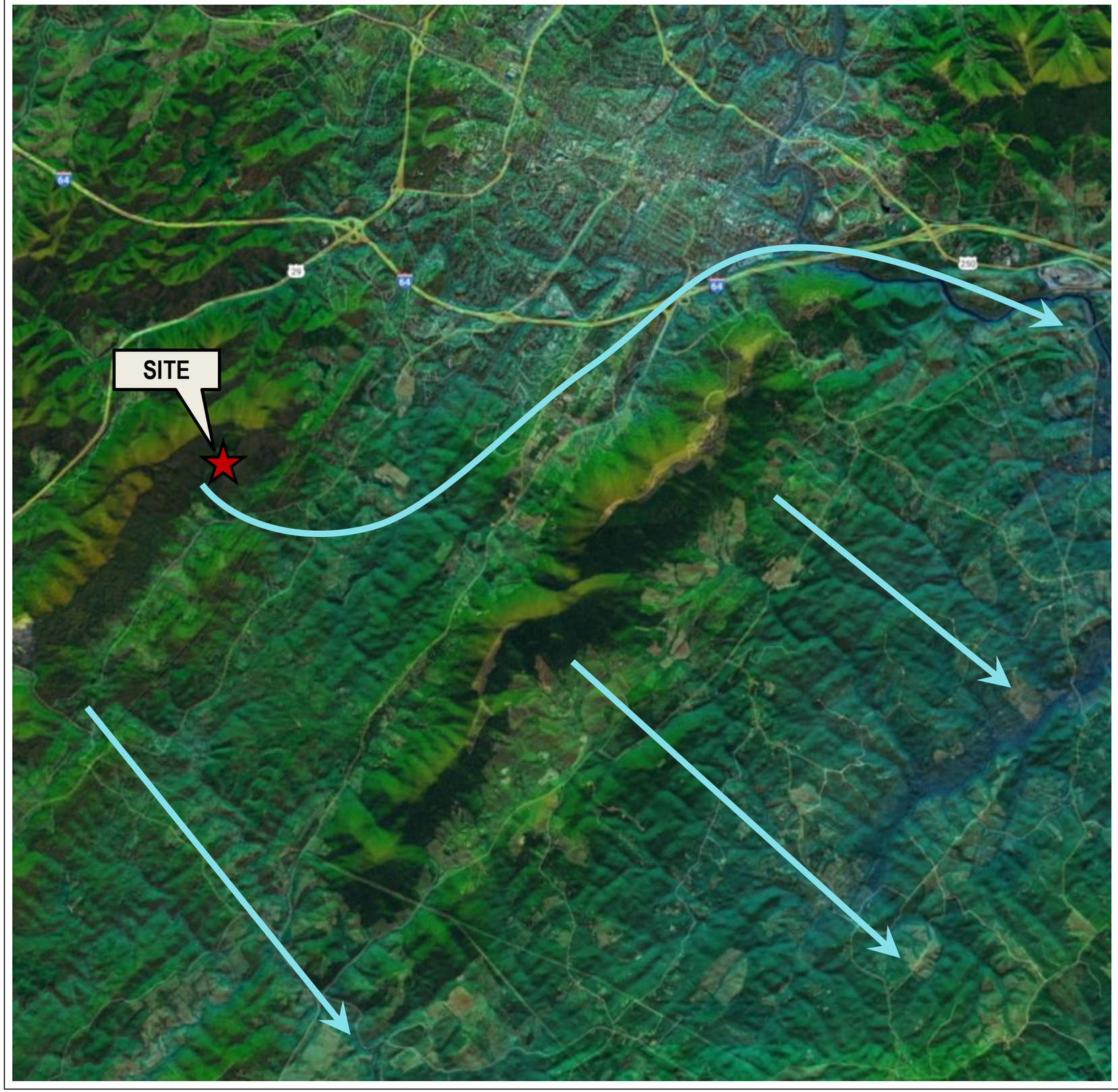
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale: ~500 ft

Date: 8/28/2024

BASEMAP: USA Topo Map



Inferred Groundwater Flow Map (Deep)

Figure 7

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Inferred Regional Groundwater Flow Direction

