



Groundwater Monitoring Plan
River Bend Quarry
Pacolet, Spartanburg County, South Carolina
S&ME Project No. 22610540

PREPARED FOR:

River Bend Aggregates, LLC
500 Duke Drive
Franklin, Tennessee 37067

PREPARED BY:

S&ME, Inc.
8646 W. Market Street, Suite 105
Greensboro, North Carolina 27409

October 5, 2023



October 5, 2023

River Bend Aggregates, LLC
500 Duke Drive
Franklin, Tennessee 37067

Attention: Mr. Jack Mitchell Submitted via email: jmitchell@synergy-materials.com

Reference: **Groundwater Monitoring Plan**
River Bend Quarry Site
Pacolet, Spartanburg County, South Carolina
S&ME Project No. 22610504

Dear Mr. Mitchell:

S&ME, Inc. (S&ME) has prepared the Groundwater Monitoring Plan in association with the proposed River Bend Quarry site in Spartanburg County, South Carolina. The Plan provides details as to how River Bend Aggregates, LLC will monitor groundwater at the River Bend Quarry site, prior to and during operation of the proposed mine. The approved Plan will be considered the Groundwater Monitoring Program for the River Bend Quarry site.

Please contact us at your convenience if there are questions regarding the information contained in this document.

Sincerely,
S&ME, Inc.

Handwritten signature of Nathan A. Williams in blue ink.

Nathan A Williams, P.G.
Senior Geologist
nwilliams@smeinc.com



Handwritten signature of Edmund Q.B. Henriques in black ink.

Edmund Q.B. Henriques, LG (NC)
Principal Geologist
ehenriques@smeinc.com



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1.0 INTRODUCTION

S&ME has prepared the Groundwater Monitoring Plan (Plan) on behalf of River Bend Aggregates, LLC in association with the proposed River Bend Quarry site located west of Hammett Grove Road, Pacolet, Spartanburg County, South Carolina. The Plan was prepared for submittal to the Mining and Reclamation Section of the South Carolina Department of Health and Environmental Control (SCDHEC) to supplement the *Application For A Mine Operating Permit (Form MR-400)*. The purpose of the Plan is to measure static groundwater levels on a regular basis to establish a pre-mining baseline for groundwater levels and to document changes to groundwater levels during the mining operations. The information gathered will provide a basis to assess if observed changes indicate a potential to impact water supply wells on neighboring properties. A discussion of site hydrogeologic conditions and details associated with the water supply well survey performed are provided in the *Hydrogeologic Assessment* report included with the mine permit application for the River Bend Quarry site.

2.0 GROUNDWATER MONITORING

2.1 Plan Monitoring Well Locations

The Plan includes four monitoring wells to serve as points to monitor groundwater occurrence within the bedrock aquifer. The Plan monitoring wells consist of GPMW22-01A, GPMW22-02, GPMW22-03, and GPMW22-04; their locations are depicted on **Figure 1, Appendix I**. The well locations were selected at points between the proposed aggregate mine pit areas and known or suspected off-site water supply wells in the vicinity, with one well positioned between the Phase 1 pit area and the Pacolet River.

2.2 Monitoring Well Construction

The Plan wells were installed in 2023, during the same drill rig mobilization used to install wells for aquifer pump tests performed for the *Hydrogeologic Assessment*. The wells serve as points to monitor groundwater occurrence within the bedrock aquifer and extended to depths similar to the proposed final pit depth. Each well was constructed with a nominal 6-inch diameter surface casing, grouted in place, situated from near the ground surface to the top of bedrock. The remaining portions of each well consists of an open borehole within the bedrock. Select well construction details are summarized in **Table 2-1** below. Completed *Water Well Records, Bureau of Water*, SCDHEC Form 1903, are contained in **Appendix II**.

Table 2-1 – Plan Well Summary

Well ID	Date Well Completed	Surface Casing Depth (Feet-BGS)	Total Depth (Feet-BGS)	Monitored Parameters (Feet Below Top of Casing)	Top of Casing Elevation (Feet - MSL)
GPMW22-01A	03/09/2023	123	590	Depth to water	699.82
GPMW22-02	03/03/2023	70	545	Depth to water	670.11
GPMW22-03	03/07/2023	62	470	Depth to water	550.70
GPMW22-04	03/13/2023	39	510	Depth to water	609.17

Feet-BGS = Feet below ground surface

Feet-MSL = Feet Mean Sea Level



Note that monitoring wells GPMW22-03 and GPMW22-04 are depicted in **Figure 1, Appendix I**, as within the outline for Pit 1 and Pit 2, respectively. These well locations are not necessarily within the actual pit limits. They may be in the vicinity of mine haul roads or perimeter roadways.

