SOLID GROUND NC

August 23, 2024

City of Brevard
c/o Sara VanLear
Project Manager
Development Finance Initiative | UNC School of Government
Campus Box 3330
Chapel Hill, NC 27599-3330

RE: Proposal for Site Development Cost Estimates
Brevard-Davidson River Presbyterian Church Property
Brevard, Transylvania County, North Carolina
Solid Ground NC Project No. NC24-0070

Dear Sara:
Solid Ground Engineering NC, PLLC (Solid Ground NC) is pleased to provide you with this High-Level Site Development Cost Estimate Evaluation for the above-referenced property.

PROJECT UNDERSTANDING

It is our understanding that the site is being evaluated for use as a residential development. Based on our preliminary geotechnical evaluation of the site, we have identified several challenges to construction which include the following:

- The soils are in a very soft to soft consistency and a very loose to loose density.
- Shallow footings cannot be utilized on the site without significant ground improvement.
- Raft foundations or aggregate piers will be required to support the buildings and retaining walls.
- On-site clay soils are moderately plastic (expansive) and cannot be used for structural fill.
- Most of the on-site silts and sands are lightweight and micaceous, making them very poor for re-use as structural fill or retaining wall backfill. As such, retaining walls will have to be designed very conservatively or significant imported fill will be required.
- All pavements will require undercutting and stabilization with geotextiles and/or crushed stone.

We understand that the client desires to further evaluate the site development costs associated with a couple of potential conceptual site plans.

SCOPE OF SERVICES

Solid Ground NC was provided with a couple of different conceptual designs for the project site prepared by others. Conceptual Plans for each design are attached as Figures 1 and 2. The Scenarios for the concepts included the following:

Scenario 1: Low density townhome development

- 1 story
- 1,200 sqft/unit
- 36 units
- 72 parking paces
- One entry/exit off Appletree St
- No secondary exit as illustrated in the image

Scenario 2: Medium density multi-family apartment buildings

- 3 stories
- 1,000 sqft/unit
- 50 units
- 90 parking paces
- One entry/exit off Appletree St
- No secondary exit as illustrated in the image

For each of the scenarios evaluated, the buildable area was estimated to be on the order of approximately 3.3 acres. The grading for each of the scenarios was also similar and assumed the creation of a generally level buildable pad at an approximate elevation of 2164, which is a balance of the site.

For each of the scenarios, Solid Ground developed estimated site development costs for the concept that assumed 1) near ideal soil conditions and 2) challenging soils that we encountered at the site.

DISCUSSION

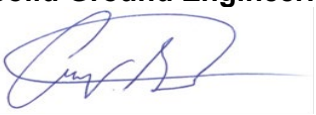
The results of our evaluation are presented in the attached tables. The results of Scenario 1 constructed on adequate soils were estimated at $1,679,080 total, or a cost of $508,812 per acre. In order to construct Scenario 1 on this particular site, retaining walls require ground improvement using aggregate piers, the structures were assumed to be constructed on rafts, and estimates for ground improvement for pavements increased the total development costs to $3,024,970, or a cost of $916,657 per acre. Total site development costs for the Scenario 1 concept equate to approximately $84,026 per unit.

The results of Scenario 2 constructed on adequate soils were estimated at $1,273,740 total, or a cost of $385,981 per acre. In order to construct Scenario 2 on this particular site, retaining walls require ground improvement using aggregate piers, the structures require ground improvement using aggregate piers, and estimates for ground improvement for pavements increased the total development costs to $4,062,240, or a cost of $1,230,981 per acre. Total site development costs for the Scenario 2 concept equate to approximately $81,245 per unit.

CLOSING

Thank you for the opportunity to submit this proposal to provide services and serve as your consultant. We look forward to the opportunity to work with you on this project and to hopefully serve as your consultant in the future. If you have any questions, or if we can be of any additional service, please contact us.