Albemarle County Parcel #89-64
Charlottesville, Virginia 22903

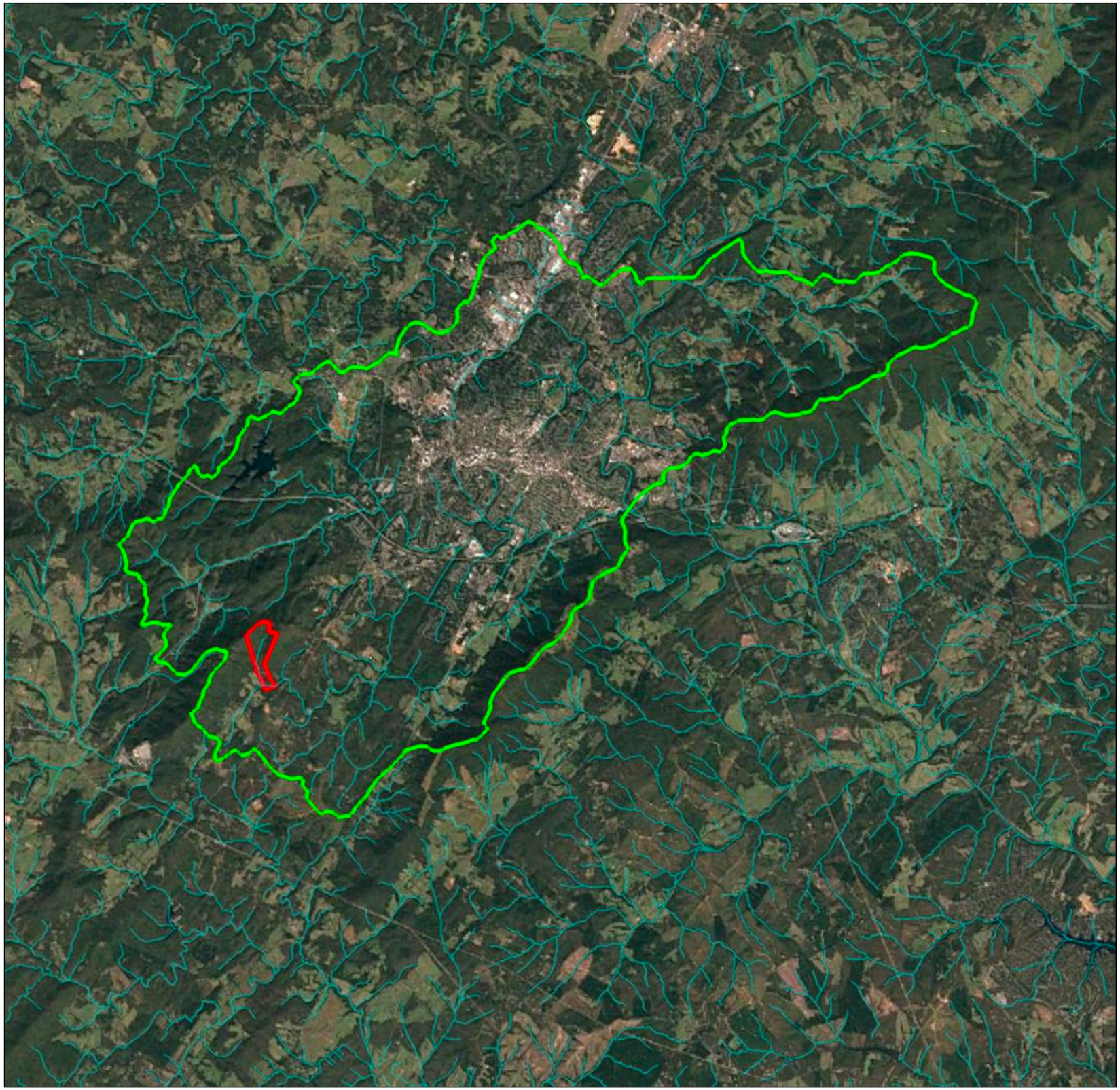
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale: ~4,000 ft

Date: 8/28/2024

BASEMAP: Google Earth 4/2024



Watershed Boundary

Figure 8

HydroGeo ENVIRONMENTAL

37°59'07"N, 78°33'46"W (WGS 1984)

Approximate Site Boundary

Upper Rivanna River/Moores Creek Watershed (HUC10)

