

Town of Laurel Park Special Called Planning Board Meeting

Date of Meeting: October 28, 2025 **Time of Meeting:** 3:00 pm

Location: Town Hall, 441 White Pine Drive, Laurel Park NC 28739

- 1. Call to Order
- 2. Approval of the Agenda
- 3. Old Business
 - a. continuation of Site plan review 210 Somersby Park
- 4. New Business
- 5. Adjourn

Title of Item: 210 Somersby Parkway Site Plan Approval Continuation

Presenter: Zoning Administrator Natalie Berry

Attachment(s): Yes

- 1. Aerial Map
- 2. Site Plan
- 3. Landscape Plan
- 4. Grading Plan
- 5. Summary Table for plantings
- 6. Plat Book 2003 slide 4734
- 7. Exception to UDO requirements on Setbacks
- 8. Annexation 1999
- 9. Geo-Technical Report

Summary of Item:

With the help of Construction Manager Austin Matthews, Masterpiece Custom Builders, Mr. and Mrs. Kelly (owners) are proposing to build a new single family dwelling unit located on Somersby Parkway. The parcel is identified on the Henderson County Geographic Information System (GIS) as property identification number 9548-94-0936 This property is in the R-30 zoning district. The parcel is located in a Planned Unit Development approved The estimated acreage is .44 acres, and the slope of the property is estimated at 23%, which is considered a steep slope. This is a non-conforming lot however the proposed dwelling meets all standards within the UDO with the exception of setbacks (see attachments 6, 7 & 8 for additional information).

The Laurel Park Unified Development Ordinance (UDO) section 2.5.3: Dimensional Standards for the R-30 zone indicates that lots with steep slopes (15%-25%) require a minimum street setback of 40 feet which cannot be met since the parcel was created in 1999 prior to the UDO adoption in 2021. The setbacks allowed for this parcel agree with the Plat Book 2003 Slide 4734 note 8.

The applicant has consulted with Gentry Geotechnical Engineering for the predevelopment investigation. This has been approved by the Town Engineer, Will Buie. Will Buie has reviewed the report and has approved the method for dispersing the stormwater from the property which includes gutter with downspouts that are connected to a pipe system that will convey water to storm drains OR to outfalls directed off-site.

Excerpt from Page 7 of Geotechnical report on this site:

"Surface Water Management Control of surface water from driveway areas and roof drainage is very important for this site. Surface water that erodes slopes could cause instability or undermine footings. All structures should incorporate gutters with downspouts that are connected to a pipe system that will convey water to storm drains or offsite. Routine maintenance should include inspecting, cleaning and repairing the gutters, downspouts and other stormwater handling systems as needed to ensure they remain operable. Inspections and cleaning should be performed at least annually. If conveyance of surface water into municipal storm drains is not possible, the surface water should be directed well away from the structure and maintained in a distributed flow onto the natural slope. Surface water should not be directed below the ground surface."

The applicant has also prepared a Landscape Plan and a summary table of plantings for the Planning Board's review.

Suggested Action: Staff requests the Planning Board to review the attachments and review criteria of UDO 6.3.16.

Suggested Motion: Motion to continue with a future date, approve, approve with conditions, or deny the site plan.