2.3 Monitoring Intervals and Data Collection

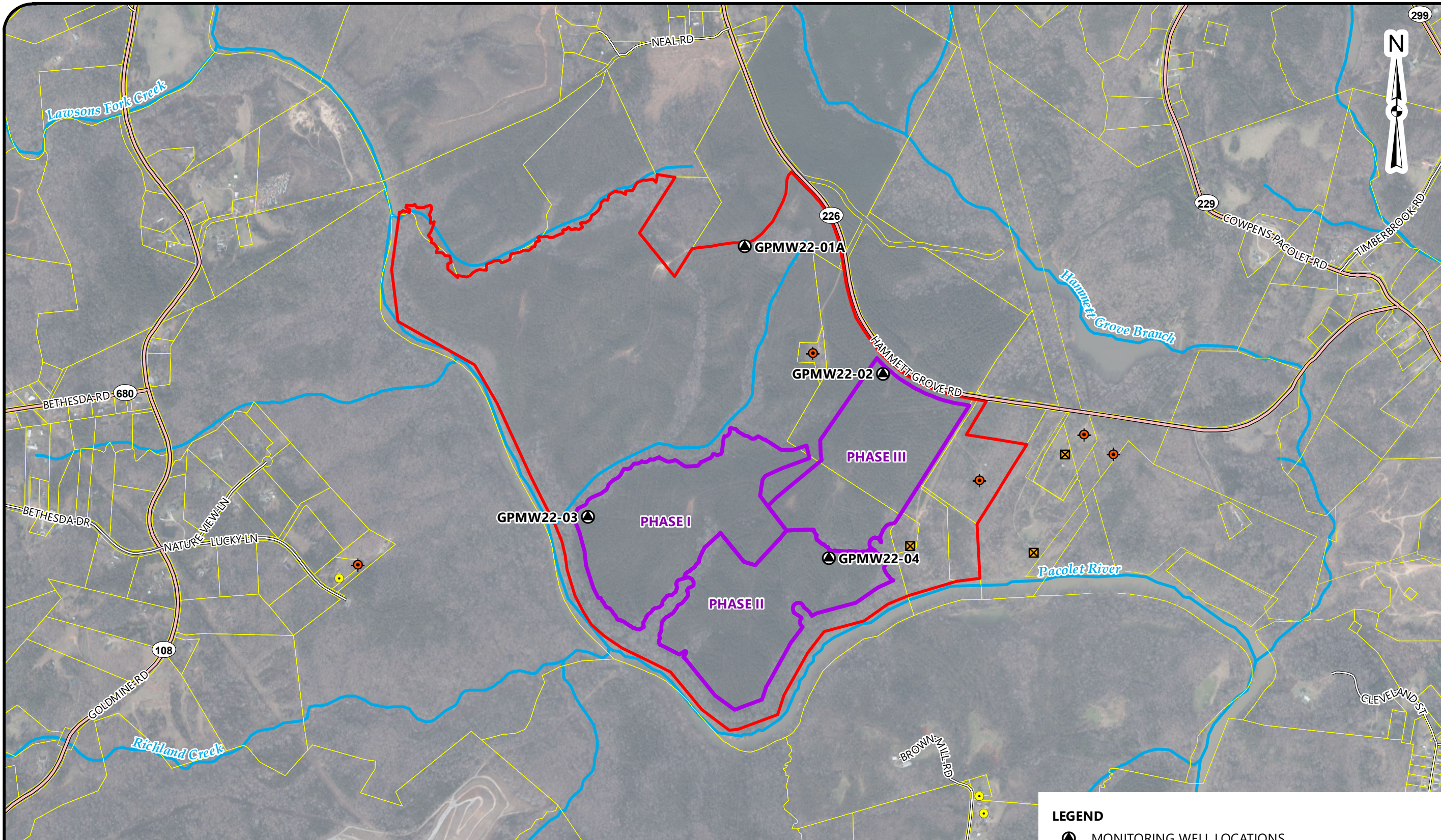
The monitoring locations detailed in Section 2.1 will be monitored for depth to water to determine the groundwater elevation. The depth to water will be measured with an electronic water probe and relative to the top of the well casing. To provide baseline water level data for the site, depth to water measurements will be collected monthly for at least 4 months prior to commencing with excavation of rock from the aggregate mine pit. Baseline water level monitoring will transition directly into long-term monitoring, which will occur for the life of mine. Long-term monitoring will include collection of depth to water measurements obtained on a monthly basis and reported to SCDHEC on a quarterly basis.

The groundwater elevation observed at each well will be calculated by subtracting the depth to water measurement from the top of casing elevation. The locations of the Plan wells and top of casing elevations were measured by Palmetto Corporation, a South Carolina licensed surveyor.

Each quarterly report will be submitted to SCDHEC within 30 days and will summarize the current and historical groundwater elevation dataset. If a statistically significant decrease in groundwater elevation occurs, which is determined by a South Carolina licensed geologist or professional engineer to be an indicator that mine dewatering operations have resulted in potential impacts to neighboring wells, then the licensed professional will prepare and submit a written report to SCDHEC within five business days from when the determination is made.