Albemarle County Parcel #89-64
Charlottesville, Virginia 22903

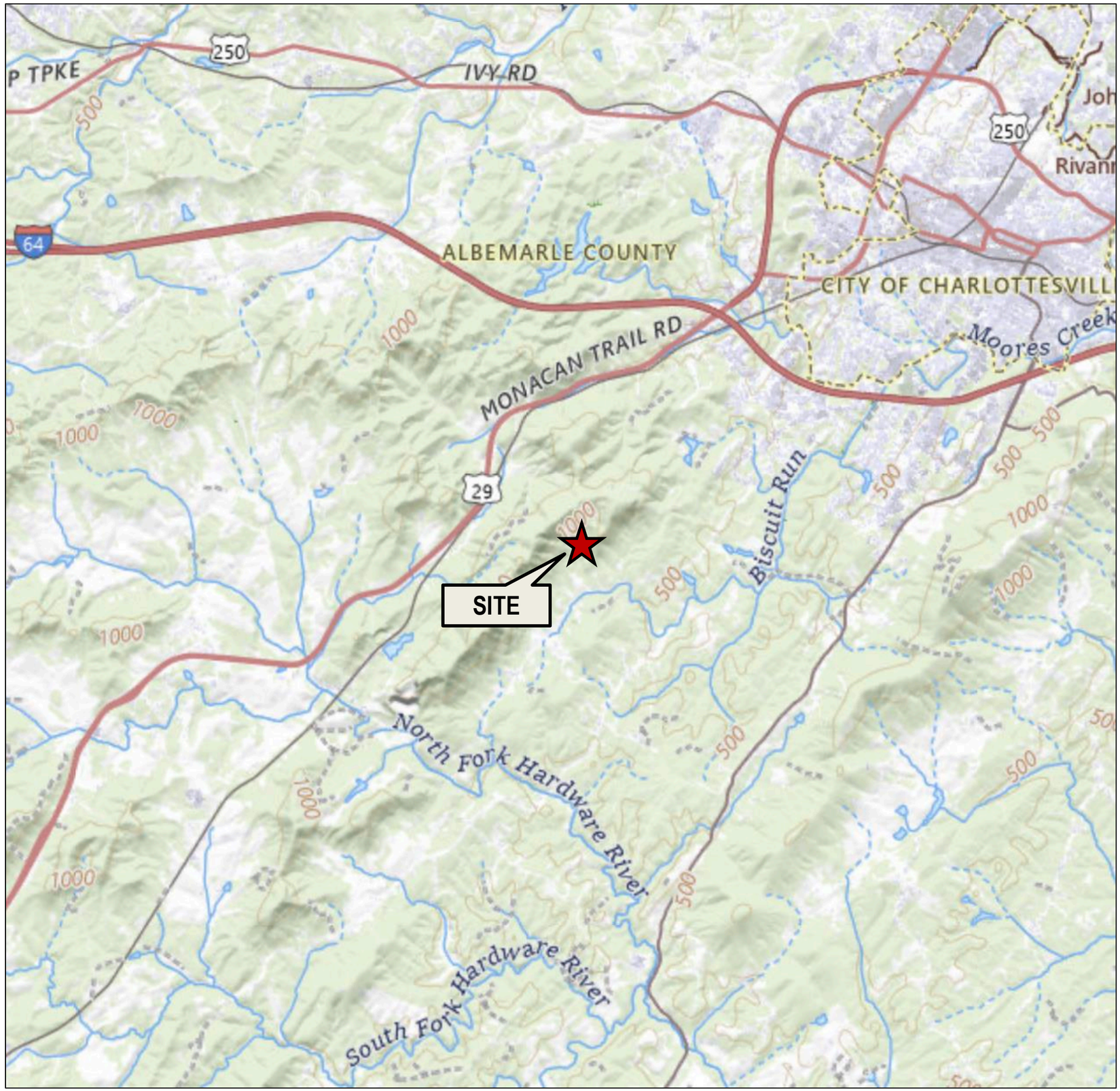
HydroGeo Environmental, LLC
5155 Three Notch'd Rd, Crozet, VA

NORTH

Scale: ~1 mi

Date: 8/28/2024

BASEMAP: Google Earth – November 2021
WATERSHED DATA : DEQ HUC 10 Watersheds.shp



Site Location

Figure 1

HydroGeo ENVIRONMENTAL

37

Albemarle County Parcel
#89-64
Charlottesville, Virginia 22903

HydroGeo Environmental, LLC

NORTH

Scale: ~1 mi

Date: 8/28/2024

BASEMAP: USGS The National Map 2024

Attachment A:

Preliminary Site Plan

SITE PLAN SHEET NOTES

1. PROPERTY LINE
2. SIDE YARD, 25'
3. FRONT YARD, 100'
4. STREAM BUFFER, 100'
5. PARKING
6. UNPAVED OVERFLOW PARKING
7. DRAINFEILD
8. RESERVE DRAINFIELD
9. MAIN GATE
10. LAWN (REINFORCED FOR FIRE DEPARTMENT ACCESS WHERE DASHED)
11. FIRE DEPARTMENT ACCESS / SERVICE YARD
12. FIRE DEPARTMENT ACCESS
13. LARGE GATHERING SPACE
14. TERRACE