Sincerely,
Solid Ground Engineering NC, PLLC



Aric V. Geda, P.E.
Principal Engineer

Attachments: Figure 1- Scenario 1 Conceptual Design
Figure 2- Scenario 2 Conceptual Design
Table 1- Scenario 1 Site Development Cost Estimates
Table 2- Scenario 2 Site Development Cost Estimates



FIGURE 1- SCENARIO 1 CONCEPTUAL DESIGN

Brevard-Davidson River Presbyterian Church Property East Main Street Brevard, North Carolina	SOLID GROUND NC 3714 Alliance Drive, Suite 400 Greensboro, North Carolina 27407 (919) 800-9093	Project Number NC24-0070 Not to scale August 2024

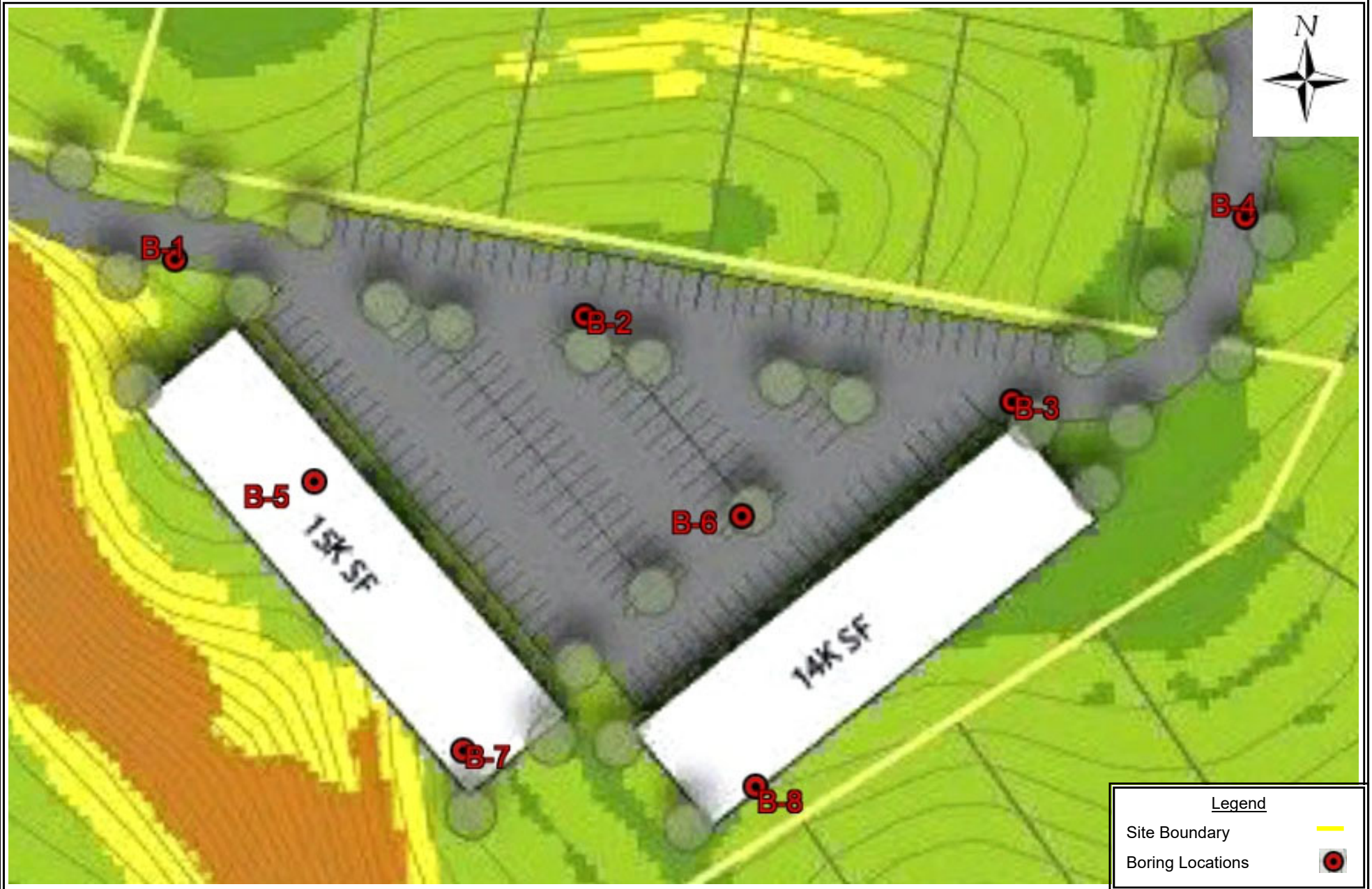


FIGURE 2- SCENARIO 2 CONCEPTUAL DESIGN

Brevard-Davidson River Presbyterian Church Property East Main Street Brevard, North Carolina	SOLID GROUND NC 3714 Alliance Drive, Suite 400 Greensboro, North Carolina 27407 (919) 800-9093	Project Number NC24-0070 Not to scale August 2024