Henderson County NC

REID: 9965308

PIN: 9548940936

Listed To: KELLY, KEVIN; KELLY, CAROL

Property Description: SOMERSBY PARK LO:5 PH:I

SE:B PL:SLD-3215

Assessed Acreage: 0.44

Mailing Address: 7665 BLANDFORD PL

Mailing City, State: ATLANTA

GA

30350

Tax District: Tax District

Physical Address: 210 SOMERSBY PKWY

Deed: 004123 / 00416

Date Recorded: 1704456715000

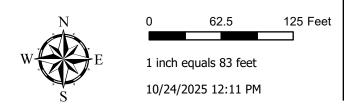
County Zoning: Cities

Total Value: \$ 42000

Neighborhood: SOMERSBY PARK

Municipality: LAUREL PARK

Flood Zone: No

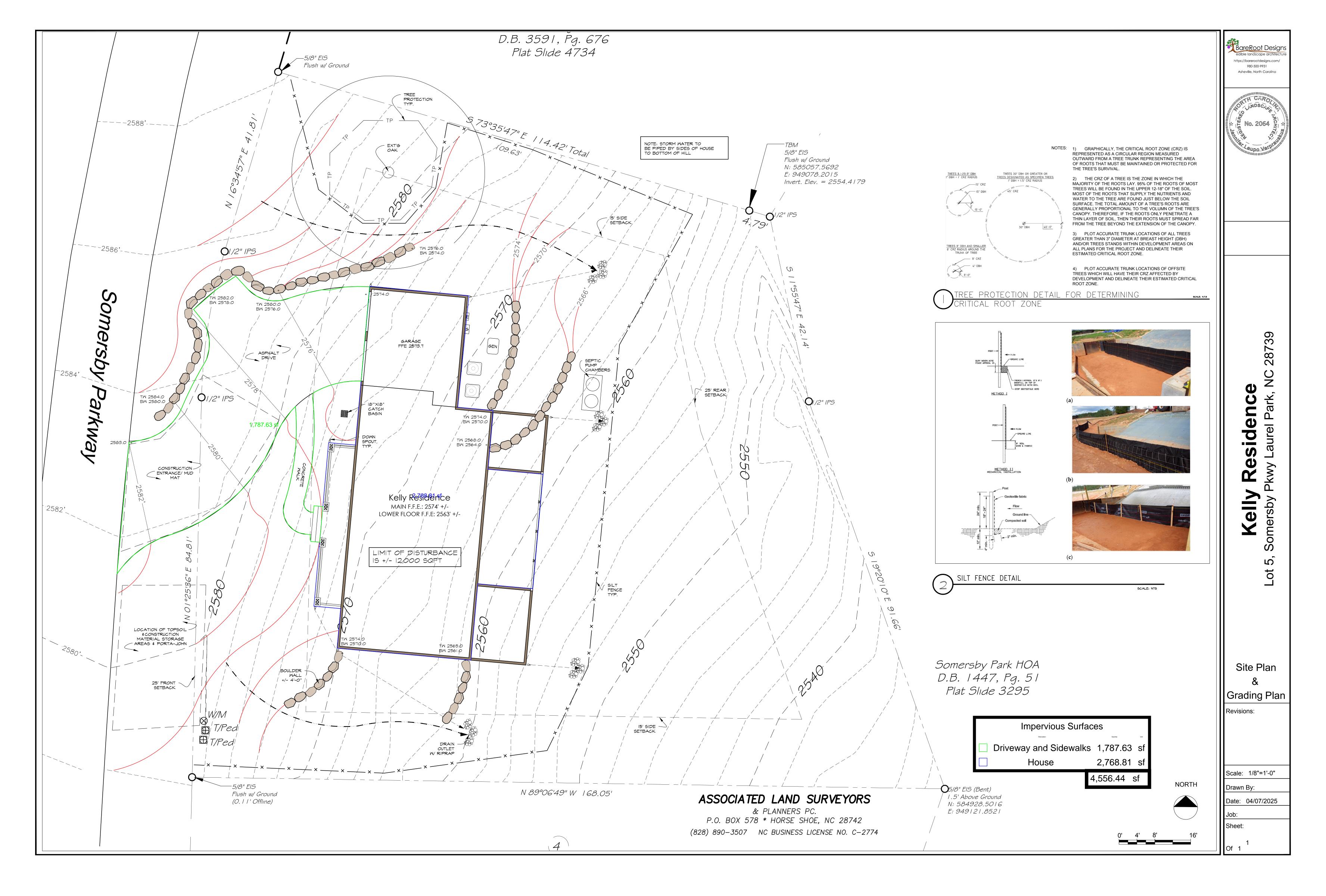


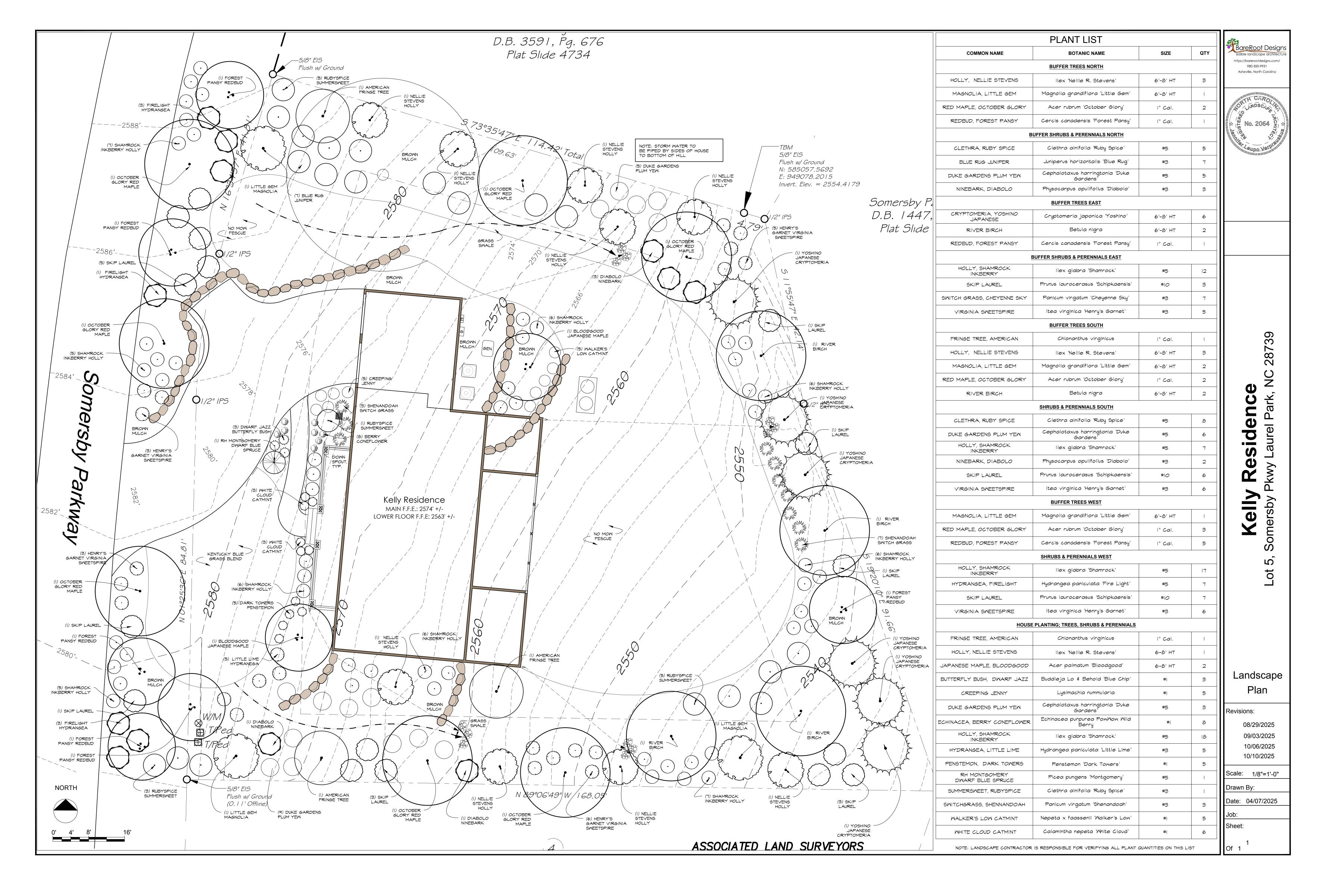


THIS IS NOT A SURVEY.

All information or data provided, whether subscribed, purchased or otherwise distributed, whether in hard copy or digital media, is provided by Henderson County without any warranty whatsoever, and its use shall be at the user's own risk. Henderson County makes no warranties or guarantees, including the warranties of merchantability or of fitness for a particular purpose. Map data is not appropriate for, and is not to be used as, a geodetic, legal, or engineering base system. The data is not intended as a substitute for surveyed locations such as can be determined by a registered Public Land Surveyor, and does not meet the minimum accuracy standards of a Land Information System/Geographic Information System Survey in North Carolina (21 NCAC 56.1608). The user should consult public primary information sources, such as recorded deeds and plats, to verify the accuracy of the data provided.







TOWN OF LAUREL PARK

Site Plan Summary

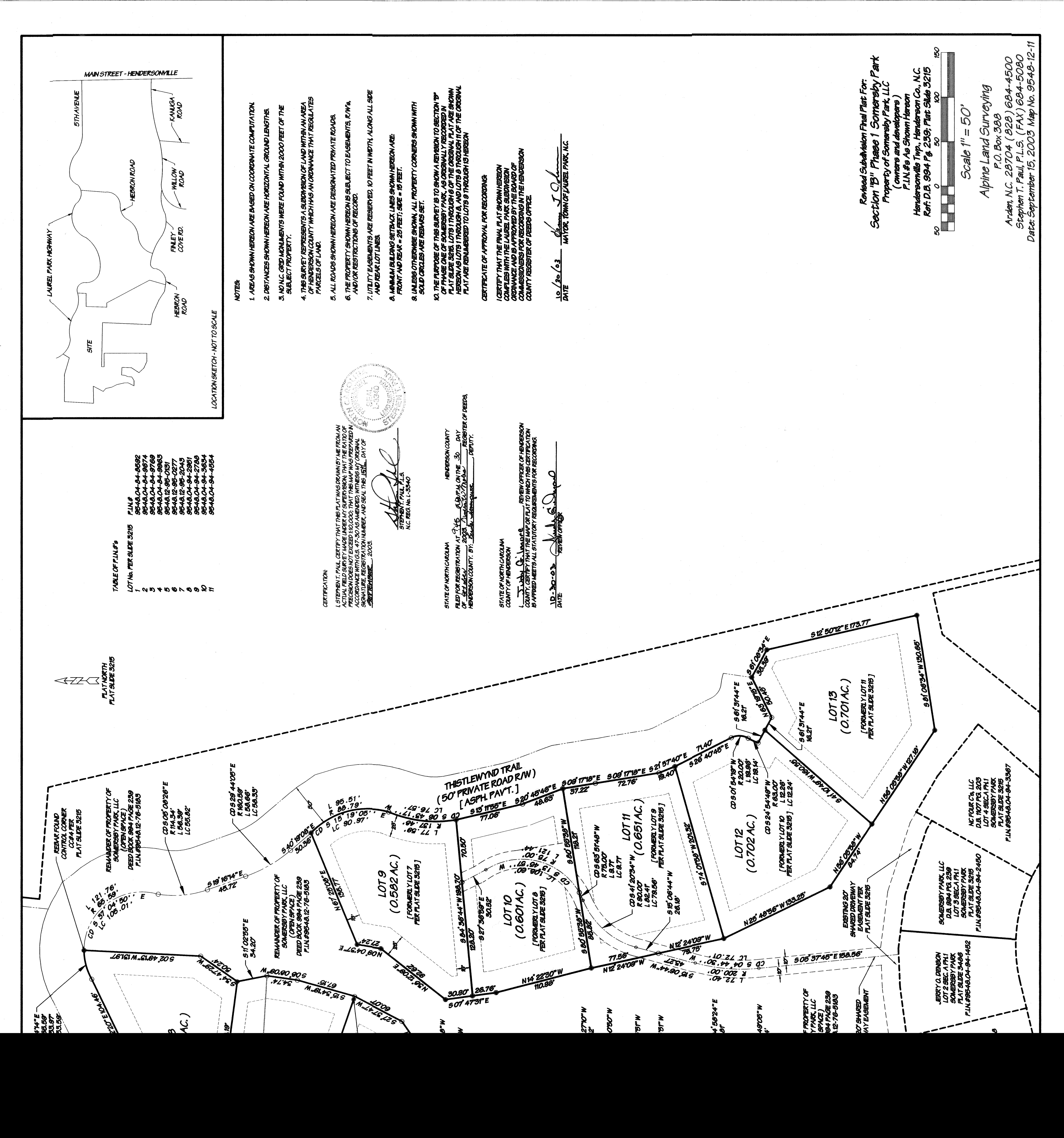
Name of project:

Kelly Residence

Address:

Lot 5, Somersby Pkwy Laurel Park, NC 28739

	Distance (ft)	Required by UDO Canopy Trees	Proposed Canopy Trees	Required by UDO Understory Trees	Proposed Understory Trees	Required by UDO Shrubs	Proposed <i>Shrubs</i>
Street Intermittant	160'	3	3	6	6	30	40
ide B	115'	3	2- 1 existing	6	6	20	20
North		1					
<u>lear</u>	133'	3	3	6	6	30	31
		+ +					
ide A	167'	3	3	6	6	30	30
South							
ŀ							
ľ							





441 White Pine Dr.

Laurel Park, NC 28739

www.laurelpark.org

July 31, 2024

office: 828-693-4840

President of Somersby Park PO BOX 6215 Hendersonville, NC 28793

RE: Somersby Park Exceptions from Town of Laurel Park Unified Development Ordinance

This letter serves to clarify that while Somersby Park is <u>NOT</u> exempted from the Town of Laurel Park's Unified Development Ordinance (UDO), the previously approved and recorded Plats include some UDO exceptions in the form of different requirements. The requirements that are different than and predate those adopted in the UDO are noted on the recorded Plats and include the approved lots with setbacks shown in the Notes section on the attached Plats and outlined as follows:

- Minimum building setback lines for sections A, D, F, and G are 20 feet front and rear, 10 feet side.
- Section D recombined reducing the number of Lots to 14 (while 17 were originally approved in 1999, the Plat recorded in 2003 decreased this to 14). Setbacks remained unchanged.
- Section F recombined reducing the number of Lots to 13 (while 14 were originally approved in 2005, the Plat recorded in 2003 decreased this to 14). Setbacks remained unchanged.
- Minimum building setback lines for section B, C, and E are denoted directly on the recorded Plat for corresponding parcels.
- Ridgeline Section: All lots are subject to building setbacks as follows: 20 feet front and rear, 10 feet side.

Therefore, Plats recorded prior to UDO adoption on August 18, 2021 (examples are attached but may not be exhaustive), which include lots and accompanying setbacks, supersede the UDO requirements. Otherwise, all new construction and development within Somersby Park is expected to comply with UDO requirements.

As an aside, as with any property, an individual may request a Variance from the Board of Adjustment upon submittal of proof of a hardship and other required findings of fact.

Please contact me with any outstanding questions you may have.

Sincerely,

Cara Reeves

Interim Town Manager Town of Laurel Park Phone: 828-693-4840

Email: assistant@laurelpark.org

CHAPTER 8 ARTICLE XXV

AN ORDINANCE TO EXTEND THE CORPORATE LIMITS OF THE TOWN OF LAUREL PARK, NORTH CAROLINA

WHEREAS, the Town Council has been petitioned under G.S. 160A-31 to annex the area described below; and

WHEREAS, the Town Council has by resolution directed the Town Clerk to investigate the sufficiency of the petition; and

WHEREAS, the Town Clerk has certified the sufficiency of the petition and a public hearing on the question of this annexation was held at Town Hall at 9:30 A.M. on November 16, 1999, after due notice by publication on November 1, 1999; and

WHEREAS, the Town Council finds that the petition meets the requirements of G.S. 160A-31;

NOW, THEREFORE, BE IT ORDAINED by the Town Council of the Town of Laurel Park, North Carolina that:

Section 1. By virtue of the authority granted by G.S. 160A-31, the following described territory is hereby annexed and made part of the Town of Laurel Park as of December 31, 1999.

LEGAL DESCRIPTION: Somersby Park Subdivision.

Lying in Crab Creek Township, Henderson County, North Carolina, and being a Portion of the Property of Carolina Development Resources, L.L.C., as described in Deed Book 968 at Page 250, and Deed Book 960 at Page 242 of the Henderson County Registry, more particularly described as follows:

Beginning at an iron pin at the terminus of the 60th call of the property of Carolina Development Resources, L.L.C., as described in Deed Book 968 at page 250 of the above described Henderson County Registry, said iron pin also being located South 58 degrees 51 minutes 58 seconds East, 562.57 feet and South 32 degrees 45 minutes 13 seconds West, 246.71 feet from North Carolina Grid Monument " Jump off "; run thence South 54 degrees 30 minutes 24 seconds East, along the southerly line of Tract I as described in Deed Book 362 at Page 64, 1262.56 feet to an iron pipe at the northwest corner of the property of Mickey Leyva as described in Deed Book 614 at Page 403 of the aforesaid Henderson County Registry; thence South 21 degrees 32 minutes 13 seconds West along the westerly line of said property of Mickey Leyva, 308.86 feet to a planted stone at the southwest corner of said property; thence South 46 degrees 03 minutes 40 seconds East along the southerly line of said property, 164.31 feet to a planted stone at the southeast corner of said property, said planted stone also being the northwest corner of the property of R.W. Spaulding as described in Deed Book 782 at Page 16;

ت

thence South 06 degrees 03 minutes 00 seconds West, along the westerly line of said Spaulding property, 651.38 feet to the southwest corner of said property; thence South 85 degrees 33 minutes 53 seconds East along the southerly line of said Spaulding Property, 126.00 feet to the northwest corner of the property of James L. Robinson, Jr. and Margaret S. Robinson as described in Deed Book 602 at Page 519, and in Deed Book 577 at Page 579; thence South 12 degrees 50 minutes 12 seconds East along the westerly line of said Robinson Property, 1392.72 feet to a planted stone; thence continuing with said westerly boundary, South 28 degrees 39 minutes 00 seconds West to a nail set in the center of Hebron Road (S.R. No. 1171); thence North 88 degrees 02 minutes 52 seconds West, 164.34 feet to a P.K. Nail in a rock on the south side of said Hebron Road; thence North 20 degrees 39 minutes 17 seconds East, 5.96 feet; thence North 39 degrees 32 minutes 30 seconds West 448.54 feet to a rebar on the north side of said Hebron Road; thence North 73 degrees 22 minutes 30 seconds West, 100.00 feet to an iron pipe on the north side of said Hebron Road; thence South 77 degrees 37 minutes 30 seconds West, 154.00 feet to an iron pipe on the south side of said Hebron Road; thence North 62 degrees 52 minutes 30 seconds West, 117.04 feet to an iron pipe on the south side of said Hebron Road; thence North 06 degrees 13 minutes 21 seconds East, 1739.18 feet to a planted stone at the northeast corner of the property of W.O. Moore as described in Deed Book 414 at Page 167; thence North 84 degrees 36 minutes 06 seconds West along the northerly line of said Moore property, and along the northerly line of the property of Don S. Orr as described in Deed Book 688 at Page 803, 1468.47 feet to an iron pipe at the northwest corner of said Orr property; thence South 16 degrees 29 minutes 49 seconds East along the boundary of said Orr property, 73.58 feet to an iron pipe; thence South 84 degrees 36 minutes 06 seconds East, 450.19 feet to a rebar; thence South 06 degrees 16 minutes 07 seconds West, 1412.00 feet to an iron pin in the asphalt of the aforesaid Hebron Road; thence North 68 degrees 28 minutes 30 seconds West, 294.61 feet to an iron pin in the asphalt of said Hebron Road; thence North 54 degrees 28 minutes 04 seconds West, 63.02 feet to an iron pin in the asphalt of said Hebron Road; thence North 28 degrees 50 minutes 06 seconds West, 127.11 feet to an iron pin in the asphalt of said Hebron Road, said iron pin also being the southernmost corner of the property of Emma and Everett Jenkins as described in Deed Book 766 at Page 899, thence with the boundary of said Jenkins Property, the following three calls: North 49 degrees 41 minutes 22 seconds East, 410.71 feet to an iron pipe; thence North 16 degrees 18 minutes 38 seconds West, 122.90 feet to an iron pipe; thence South 88 degrees 45 minutes 59 seconds West, 164.97 feet to an iron pipe at the northwest corner of the aforesaid Jenkins property, said iron pipe also being in the boundary of the property of Floyd M. Summersill as described in Deed Book 938 at Page 354; thence along said Summersill boundary, the following 9 calls: North 00 degrees 14 minutes 05 seconds East, 459.87 feet to an iron pipe; thence North 89 degrees 45 minutes 55 seconds West, 239.65 feet to a locust snag; thence South 44 degrees 14 minutes 36 seconds West, 43.22 feet to an iron pipe; thence South 21 degrees 33 minutes 50 seconds West, 60.47 feet; thence South 01 degrees 11 minutes 21 seconds East, 69.42 feet; thence South 05 degrees 07 minutes 04 seconds East, 78.96 feet to an iron pipe; thence South 15 degrees 49 minutes 33 seconds West, 133.31 feet to an iron pipe; South 27 degrees 20 minutes 42 seconds West, 48.17 feet, thence South 04 degrees 28 minutes 27 seconds West, 233.36 feet to an iron pipe on the north side of the aforesaid Hebron Road; thence North 68 degrees 09 minutes 07