ECOSYSTEM BASE

thrive architecture
108 south first street
charlottesville, va 22902

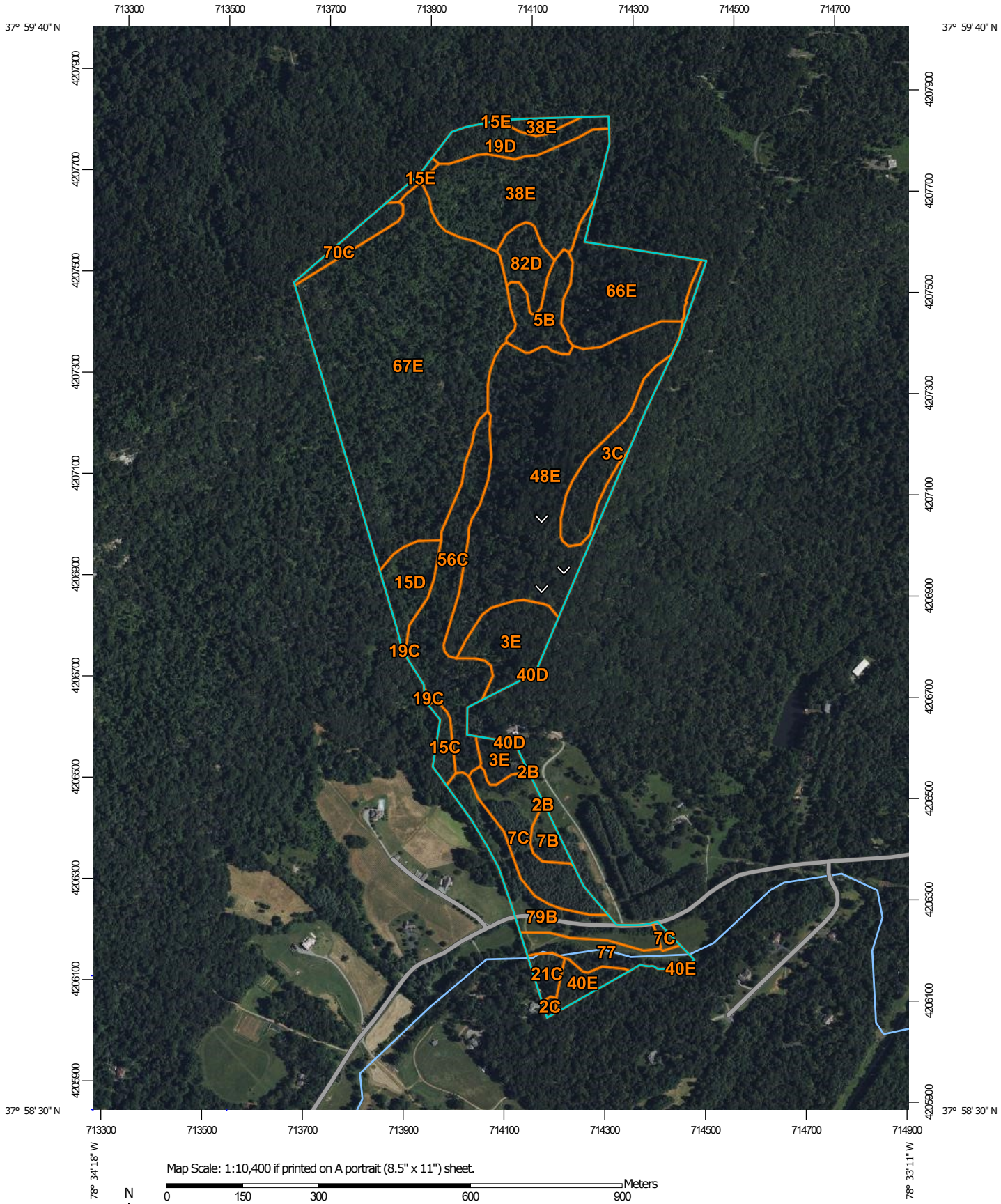
CBI Forest School | SITE PLAN
17, JULY 2024

A0

Attachment B:

NRCS Soil Map

Soil Map—Albemarle County, Virginia
(CBI Forest School NRCS Soils Map)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Albemarle County, Virginia
Survey Area Data: Version 17, Aug 25, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 19, 2022—Jul 1, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