Scenario 1: Low density TH development (typical soil conditions)				
	Quantity	**Units**	**Cost/Unit**	**Total Cost**
Site Preparation				
Demolition	0	SF	$5.00	$0.00
Clearing and Grubbing	3.3	AC	$7,000.00	$23,100.00
Earthwork	39,000	CY	$6.00	$234,000.00
Rock Allowance	0.0	CY	$32.00	$0.00
Infrastructure				
Retaining Wall Construction	6,600	SF	$40.00	$264,000.00
Roadway Construction	310	LF	$550.00	$170,500.00
Electrical Service	1,200	LF	$150.00	$180,000.00
Water Service	1,050	LF	$150.00	$157,500.00
Sewer Service	1,050	LF	$250.00	$262,500.00
Subtotal				$1,291,600.00
GC, Profit, Overhead, Contingencies			30%	$387,480.00
Total				**$1,679,080.00**
			Cost per acre:	**$508,812.12**

Scenario 1: Low density TH development (required ground improvement)				
	Quantity	**Units**	**Cost/Unit**	**Total Cost**
Site Preparation				
Demolition	0	SF	$5.00	$0.00
Clearing and Grubbing	3.3	AC	$7,000.00	$23,100.00
Earthwork	39,000	CY	$6.00	$234,000.00
Rock Allowance	0.0	CY	$32.00	$0.00
Infrastructure				
Retaining Wall Construction	6,600	SF	$40.00	$264,000.00
Roadway Construction	310	LF	$550.00	$170,500.00
Electrical Service	1,200	LF	$150.00	$180,000.00
Water Service	1,050	LF	$150.00	$157,500.00
Sewer Service	1,050	LF	$250.00	$262,500.00
Ground Improvement				
Agg. Piers for Retaining Walls	770	EA	$1,100.00	$847,000.00
Raft Foundations/prep for structures	43,200	SF	$4.00	$172,800.00
Pavement Ground Improvement	1,550	CY	$10.00	$15,500.00
Subtotal				$2,326,900.00
GC, Profit, Overhead, Contingencies			30%	$698,070.00
Total				**$3,024,970.00**
			Cost per acre:	**$916,657.58**

Scenario 2: Medium density MF apt. buildings (typical soil conditions)				
	Quantity	**Units**	**Cost/Unit**	**Total Cost**
Site Preparation				
Demolition	0	SF	$5.00	$0.00
Clearing and Grubbing	3.3	AC	$7,000.00	$23,100.00
Earthwork	39,000	CY	$6.00	$234,000.00
Rock Allowance	0.0	CY	$32.00	$0.00
Infrastructure				
Retaining Wall Construction	6,600	SF	$40.00	$264,000.00
Roadway Construction	234	LF	$550.00	$128,700.00
Electrical Service	600	LF	$150.00	$90,000.00
Water Service	600	LF	$150.00	$90,000.00
Sewer Service	600	LF	$250.00	$150,000.00
Subtotal				$979,800.00
GC, Profit, Overhead, Contingencies			30%	$293,940.00
Total				**$1,273,740.00**
			Cost per acre:	**$385,981.82**

Scenario 2: Medium density MF apt. buildings (required ground improvement)				
	Quantity	**Units**	**Cost/Unit**	**Total Cost**
Site Preparation				
Demolition	0	SF	$5.00	$0.00
Clearing and Grubbing	3.3	AC	$7,000.00	$23,100.00
Earthwork	39,000	CY	$6.00	$234,000.00
Rock Allowance	0.0	CY	$32.00	$0.00
Infrastructure				
Retaining Wall Construction	6,600	SF	$40.00	$264,000.00
Roadway Construction	234	LF	$550.00	$128,700.00
Electrical Service	600	LF	$150.00	$90,000.00
Water Service	600	LF	$150.00	$90,000.00
Sewer Service	600	LF	$250.00	$150,000.00
Ground Improvement				
Agg. Piers for Retaining Walls	770	EA	$1,100.00	$847,000.00
Agg. Piers for Structures	1,160	EA	$1,100.00	$1,276,000.00
Pavement Ground Improvement	2,200	CY	$10.00	$22,000.00
Subtotal				$3,124,800.00
GC, Profit, Overhead, Contingencies			30%	$937,440.00
Total				**$4,062,240.00**
			Cost per acre:	**$1,230,981.82**