seconds West, 206.00 feet to an iron pin in the asphalt of said Hebron Road; thence South 10 degrees 08 minutes 55 seconds West, along the boundary of the property of Ronald and Mary Justus as described in Deed Book 505 at Page 689, 198.19 feet to an iron pipe in the boundary of the property of Thomas Aver Steitler as described in Deed Book 752 at Page 583; thence along said Steitler boundary, the following 9 calls: North 43 degrees 21 minutes 32 seconds West, 115.00 feet; thence North 77 degrees 01 minutes 32 seconds West, 280.80 feet; thence North 71 degrees 42 minutes 32 seconds West, 91.50 feet; thence North 62 degrees 21 minutes 32 seconds West, 89.90 feet; thence North 74 degrees 19 minutes 32 seconds West, 137.90 feet; thence South 88 degrees 52 minutes 28 seconds West, 128.30 feet; thence North 77 degrees 23 minutes 32 seconds West, 81.30 feet; thence North 65 degrees 08 minutes 32 seconds West, 142.10 feet; thence North 45 degrees 33 minutes 32 seconds West, 74.30 feet to a railroad spike in the asphalt of the aforesaid Hebron Road; thence along the center of said Hebron Road, and along the boundary of the property of Nancy S. Barron as described in Deed Book 927 at Page 446,the following 9 calls: North 89 degrees 10 minutes 32 seconds West, 84.00 feet; thence North 77 degrees 45 minutes 32 seconds West, 94.40 feet; thence North 85 degrees 52 minutes 32 seconds West, 47.40 feet; thence South 77 degrees 06 minutes 28 seconds West, 48.60 feet; thence South 61 degrees 44 minutes 28 seconds West, 62.20 feet; thence South 51 degrees 30 minutes 28 seconds West, 116.40 feet; thence South 52 degrees 15 minutes 28 seconds West, 68.80 feet; thence South 56 degrees 20 minutes 28 seconds West, 84.00 feet, thence South 65 degrees 57 minutes 28 seconds West, 62.30 feet to a railroad spike in the center of the aforesaid Hebron Road, said railroad spike also being the southeast corner of the property of G.F. Partnership as described in Deed Book 860 at Page 669; thence North 06 degrees 44 minutes 28 seconds East along the easterly line of the aforesaid G.F. Partnership property, and along the easterly line of the property of J. William Sanders and Jean Sanders as described in Deed Book 860 Page 731, 1142.30 feet to a rebar in a stump, said rebar being in the southerly line of the property of Clay F. Staton and Dillie H. Staton as described in Deed Book 591 at Page 844; thence South 83 degrees 58 minutes 25 seconds East along said southerly line, 859.77 feet to a planted stone at the southeast corner of said Staton property; thence North 10 degrees 51 minutes 52 seconds East along the easterly line of said Staton property, and along the easterly line of the property of Stuart Van Meter as described in Deed Book 750 at Page 339, 1605.95 feet; thence South 79 degrees 08 minutes 08 seconds East, 10.00 feet; thence North 74 degrees 30 minutes 27 seconds East, 116.45 feet; thence North 68 degrees 51 minutes 48 seconds East, 121.81 feet; thence North 37 degrees 25 minutes 26 seconds East, 82.75 feet; thence North 04 degrees 55 minutes 24 seconds East, 10.00 feet to a point in the southerly line of the property of Stuart Van Meter as described in Deed Book 826 at Page 491; thence South 85 degrees 04 minutes 36 seconds East along the southerly line of said Van Meter property, 759.54 feet to an iron pipe at the southeast corner of said Van Meter property, said iron pipe also being the northwest corner of the property of Carolina Development Resources, L.L.C. as described in Deed Book 968 at Page 242; thence along the boundary of said property of Carolina Development Resources, L.L.C., the following two calls: South 05 degrees 24 minutes 10 seconds West, 1016.13 feet; thence North 38 degrees 03 minutes 05 seconds East, 900.70 feet to an iron pipe at the southwest corner of the property of the Town of Laurel Park, as described in Tract C of Deed Book 968 at Page 246; thence along the

boundary of said property of the Town of Laurel Park, the following two calls: South 53 degrees 23 minutes 45 seconds East, 242.47 feet to an iron pipe; thence along a circular curve to the right, having a radius of 90.00 feet, and whose chord bearing and distance are North 71 degrees 06 minutes 45 seconds East and 97.09 feet, an arc length of 102.55 feet to the Point of Beginning.

Containing 179.89 acres, more or less.

Section 2. Upon and after December 31, 1999, the above described territory and its citizens and property shall be subject to all debts, laws, ordinances and regulations in force in the Town of Laurel Park and shall be entitled to the same privileges and benefits as other parts of the Town of Laurel Park. Said territory shall be subject to municipal taxes according to G.S. 160A-58.10.

Section 3. The Mayor of the Town of Laurel Park shall cause to be recorded in the office of the Register of Deeds of Henderson County, and in the office of the Secretary of State at Raleigh, North Carolina, an accurate map of the annexed territory, described in Section 1 above, together with a duly certified copy of this ordinance. Such a map shall also be delivered to the County Board of Elections, as required by G.S. 163-288.1.

Adopted this 16th day of November, 1999.

Jown of Lovellark

Arthur E. Stuenkel Mayor

APPROVEDAS TO FO

D. Samuel Neill Town Attorney

Anita V. Hosack, CMC Town Clerk

STATE OF NORTH CAROLINA COUNTY OF HENDERSON

I, Kimberly B. Hensley, a Notary Public of said County and State, do hereby certify that Arthur E. Stuenkel, Mayor of the Town of Laurel Park, personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal this the 16th day of November 1999.

Official Seal TARY

PUECIC

My commission Coopings May 26, 2002.

Vernicely B. Jerrey
Notary Public

Notary Public Register of Deeds

Notary Public Register of Deeds

The toregoing certificate(*) of Public Register of Deeds

The tore



Geotechnical Engineering Exploration and Analysis

Proposed Kelly Residence 210 Somersby Parkway Laurel Park, North Carolina

Prepared for:

Masterpiece Custom Builders PO Box 892 Etowah, North Carolina

Prepared by:

Gentry Geotechnical Engineering, PLLC. Asheville, North Carolina

July 10, 2025 Gentry Project Number 25G-0149-01



819 Haywood Road Asheville, NC 28806

Ph: [828] 232-8932 admin@gentrygeotech.com www.gentrygeotech.com

July 10, 2025

Masterpiece Custom Builders PO Box 892 Etowah. North Carolina

Attention: Austin Matthews, Construction Manager

Subject: **Geotechnical Engineering Exploration and Analysis**

> Proposed Kelly Residence 210 Somersby Parkway Laurel Park, North Carolina Gentry Project No. 25G-0149-01

Gentry NC Engineering License No. P-1170

Dear Mr. Matthews:

As requested, Gentry Geotechnical Engineering, PLLC (Gentry) conducted a Geotechnical Engineering Exploration and Analyses for the proposed project. The accompanying report describes the services that were conducted for the project, and it provides geotechnical-related findings, conclusions and recommendations that were derived from those services.

We sincerely appreciate the opportunity to provide geotechnical consulting services for the proposed project. Please contact the undersigned if there are questions concerning the report or if we may be of further service.