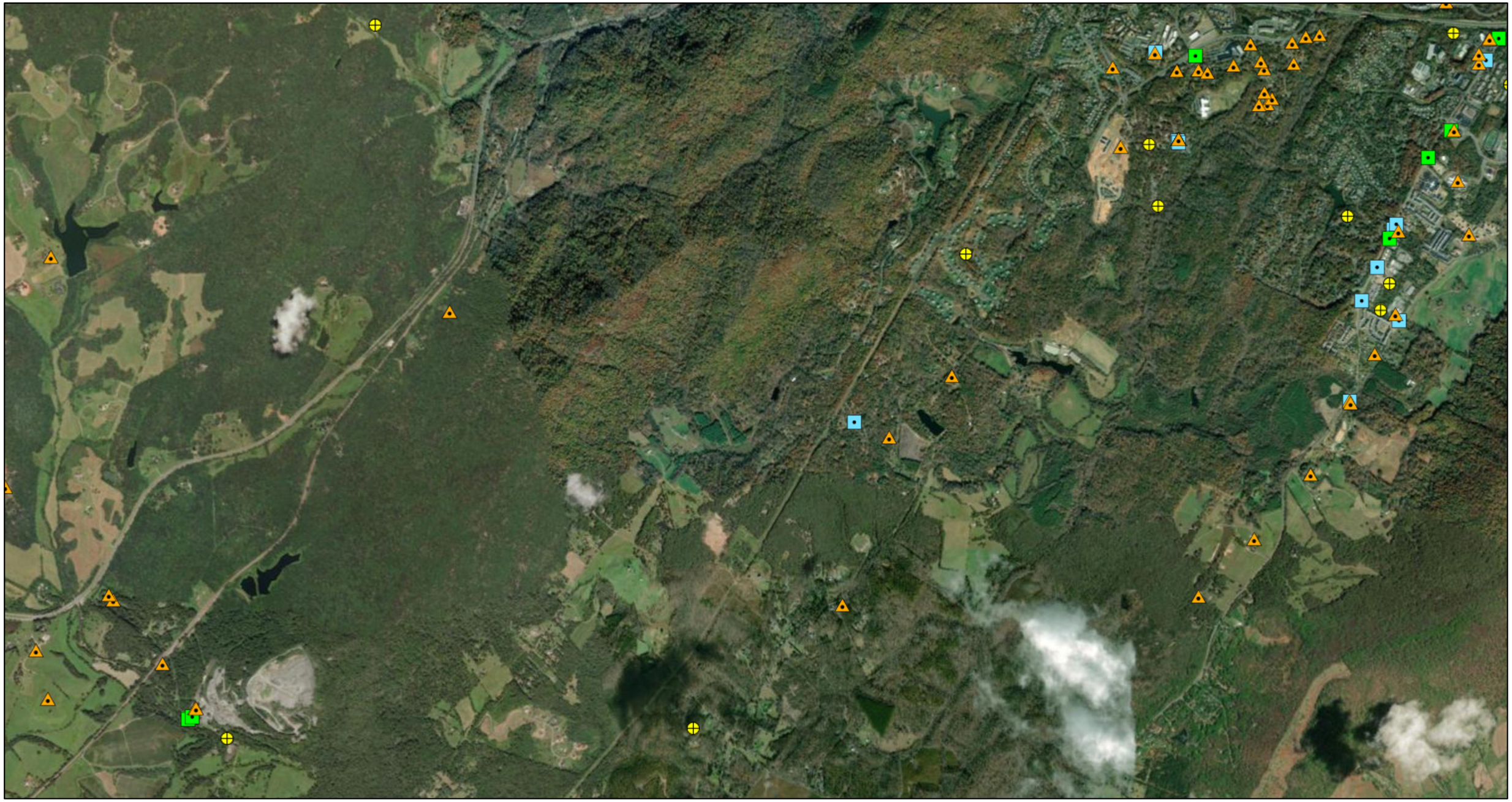
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2B	Albemarle fine sandy loam, 2 to 7 percent slopes	0.0	0.0%
2C	Albemarle fine sandy loam, 7 to 15 percent slopes	0.2	0.1%
3C	Albemarle fine sandy loam, 7 to 15 percent slopes, very stony	5.0	3.0%
3E	Albemarle fine sandy loam, 25 to 45 percent slopes, very stony	7.0	4.2%
5B	Belvoir loam, 2 to 7 percent slopes	3.7	2.3%
7B	Braddock loam, 2 to 7 percent slopes	1.3	0.8%
7C	Braddock loam, 7 to 15 percent slopes	6.6	4.0%
15C	Chester very stony loam, 7 to 15 percent slopes	1.2	0.7%
15D	Chester very stony loam, 15 to 25 percent slopes	3.4	2.1%
15E	Chester very stony loam, 25 to 45 percent slopes	0.4	0.3%
19C	Minnieville loam, 7 to 15 percent slopes	0.1	0.1%
19D	Minnieville loam, 15 to 25 percent slopes	4.0	2.4%
21C	Culpeper fine sandy loam, 7 to 15 percent slopes	1.2	0.7%
38E	Hayesville loam, 25 to 45 percent slopes, very stony	14.8	8.9%
40D	Hazel loam, 15 to 25 percent slopes, very stony	0.0	0.0%
40E	Hazel loam, 25 to 45 percent slopes, very stony	1.7	1.0%
48E	Philomont sandy loam, 25 to 45 percent slopes, very stony	32.3	19.5%
56C	Meadowville loam, 7 to 15 percent slopes	10.9	6.6%
66E	Parker very stony loam, 25 to 45 percent slopes	10.5	6.3%
67E	Parker extremely stony loam, 25 to 60 percent slopes	46.7	28.2%
70C	Porters very stony loam, 7 to 15 percent slopes	1.6	1.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
77	Dan River-Codorus complex, 0 to 2 percent slopes, occasionally flooded	3.7	2.2%
79B	Meadowville silt loam, 2 to 7 percent slopes	6.4	3.9%
82D	Thurmont very stony loam, 15 to 25 percent slopes	2.8	1.7%
Totals for Area of Interest		**165.5**	**100.0%**

Attachment C:

VADEQ Environmental Data Mapper Web Map

Environmental Data Mapper Web Map



8/13/2024, 11:40:59 AM

1:36,112

0 0.35 0.7 1.4 mi

0 0.5 1 2 km

Registered Petroleum Tank Facilities (Daily)

- Not Active
- Active

PReP Reports (Daily)

- Closed

Virginia County Boundaries

Petroleum Releases (Daily)

- Closed

Virginia Department of Environmental Quality, This EPA Geospatial data set is generated from the following national environmental programs: Superfund National Priorities List (NPL) from the Superfund Enterprise Management System (SEMS); Resource Conservation

Provided by Virginia Department of Environmental Quality

Terms of use: https://geohub-vadeq.hub.arcgis.com/pages/terms-of-use

Attachment D:

Water Budget Calculations

Groundwater Use Calculations for Ladd Farm

Quantitative analysis helps evaluate the impact to local groundwater resources due to creation of impervious surface and increased groundwater pumping as a result of site development. Existing recharge to the Site itself (approximately 171.045 acres of undeveloped forest with a gravel driveway and a single-family residential structure) can be modeled as follows:

Annual regional precipitation: **46.8 inches (Sanford, W.E., Nelms, D.L., Pope, J.P., & Selnick, D.L. (2011) 'Quantifying Components of the Hydrologic Cycle in Virginia using Chemical Hydrograph Separation and Multiple Regression Analysis', USGS Scientific Investigations Report 2011-5198, pp. 60.**

Very conservative estimate for the percentage of precipitation contributing to groundwater recharge, subtracting runoff and evapotranspiration: **15%**

Annual regional groundwater recharge: **7.02 inches**

Avg. regional daily groundwater recharge: 7.02 in. per year / 365 = 0.02 in. / 12 = **0.0016 ft.**

Daily recharge per acre: 0.0016 feet X 43,560 square feet per acre = **69.7 cubic feet recharge per acre**

Gallons recharge per day per acre: 69.7 cubic feet x 7.48 gallons per cubic foot = **521.3 gallons per day per acre**

Gallons per day natural recharge via direct precipitation to Site: 521.3 gallons per acre x 171.045 acres = **89,165.76 gallons per day (gpd).**

Gallons per day recharge lost due to existing onsite impervious cover: 521.3 gallons per acre x 0.1 acre = **52.13 gallons per day.**

Existing recharge = 89,165.76 gpd – 52.13 gpd = 89,113.63 gpd

Pre-development groundwater use calculations:

Considering current withdrawals from existing onsite units within watershed:

Average water usage per day: **400 gallons / day / residence**
Total current units (1 single family residence): **400 gpd**
Total current avg water use per day onsite: **400 gpd**

Current (pre-development) groundwater surplus (Total avg watershed recharge – total avg daily usage): 89,113.63 gpd – 400 gpd = **88,713.63 gpd**

Post-Development Calculations:

Our current conservative estimate is that the project will result in a net increase of impervious surface of 2 acres. The impact on post-development groundwater recharge is estimated below:

Gallons per day additional recharge lost due to new impervious cover: 521.3 gallons per acre x 2 acres = **1,042.6 gallons per day**

Existing surplus – Recharge Lost Due to New Impervious Surfaces = Post-Dev. Recharge

88,713.63 gpd - 1,042.6 gpd = 87,671.03 gpd

And considering projected withdrawals from students, guests, and faculty (200 people):

Average water usage per day: **10 gallons / day / person**
Estimated students, guests, and faculty (200 total): **200 people**
Additional onsite groundwater usage: 10 gallons / day / person x 200 people= **2,000 gallons per day**

Based on this set of calculations and assumptions, the estimated post-development groundwater surplus for the Site can be expressed as:

Inputs (post-development recharge) – Outputs (GW pumped) = Surplus

87,671.03 gpd – 2,000 gpd = **85,671.03 gpd surplus (post-development)**

Relative to the proposed usage of groundwater post development, overall recharge post-development will be more than adequate to supply groundwater usage without long-term degradation of groundwater resources.

Attachment E:

Terms and Conditions

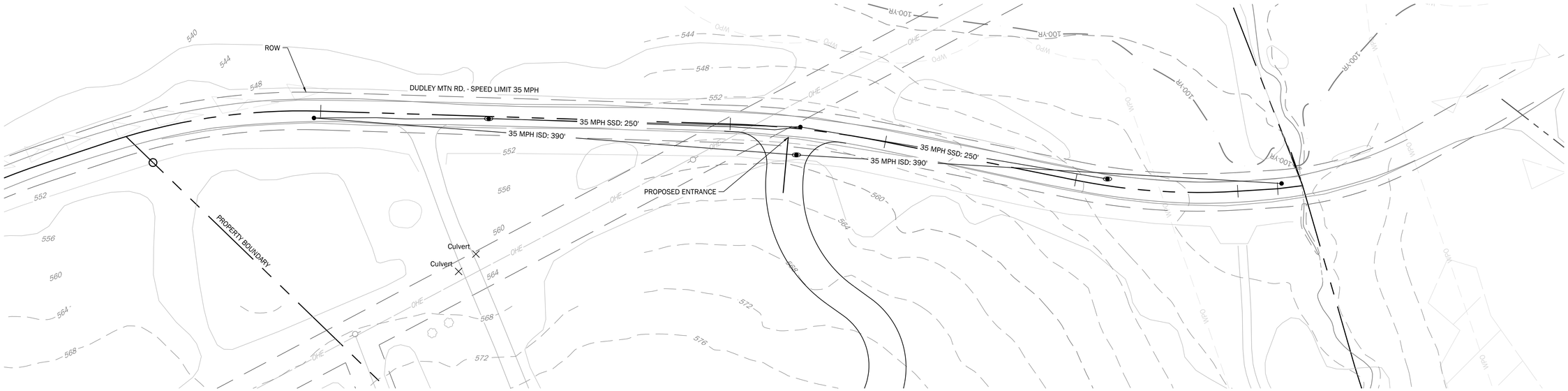
Attachment E: Terms and Conditions

The information and conclusions presented in this report are based upon work conducted by HydroGeo staff trained in the performance of environmental and hydrogeologic field data collection and review in accordance with industry standards in place at the time the work was performed.

The findings and conclusions of this work are based upon the professional judgment of HydroGeo personnel in light of the quality and quantity of data collected during the performance of this assessment. The conclusions presented herein are based on *in-situ* point data and publicly available information, and are deemed representative of the conditions at the testing locations at the time the tests were conducted. HydroGeo does not suggest the conclusions presented herein represent all areas of the Site nor that areas covered by this assessment are not subject to change. Stated opinions and conclusions are not intended as a guarantee. The only reliable way to confirm that a sustainable groundwater resource is present is to drill a well and test it for quantity.

Appendix E

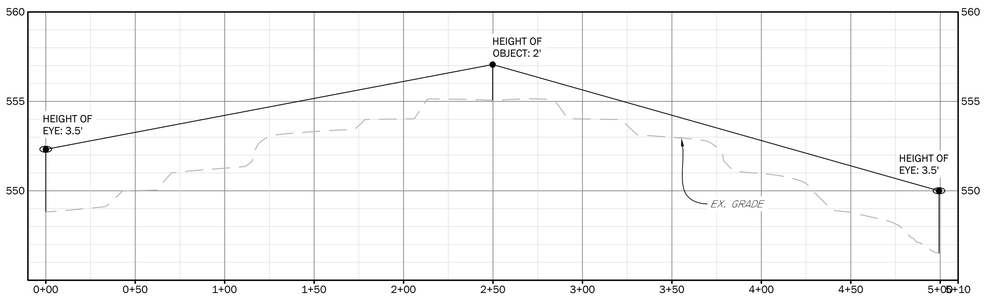
Sight Distance Exhibit



1 RELOCATED ENTRANCE LOCATION

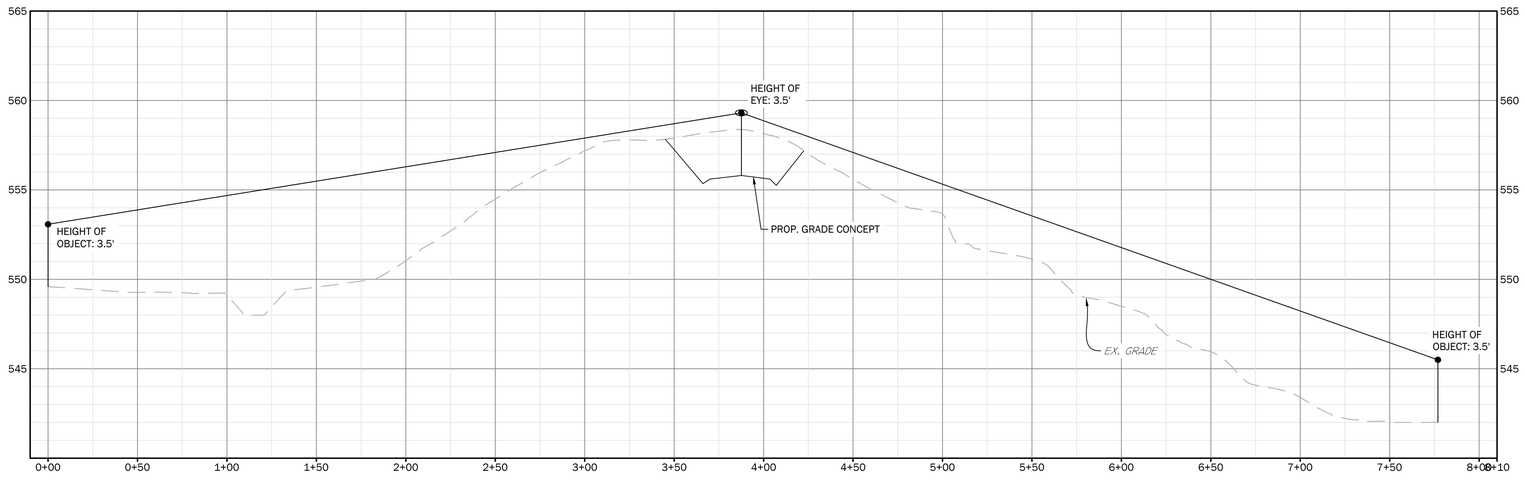
1" = 40': 0 40 80

N



2 35 MPH SSD - RELOCATED ENTRANCE

H: 1" = 40': 0 40 80
V: 1" = 4': 0 4 8



3 35 MPH ISD - RELOCATED ENTRANCE

H: 1" = 40': 0 40 80
V: 1" = 4': 0 4 8

RELOCATED ENTRANCE SIGHT DISTANCE

CBI FOREST SCHOOL
SPECIAL USE PERMIT
ALBEMARLE COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
01/06/2025
NOT FOR CONSTRUCTION
PROFESSIONAL ENGINEER

SUBMISSIONS/REVISIONS
1: 01/06/2025

LINE AND GRADE
Civil Engineering

C0.2

L+G PROJECT NUMBER: 2403005

Appendix F

Road Width Assessment

LINE AND GRADE
Civil Engineering

Memorandum

TO: Syd Shoaf
Senior Planner
Albemarle County Community Development

FROM: Kendra Moon, PE
Line and Grade Civil Engineering

DATE: January 6, 2025

RE: CBI Forest School – Dudley SP202400023
Road Width Assessment

EXECUTIVE SUMMARY

Based on community feedback, the number one concern related to the proposed private school at TMP 89-64 off of Dudley Mountain Road is the addition of traffic, especially at concentrated times, to Dudley Mountain Road. Dudley Mountain Road is a state-maintained road (SR 706), marked 35 MPH, with very low volumes of traffic, no centerline striping, and an average width of 18 ft. As expounded upon below, it was determined that the road should be evaluated for its ability to provide adequate space for vehicles to pass one another and recommendations should be made based on those findings. The entire 3.77 miles of road were evaluated and found to meet the criteria outlined, therefore no road widening is proposed.

BACKGROUND AND PURPOSE OF STUDY

Line and Grade and CBI Forest School met with County planning staff and VDOT staff on December 12, 2024 to discuss appropriate assessment and improvement measures for Dudley Mountain Road in conjunction with the current Special Use Permit. During this meeting, VDOT expressed that they do not have requirements for road improvements related to land development, and that this would be within the review of County staff. VDOT's concerns and approval related to the site are limited to the entrance and access to the site, including sight distance and turn lanes if warranted. The site entrance has been proposed to be relocated to meet all of VDOT's requirements. The outstanding questions from County staff related to the road were then primarily 1) what is the applicant proposing to do to mitigate impacts of peak traffic flow in the morning where effects would be seen most acutely and 2) what is the applicant proposing to do about the current road conditions, which have been expressed by neighbors to be unsafe. To address comment #1, CBI has agreed to extend the drop-off window to an hour long and provide additional staffing during that time to spread out the peak traffic in the morning, which is of highest concern. Additionally, they have agreed to provide the option for a shuttle to the school, the exact location of pick up to be determined based on highest expected ridership. As for comment #2, County staff agreed that a general widening of Dudley Mountain Road is not the appropriate solution as it may invite more traffic and higher speeds. VDOT noted that the minimum width of a road that is necessary for vehicles to pass one another is 16 feet, therefore the purpose of this study is to determine whether or not the road meets this requirement, and what improvements may be necessary to bring the road into compliance.

METHODOLOGY

Measurements of the road width were taken at a maximum interval of 500 linear feet apart for the entire length of the road from Red Hill Road to Old Lynchburg Road. Aerial imagery was utilized to measure road widths in areas where the edge of pavement was easily discernible. There are many locations along the road where vegetation blocks the aerial view of the road, therefore road width data was supplemented with field measurements utilizing a GNSS receiver with up to 1 cm accuracy. These measurements were double checked for accuracy with a measuring wheel.

LINE AND GRADE
Civil Engineering

FINDINGS AND DISCUSSION

All locations that were measured along Dudley Mountain Road were found to exceed 16 ft in width. It is worth noting that the perception of the road width is affected by many factors besides the actual pavement width, many of which could be contributing to the perception of this road or its usable width. Contributing factors include the condition of the roadway surface, availability of a shoulder, and distance from the edge of pavement to objects such as mailboxes, embankments, or ditches. Maintaining the posted speed limit of 35 MPH should allow users to traverse this road and pass one another safely.

Sincerely,

Kendra G. Moon, PE