Respectfully submitted,

GENTRY GEOTECHNICAL ENGINEERING, PLLC

Brian P. Moretti **Project Manager**

Michon T. Sentner, PE Senior Geotechnical Engineer

Registered, NC #42383

TABLE OF CONTENTS

GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSES

PROPOSED KELLY RESIDENCE 210 SOMERSBY PARKWAY LAUREL PARK, NORTH CAROLINA GENTRY PROJECT NO. 25G-0149-01

Section	า No.	Description	Page No.
1.0	SCO	PE OF SERVICES	1
2.0		DESCRIPTION	
3.0	PRO.	JECT DESCRIPTION	
4.0	GEO	TECHNICAL SUBSURFACE EXPLORATION PROGRAM	2
5.0		GEOLOGY	
6.0	MAT	ERIAL CONDITIONS	2
	6.1.	Surface Materials	2
	6.2.	Residual Soils and Partially Weathered Rock (PWR)	2
7.0	GRO	UNDWATER CONDITIONS	
8.0		CLUSIONS AND RECOMMENDATIONS	
	8.1.	Slope Stability Considerations	3
	8.2.	Building Foundation Recommendations	3
	8.3.	Floor Slab Recommendations	
	8.4.	Retaining Wall Recommendations	5
	8.5.	Generalized Site Preparation Recommendations	6
	8.6.	Generalized Construction Considerations	7
	8.7.	Recommended Construction Materials Testing Services	
	8.8.	Basis of Report	

ATTACHMENTS:

Test Pit Location Plan Records of Subsurface Exploration (3 Pages) Reference Notes for Test Pit Logs

GEOTECHNICAL ENGINEERING EXPLORATION AND ANALYSES

PROPOSED KELLY RESIDENCE 210 SOMERSBY PARKWAY LAUREL PARK, NORTH CAROLINA GENTRY PROJECT NO. 25G-0149-01

1.0 SCOPE OF SERVICES

This report provides the results of the *Geotechnical Engineering Exploration and Analyses* that Gentry Geotechnical Engineering, PLLC ("*Gentry*") conducted regarding the proposed development. The *Geotechnical Engineering Exploration and Analyses* included several separate, but related, service areas referenced hereafter as the Geotechnical Subsurface Exploration Program and Geotechnical Engineering Services. The scope of each service area was narrow and limited, as directed by our client and in consideration of the proposed project. Each service area is briefly explained later.

Geotechnical-related recommendations for design and construction of the foundation, floor slabs and site retaining walls for the proposed residence are provided in this report. Site preparation recommendations are also given; however, those recommendations are only preliminary since the means and methods of site preparation will largely depend on factors that were unknown when this report was prepared. Those factors include the weather before and during construction, subsurface conditions that are exposed during construction, and finalized details of the proposed development.

2.0 SITE DESCRIPTION

We have reviewed the preliminary site plan, prepared by BareRoot Designs, provided by you, and dated April 7, 2025. The site plan shows the approximate location and orientation of the house and garage footprint.

Based on our observations and a review of the topography as shown on the Henderson County GIS website, the natural slopes in the vicinity of the building site angles down generally to the southeast at inclinations ranging from 2.5H: 1V (Horizontal: Vertical) or 40.0 percent slope to 3H: 1V or 33.3 percent slope. The property consists of mountainous terrain and is moderately wooded. The property is bordered by Somersby Parkway to the west and by undeveloped property to the north, south and east. The *Town of Laurel Park Unified Development Ordinance* requires a geotechnical analysis for home sites on a 15% or greater slope.

Based on our review of the Henderson County GIS website, a Potential Debris Flow Pathway is located along the east side of the property. However, based on our review of the site plan, the proposed residence will not be located within the Potential Debris Flow Pathway and the property is not identified as susceptible to landslides within the Henderson County Landslide Mapping Data.

3.0 PROJECT DESCRIPTION

Based on our discussions with you, we understand that the proposed residence will consist of a main level over lower, walk-out level, and is anticipated to have a footprint of approximately 2,300 square feet. An attached two-car garage is planned at the north side of the main floor elevation.

It is anticipated the residence will be supported by continuous concrete perimeter footings and/or concrete pier footings. It is assumed that the house, including any decks, porches or garages, will be constructed across the natural slope. The actual structural loads were unknown at the time this report was prepared. The structures are anticipated to consist of conventional wood framing and wood roof truss supported by bearing walls and/or columns with maximum loads estimated at 2,000 pounds per lineal foot for walls and 25 kips for columns. The floors are expected to support a maximum 100 pounds per square foot live load.



4.0 GEOTECHNICAL SUBSURFACE EXPLORATION PROGRAM

The scope of the Geotechnical Subsurface Exploration Program included evaluating the subsurface conditions by performing three test pits (TP-1 through TP-3) at the site on May 13, 2025. The approximate test pit locations are shown on the attached *Test Pit Location Plan*.

Dynamic cone penetrometer (DCP) testing was performed routinely in the test pits to provide quantitative data about the soil strength and density. The dynamic cone penetrometer is an instrument composed of a conical point driven with blows from a 15-pound hammer falling 20 inches. The point is driven into the soil in three increments of 1-3/4 inches. The number of hammer blows required to drive each increment is recorded. The average number of blows of the final two increments is an index to soil strength and bearing capacity.

At certain depths, samples of the excavated soils were collected from the test pits. Immediately after sampling, soil samples were transferred to zip lock bags that were labeled at the site for identification. At completion of the field exploration, the test pits were backfilled and compacted in lifts with the bucket of the mini-excavator.

5.0 SITE GEOLOGY

The project site is located in the Blue Ridge Physiographic Province. The bedrock in this region is a complex crystalline formation that has been faulted and contorted by past tectonic movements. The rock has weathered to residual soils which form the mantle for the hillsides and hilltops. The typical residual soil profile in areas not disturbed by erosion or human activities consists of clayey soils near the surface where weathering is more advanced, underlain by sandy silts and silty sands.

The boundary between soil and rock is not sharply defined, and there often is a transitional zone, termed "partially weathered rock," overlying the parent bedrock. Partially weathered rock is defined, for engineering purposes, as residual material with standard penetration resistances in excess of 100 blows per foot (bpf). Weathering is facilitated by fractures, joints, and the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and boulders of hard rock and/or zones of partially weathered rock within the soil mantle well above the general bedrock level.

6.0 MATERIAL CONDITIONS

Since material sampling at the test pits was discontinuous, it was necessary for *Gentry* to suppose conditions between sample intervals. The supposed conditions at the test pits are briefly discussed in this section and are described in detail on the *Records of Subsurface Exploration*. Also, the conclusions and recommendations in this report are based on the supposed conditions.

6.1. Surface Materials

The surface materials consisted of 12 to 16 inches of silty sand topsoil and rootmat.

6.2. Residual Soils and Partially Weathered Rock (PWR)

Below the surface materials, the subsurface materials consisted of loose to firm, red, brown, tan, grey, white, damp to moist, micaceous, silty sand residual soils with PWR fragments. The residual soils were encountered to depths below the surface elevation of 6 feet at TP-1, 5 feet at TP-2 and 8 feet at TP-3, with DCP values ranging from 6 to 25 or better. TP-1 and TP-2 were terminated at these depths due to mini-excavator refusal on PWR and TP-3 was terminated due to the maximum reach of the mini-excavator.



7.0 GROUNDWATER CONDITIONS

Groundwater was not encountered within the depths explored when the Geotechnical Subsurface Exploration Program was conducted. It should be noted that ground water levels may fluctuate several feet with seasonal and rainfall variations and with changes in the water level in adjacent drainage features. Normally, the highest ground-water levels occur in late winter and spring and the lowest levels occur in late summer and fall.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1. Slope Stability Considerations

Site grading in mountainous areas such as at this site can have a significant impact on the stability of natural and manmade slopes. As mentioned previously, the natural slope angle of the property ranges from approximately 2.5H: 1V to 3H: 1V.

A site reconnaissance did not observe any signs of slope instability (i.e., scarps, tension cracks, bulges or recurved trees) within the proposed construction limits and for a distance of about 50 feet in all directions. Although we did not observe evidence of slope instability in the site area, care should be taken to minimize disturbance of the existing slope. Site grading within the planned residential area should be limited to excavation as required to achieve the planned finished grade elevations.

A preliminary global stability analysis indicated the natural slope to be stable. The analysis used estimated soil strength parameters based on the subsurface conditions encountered and our experience with similar materials. Based on our observations of the slope and the soil conditions encountered at the test pits, shallow foundations with sufficient embedment into residual soils should be used to support the proposed residence. Based on our observations and the subsurface conditions encountered at our test pit locations, the risk of instability of the natural slope appears to be reasonable with the recommended design measures, site preparation and testing during construction.

8.2. Building Foundation Recommendations

Based on the test pit findings, and the estimated bearing depths below the surface elevation, including the basement, the foundation soils are suitable for a maximum, net, allowable soil bearing capacity of 3,000 psf. We recommend that the foundations be embedded at least 2 feet into residual soils or PWR. Strip footing pads are recommended to be at least 18 inches wide and column pads are recommended to be at least 24 inches wide for geotechnical considerations, regardless of the calculated foundation bearing stress.

Foundation walls, stem walls or pedestals above the ground surface are assumed to be built of reinforced, cast-in-place concrete or a reinforced concrete masonry unit system. It is understood that specific foundation details including footing dimensions, reinforcing, and other parameters will be constructed per the most recent edition of the North Carolina Residential Code.

It is understood that the North Carolina Residential Code requires a minimum 12-inch foundation depth. However, we recommend that foundations have a minimum 24-inch foundation depth for erosion, stability and frost action concerns. Therefore, footings for foundation walls and columns of the proposed structure are recommended to bear at least 24 inches below the finished ground grade. The foundation analysis was conducted assuming that the foundations will bear at about 24 inches.



The tops of footings must be at least 5 feet horizontally from a slope face. This includes footings bearing near the crest of a slope or within the slope itself. This may result in the footings bearing deeper than the recommended minimum depth to provide 5 feet horizontally from a slope face.

Foundation excavations are recommended to be dug with a smooth-edge backhoe bucket to develop a relatively undisturbed bearing surface. A toothed bucket will likely disturb foundation-bearing soil more than a smooth-edge bucket, thereby making soil at the excavation base more susceptible to saturation and instability, especially during adverse weather. It is critical that contractors protect foundation support soil and foundation construction materials (concrete, reinforcing, etc.). In addition, engineered fill is recommended to be placed and compacted in benched excavations along foundation walls immediately after the foundation walls can support lateral pressures from backfill, compaction, and compaction equipment.

Earth-formed footing construction techniques will likely be feasible considering that sandy silt to silty sand were above the estimated foundation bearing elevations at the test pits. However, difficult excavation of the PWR or rock may require a high-capacity rock hammer. Once complete, the bearing surface should be relatively level.

Foundation Support Soil Requirements

Footing pads are recommended to be directly and entirely supported by suitable-bearing residual soil or PWR. A minimum DCP value of 7 is recommended for a bearing capacity of 3,000 psf. Suitable bearing residual soils or PWR for foundation support are anticipated to be available at minimum depths below the surface elevation of 4 feet at TP-1 and 2 feet at TP-2 and TP-3. It is recommended that the strength characteristics of the soil or PWR within the foundation influence zone (determined by *Gentry* during construction) meet or exceed the recommended values, unless *Gentry* approves lesser values.

Estimated Foundation Settlement

The post-construction total and differential settlements of foundations designed and constructed based on this report are estimated to be a maximum of about 1 and 1/2 inch, respectively. The post-construction angular distortion is estimated to be a maximum of about 1/480 across at least 20 feet.

8.3. Floor Slab Recommendations

With proper sub-grade preparation, it is expected that site soil will be suitable for floor slab support. However, over-excavation of unsuitable bearing soils may be necessary to develop a suitable sub-grade. Engineered fill that is selected, placed, and compacted according to this report could support a concrete slab. It is understood that foundation details including dimensions, reinforcing and other parameters will be constructed per the most recent edition of the North Carolina Residential Code.

A minimum 4-inch-thick base course is recommended to be directly below the floor slab to serve as a capillary break and help develop uniform support. It is recommended that the base course consist of free-draining aggregate. Also, it is recommended that *Gentry* test and approve the subgrade soils, any fill soils required to achieve final subgrade elevation and the aggregate base course before it is placed. Depending on aggregate gradation, a geotextile might need to be installed below the base course.

A minimum 10-mil vapor retarder is recommended to be directly below the base course throughout the entire floor area. If the base course has sharp, angular aggregate, protecting the retarder with a geotextile (or by other means) is recommended. Also, it is recommended that a structural engineer or architect specify the vapor retarder location with careful consideration of concrete curing and the effects of moisture on future flooring materials.



Estimated Floor Slab Settlement

The post-construction total and differential settlements of an isolated floor slab constructed in accordance with this report are estimated to be a maximum of about $\frac{1}{2}$ and $\frac{1}{3}$ -inch, respectively.

8.4. Retaining Wall Recommendations

We understand that basement retaining walls for the proposed residence will be required. Cast-in-place concrete or concrete masonry unit cantilever retaining walls for the residence should be designed as "restrained" retaining walls based on "at-rest" earth pressure, plus any surcharges near the walls as described below, if the walls are expected to be part of the residence and lateral movement is not acceptable. Cast-in-place concrete or CMU (concrete masonry unit) cantilever walls that are not attached to the residence and that can accept some lateral movement may be designed based on "active" earth pressures, plus any surcharges. Based on the geotechnical test pits and our experience with similar soil conditions, an allowable bearing pressure of 3,000 pounds per square foot (psf) may be used for footings.

Table 1 presents the recommended soil related design parameters for stem walls or site retaining walls with a level back slope behind the walls (i.e. β =0 degrees). *Gentry* should be contacted if an alternate retaining wall system is used or if a different sloped backfill surface is planned.

Table 1 – RECOMMENDATIONS FOR SOIL PROPERTY AND LATERAL EARTH PRESSURES									
					Active earth At-re pressures pres			Passive earth pressures	
Material	Unit Wt (pcf)	Friction Angle, Φ (degrees)	fs	Equiv. fluid pressure (pcf)	K _a	Equiv. fluid pressure (pcf)	K _o	Equiv. fluid pressure (pcf)	K _p ⁽¹⁾
Uncompacted silty SAND backfill	125	26	0.31	49	0.39	70	0.56	320 ⁽¹⁾	2.56
On-site silty SAND Residual Soils	125	33	0.40	37	0.29	58	0.46	425 ⁽¹⁾	3.4
Clean washed stone (No. 57) ⁽²⁾	100	40	0.5	22	0.22	36	0.36	460 ⁽¹⁾	4.6

- (1) The passive earth pressure coefficient should be divided by a safety factor of 2 to limit the amount of lateral deformation required to mobilize the passive resistance.
- (2) In order for this coefficient to be used, the soil wedge within an angle of 45 degrees from the base of the wall to 2 feet below the finished exterior grade should be excavated and replaced with compacted clean washed stone.

The compacted mass unit weight of the backfill soil presented in the previous table should be used with the earth pressure coefficients to calculate lateral earth pressures. Lateral pressure arising from surcharge loading should be added to the above soil earth pressures to determine the total lateral pressures which the walls must resist. In addition, transient loads imposed on the walls by construction equipment during backfilling should be taken into consideration during design and construction. Excessively heavy grading equipment should not be allowed within about 5 feet horizontally of the walls.

Surface water should be rerouted around the walls and not allowed to flow over or pond behind the walls. In addition, to reduce the potential for the infiltration of surface water in the backfill, the upper 24 inches of backfill should consist of relatively impervious soils (i.e., clayey or silty soils) as backfill. This soil should be compacted to a minimum of 95 percent of its standard Proctor maximum dry density within plus or minus three percent of the optimum moisture content in accordance with ASTM D698.



We recommend that positive, unblocked gravity drainage be provided from behind the walls. A perforated, rigid conduit within free draining crushed stone backfill at the base of the wall can be used to help provide the drainage required. A layer of nonwoven geotextile filter fabric should wrap entirely around the crushed stone backfill. If drainage is not provided, the walls should be designed to accommodate hydrostatic pressures that could develop.

8.5. Generalized Site Preparation Recommendations

This section deals with site preparation including preparation of foundation and engineered fill areas. The means and methods of site preparation will greatly depend on the weather conditions before and during construction, the subsurface conditions that are exposed during earthwork operations, and the finalized details of the proposed development. Therefore, only generalized site preparation recommendations are given.

Clearing, Grubbing and Stripping

Surface vegetation, trees and bushes (including root-balls), topsoil with adverse organic content, and otherwise unsuitable bearing materials are recommended to be removed from the proposed building footprint, pavement area, and other structural areas. Clearing, grubbing and stripping should extend at least several feet beyond proposed development areas, where feasible. When the test pits were excavated, the topsoil at the test pit locations was about 2 inches thick. Topsoil thicknesses could be used on a preliminary basis to estimate topsoil stripping quantities. However, since topsoil may be thinner or thicker away from the test pits, the actual stripping quantity may be more or less than estimated. It might be beneficial to stockpile topsoil on the site for later use in landscape areas.

Subgrade Evaluation and Fill Placement

After the recommended clearing, grubbing, and stripping as needed, the sub-grade is recommended to be evaluated by visual observations and probing since site constraints will not allow for typical proof-rolling to help locate unstable soil. It is recommended that *Gentry* evaluate the sub-grade stability based on those observations. Soil that shows signs of instability is recommended to be replaced with engineered fill. Unsuitable soil could also be mechanically stabilized with coarse aggregate and/or geosynthetics (geogrids, geotextiles, etc.). It is recommended that *Gentry* provide specific soil improvement recommendations based on the conditions during construction.

The site is recommended to be raised, where necessary, to the planned finished grade with engineered fill immediately after the sub-grade is confirmed to be stable and suitable to support the proposed site improvements. Engineered fill should have a maximum liquid limit of 50, maximum plasticity index of 25, a maximum fines content of 50 percent, a maximum organic content of 5 percent and be free of deleterious or otherwise unsuitable material.

Engineered fill is recommended to be placed in uniform, relatively thin layers (lifts). It is recommended that engineered fill slopes be placed no steeper than 2H:1V and be properly benched into the existing residual soils. Any fill slopes steeper than 2H:1V should be designed by a Professional Engineer. Each layer of engineered fill is recommended to be compacted to at least 95 percent of the fill material's maximum dry density within 3 percent of the optimum moisture content as determined by The Standard Proctor Compaction test (ASTM D698).

Engineered fill that does not meet the density and water content requirements is recommended to be replaced or scarified to a sufficient depth (likely 6 to 12 inches, or more), moisture-conditioned, and compacted to the required density. A subsequent lift of fill should only be placed after *Gentry* confirms that the previous lift was properly placed and compacted. Sub-grade soil may need to be recompacted immediately before construction since equipment traffic and adverse weather may reduce soil stability.



Use of Site Soil as Engineered Fill

Site soil that does not contain adverse organic content, or other deleterious materials or fines content greater than 50 percent, could be used as engineered fill. If construction is during adverse weather (discussed in the following section), drying site soil will likely not be feasible. In that case, aggregate fill (or other fill material with a low water-sensitivity) will likely need to be imported to the site.

Surface Water Management

Control of surface water from driveway areas and roof drainage is very important for this site. Surface water that erodes slopes could cause instability or undermine footings. All structures should incorporate gutters with downspouts that are connected to a pipe system that will convey water to storm drains or offsite. Routine maintenance should include inspecting, cleaning and repairing the gutters, downspouts and other stormwater handling systems as needed to ensure they remain operable. Inspections and cleanings should be performed at least annually.

If conveyance of surface water into municipal storm drains is not possible, the surface water should be directed well away from the structure and maintained in a distributed flow onto the natural slope. Surface water should not be directed below the ground surface.

8.6. Generalized Construction Considerations

Adverse Weather

Site soil is moisture sensitive and will become unstable when exposed to adverse weather such as rain, snow, and freezing temperatures. Therefore, it might be necessary to remove or stabilize the upper 6 to 12 inches (or more) of soil due to adverse weather, which commonly occurs during late fall, winter, and early spring. At least some over-excavation and/or stabilization of unstable soil should be expected if construction is during or after adverse weather.

Based on the test pits, extensive over-excavation is not expected to be needed if construction is during and after favorable, dry weather. Because site preparation is weather dependent, bids for site preparation, and other earthwork activities, are recommended to be based on the time of year that construction will be conducted. To protect soil from adverse weather, the site surface should be smoothly graded and contoured during construction to divert surface water away from construction areas. Foundation construction should begin immediately after suitable support is confirmed.

Difficult Excavation

Mini-excavator refusal occurred on PWR at depths below the surface elevation of 6 feet at TP-1 and 5 feet at TP-2. Based on the subsurface materials encountered throughout the site, it is likely that PWR will be encountered within the footprint of the residence. Although refusal occurred with the mini-excavator, conventional construction equipment such as trackhoes, should be capable of excavating through the PWR refusal material, particularly during mass grading. The ease of excavation cannot be specifically quantified and depends on the quality of grading equipment, skill of the equipment operators and geologic structure of the material itself, such as the direction of bedding, planes of weakness and spacing between discontinuities.

Dewatering

Groundwater was not encountered during or at completion of the test pits. Some dewatering might be needed during construction due to precipitation or if perched water is encountered. Water that accumulates in construction areas is recommended to be removed from excavations and other construction areas, along with unstable soil as soon as possible.



Filtered sump pumps, drawing water from sump pits excavated in the bottom of construction trenches, will likely be adequate to remove water that collects in shallow excavations. Excavated sump pits should be fully-lined with a geotextile and filled with open-graded, free-draining aggregate.

Cut and Fill Slopes

Confined excavations are recommended to be made in accordance with current OSHA excavation and trench safety standards, and other applicable requirements. Sides of excavations might need to be sloped or braced to maintain or develop a safe work environment. Temporary shoring must be designed according to regulatory requirements. Contractors are responsible for excavation safety.

For slopes which are not confined, our test pits, tests on similar soils and our experience, the following ratios (horizontal: vertical) shown in Table 2 are recommended for slopes without surcharge at the top.

TABLE 2 – RECOMMENDATIONS FOR CUT AND FILL SLOPE RATIOS							
Type of Material	Type of Material Temporary Slopes Permanent Slopes						
Structural Fill	1:1 (Cut)	2:1					
Residual Soil-Cut	1:1	1.5:1					
Partially Weathered Rock-Cut	0.5:1	1:1					
Unweathered Rock-Cut	0.25:1 to vertical	0.25:1 to vertical					

The outer edge of structural fill should extend at least 5 ft beyond paved areas before sloping. Fill slopes should initially be constructed beyond the design slope edge due to the difficulty of compacting the edge of slopes. The fill could then be cut back leaving the exposed face well compacted. Fill slopes should be adequately compacted in accordance with the recommendations of this report. Cut and fill slope surfaces should be protected from erosion by grassing or other means. Permanent slopes of 3:1 or flatter would be desirable for mowing.

8.7. Recommended Construction Materials Testing Services

This report was prepared assuming that *Gentry* will perform Construction Materials Testing ("CMT") services during construction of the proposed development. In general, CMT services are recommended to at least include observation and testing of: foundation, retaining walls, grading, compaction; concrete and other construction materials. It might be necessary for *Gentry* to provide supplemental geotechnical recommendations based on the results of CMT services and provided specific details of the project.

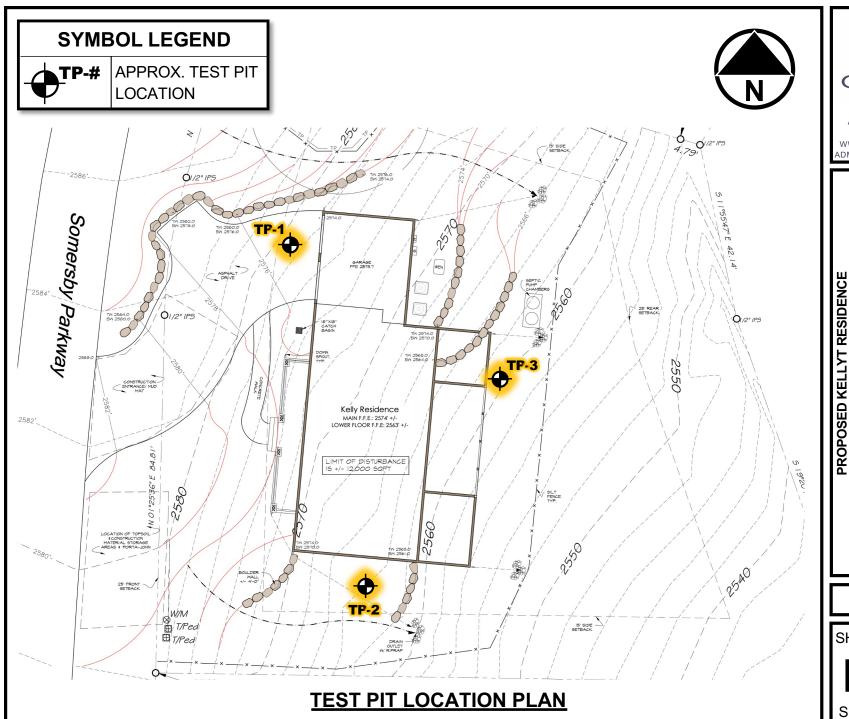
8.8. Basis of Report

This report is based on *Gentry* Proposal No. 25P-156, dated April 30, 2025, and authorized by your signature on May 2, 2025. The actual project services varied somewhat from those described in the proposal due to the conditions encountered while performing the services and in consideration of the proposed project.

This report is strictly based on the project description given earlier in this report. *Gentry* must be notified if any part of the project description is not accurate so that this report can be amended, if needed. This report is based on the assumption that the structure will be designed and constructed according to the building code that governs construction at the site.

The conclusions and recommendations in this report are based on supposed subsurface conditions as shown on the *Records of Subsurface Exploration*. *Gentry* must be notified if the subsurface conditions that are encountered during construction of the proposed development differ from those shown on the *Records of Subsurface Exploration* because this report will likely need to be revised.







819 HAYWOOD ROAD ASHEVILLE, NC 28806 TEL: 828.232.8932 WWW.GENTRYGEOTECH.COM ADMIN@GENTRYGEOTECH.COM

25G-0149-01

ETOWAH, NORTH CAROLINA PROJECT No:

2025 13, May DATE:

NOT TO SCALE

MASTERPIECE CUSTOM BUILDERS PO BOX 892

210 SOMERSBY PARKWAY LAUREL PARK, NORTH CAROLINA

SHEET No.

SHEET **01** OF **01**

GENTRY GEOTECHNICAL ENGINEERING, PLLC

Record of Subsurface Exploration

Test Pit:

TP-1

Proposed Kelly Residence Elevation: 2,579 ft May 13, 2025 Project Name:

210 Somersby Parkway - Laurel Park, North Carolina

West side of Garage - See Test Pit Location Plan Location:

Project No. 25G-0149-01

Te	Technician: KB. Equipment: Excavator: Bobcat 331 Mini Excavator and DCP.					
	Description	Depth	Sample		Remarks	
		feet	type	DCP	Remarks	
	16 inches of silty sand topsoil and rootmat.	1001	Grab		DCP = Dynamic Cone	
	Loose, red, brown, tan, moist, micaceous, silty, fine to medium SAND (Residual)	2	Grab	6	Penetrometer	
		_	Grab			
	Firm, grey, white, damp, micaceous, silty SAND (Residual) with PWR fragments		Grab	16	PWR = Partially Weathered Rock	
		5	Grab Grab	25/.5"		
	Test pit terminated at 6 feet due to mini-excavator refusal on PWR.	-	Grab	23/.3		
	No groundwater encountered.					
-		10				
-						
-						
		15				
\vdash						
		_				
		20				
		_				
\vdash						
\vdash						
		25				
_						
-		_				
		_				
-						
-						
		10				
\vdash		-				
\vdash		-				
		_				
\vdash		<u> </u>				
\vdash		-				
		l –				
\vdash		l –				
\vdash		-				
		1				

GENTRY GEOTECHNICAL ENGINEERING, PLLC

Record of Subsurface Exploration

Test Pit:

TP-2

Project Name: Proposed Kelly Residence Elevation: 2,564 ft May 13, 2025

210 Somersby Parkway - Laurel Park, North Carolina

Location: South side of House - See Test Pit Location Plan

Project No. 25G-0149-01

Technician: KB. Equipment: Excavator: Bobcat 331 Mini Excavator and DCP.				
Description	Depth	Sample		Remarks
	feet	type	DCP	
16 inches of silty sand topsoil and rootmat.	_	Grab		DCP = Dynamic Cone
Loose, red, brown, tan, moist, micaceous, silty, fine to medium SAND (Residual)	2	Grab	13	Penetrometer
		Grab		
Firm, grey, white, damp, micaceous, silty SAND (Residual) with PWR fragments	l <u> </u>	Grab	25/.25"	PWR = Partially Weathered Rock
	5	Grab		
Test pit terminated at 5 feet due to mini-excavator refusal on PWR.	_			
No groundwater encountered.	_			
\vdash	l –			
\vdash				
H	10			
H	_	ł		
H	_			
\vdash	-			
H	15			
H	13_	1		
H	_	1		
H	-			
H	_	1		
П	20			
П		1		
П	I -	1		
	_			
	25			
	_			
	l <u> </u>			
	_			
\vdash	_			
	_			
\vdash	_			
H	<u> </u>			
H	I —			
H				
H	I -	1		
H	10	1		
H	I -	1		
Н	I -	1		
	_	1		
П	I -	1		
П	_	1		
]		
]		
		1		

GENTRY GEOTECHNICAL ENGINEERING, PLLC

Record of Subsurface Exploration

Test Pit:

TP-3

Project Name: Proposed Kelly Residence Elevation: 2,561 ft May 13, 2025

210 Somersby Parkway - Laurel Park, North Carolina

Location: Northeast side of House - See Test Pit Location Plan

Project No. 25G-0149-01

Technician: KB Equipment: Excavator: Bobcat 331 Mini Excavator and DCP

Te	chnician: KB. Equipment: Excavator: Bobcat 331 Mini Excavator and DCP.				
	Description	Depth	Sample		Remarks
		feet	type	DCP	
	12 inches of silty sand topsoil and rootmat.		Grab		DCP = Dynamic Cone
	Loose to firm, red, brown, tan, moist, micaceous, silty, fine to medium SAND (Residual)	2	Grab	7	Penetrometer
			Grab		
			Grab	8	PWR = Partially Weathered Rock
		5	Grab		
			Grab	12	
-			Grab		
			Grab	15	
	Test pit terminated at 8 feet due to maximum reach of mini-excavator.				
-	No groundwater encountered.	10			
-					
-					
-		_			
\vdash		15			
H		13			
\vdash		15 <u> </u>			
-		-			
		_			
		20			
		25			
-					
-		_			
-					
		_			
-		_			
		_			
		_			
		20			
<u> </u>		_			
-		_			
		_			
\vdash		_			
\vdash		_			
\vdash		_			
\vdash		I —			
\vdash		_			
Ь.		1	I		

Drilling and Sampling Abbreviations:

Sample/Drilling: In-Situ Tests:

SS-Split Spoon Sampler SPT-Standard Penetration Test

ST-Shelby Tube Sampler PMT-Pressuremeter Test

RC-Rock Core: NX, BX, AX VS-Vane Shear

HSA-Hollow Stem Auger DCP-Dynamic Cone Penetrometer

Qp-Estimated Unconfined Compressive Strength using Pocket Penetrometer Qu-Estimated Unconfined Compressive Strength using strain-controlled axial

load device.

Correlation of Penetration Resistances to Soil Properties:

Relative Density - Sands, Silts

More than 50% retained onto the No. 200 sieve

Consistency Cohesive Soils

More than 50% passing the No. 200 seive

Unconfined Compressive SPT-N Value Strength Qp tsf SPT-N Value Consistency Relative Density 0-4 Very Loose under 0.25 0-2 Very Soft 5-10 Loose 3-4 Soft 0.25-0.50 Firm 11-20 Firm 0.50-1.00 5-8 21-30 Very Firm 1.00-2.00 9-15 Stiff 31-50 Dense 16-30 Very Stiff 2.00-4.00 Very Dense Hard over 50 4.00-8.00 31-50 over 8.00 over 50 Very Hard

Gradation Description and Terminology:

Major				
Component		Description of	Percent of	
of Sample	Size Range	Minor Components	Dry Weight	
Boulders	Over 12 inches	Trace	1-9	
Cobbles	12 inches to 3 inches	Little	10-19	
Gravel	3 inches to No. 4 sieve	Some	20-34	
Coarse	3 inches to 3/4 inches	And	35-50	
Fine	3/4 inches to No. 4 sieve			
Sand	No. 4 sieve to No. 200 sieve			
Coarse	No. 4 sieve to No. 10 sieve			
Medium	No. 10 seive to No. 40 sieve			
Fine	No. 40 seive to No. 200 sieve			
Silt/Clay	Passing No. 200 seive			



REFERENCE NOTES FOR BORING LOGS