Appendices

Appendix I – Figure



REFERENCE: 2020 AERIAL PHOTOGRAPH
GIS BASE LAYERS WERE OBTAINED FROM SPARTANBURG COUNTY AND THE STATE OF SOUTH CAROLINA. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

Well ID	Latitude	Longitude	Top Of Casing Elevation
GPMW22-01A	34.93971	-81.76755	699.82
GPMW22-02	34.93616	-81.76280	670.11
GPMW22-03	34.93206	-81.77284	550.70
GPMW22-04	34.93096	-81.76461	609.17

LEGEND

- MONITORING WELL LOCATIONS
- FIELD LOCATED WATER SUPPLY WELL STRUCTURE
- SUSPECTED RESIDENTIAL WATER SUPPLY WELL
- POTENTIAL WELL ADDRESSES FROM DATABASE SOURCE
- PROPOSED PIT AREAS
- PROJECT BOUNDARY

MONITORING WELL MAP

RIVER BEND QUARRY
SPARTANBURG COUNTY, SOUTH CAROLINA

SCALE:
1" = 1,000'

DATE:
10-4-23

PROJECT NUMBER
22610504

FIGURE NO.

1

Appendix II –Water Well Records



Water Well Record Bureau of Water

2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

Note: Personal information provided on this document is subject to public scrutiny or release.

1. WELL OWNER INFORMATION:
Name: Jack Mitchell / Synergy Materials LLC
(last) (first)
Address: 1010 Hammett Grove Rd
City: Spartanburg State: SC Zip: 29307-0000
Telephone: Work: 864-595-9900 Home:

2. LOCATION OF WELL: COUNTY: Spartanburg
Name:
Street Address: 1010 Hammett Grove Rd
City: Spartanburg Zip: 29307-0000
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:
GPMW-22-2

4. ABANDONMENT: Yes No
Give Details Below
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum

*Indicate Water Bearing Zones
(Use a 2nd sheet if needed)

5. REMARKS:

6. TYPE: Mud Rotary Jetted Bored
 Dug Air Rotary Driven
 Cable tool Other

7. PERMIT NUMBER: MW-13489

8. USE:
 Residential Public Supply Process
 Irrigation Air Conditioning Emergency
 Test Well Monitor Well Replacement

9. WELL DEPTH (completed) _____ ft. Date Started: 3-1-23
545 ft. Date Completed: 3-3-23

10. CASING: Threaded Welded
Diam.: 6" _____
Type: PVC Galvanized
 Steel Other
6" _____ in. to 70 _____ ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface 2.5 _____ ft.
Weight sch. 40 _____ lb./ft.
Drive Shoe? Yes No

11. SCREEN:
Type: NA _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ ft.
_____ ft. and _____ ft. **NOTE: MULTIPLE SCREENS USE SECOND SHEET**
Sieve Analysis Yes (please enclose) No

12. STATIC WATER LEVEL _____ ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
_____ ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: Yes (please enclose) No
Yield: _____

14. WATER QUALITY
Chemical Analysis Yes No Bacterial Analysis Yes No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) Yes No
Installed from _____ ft. to _____ ft.
Effective size _____ Uniformity Coefficient _____

16. WELL GROUTED? Yes No
 Neat Cement Bentonite Bentonite/Cement Other _____
Depth: From 50 _____ ft. to 0 _____ ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: _____ ft. direction
Type _____
Well Disinfected Yes No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe _____ ft. Capacity _____ gpm
TYPE: Submersible Jet (shallow) Turbine
 Jet (deep) Reciprocating Centrifugal

19. WELL DRILLER: Randy Phillips CERT. NO.: 1096-A
Address: (Print) Level: A B C D (circle one)
30 Grant Park Place
Piedmont, SC 29673
Telephone No.: 864-288-1986 Fax No.: 864-288-2272

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Randy Phillips Date: 4/18/23
Well Driller

If D Level Driller, provide supervising driller's name:



Water Well Record
Bureau of Water

2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

Note: Personal information provided on this document is subject to public scrutiny or release.

1. WELL OWNER INFORMATION:
Name: Jack Mitchell / Synergy Materials LLC
Address: 1010 Hammett Grove Rd
City: Spartanburg State: SC Zip: 29307-0000
Telephone: Work: 864-595-9900 Home:

2. LOCATION OF WELL: COUNTY: Spartanburg
Name:
Street Address: 1010 Hammett Grove Rd
City: Spartanburg Zip: 29307-0000
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:
GPMW-22-4

4. ABANDONMENT: Yes No
Give Details Below
Grouted Depth: from ft. to ft.

Table with 3 columns: Formation Description, *Thickness of Stratum, Depth to Bottom of Stratum. Includes note: *Indicate Water Bearing Zones (Use a 2nd sheet if needed)

5. REMARKS:

6. TYPE: Mud Rotary Jetter Bored Dug Air Rotary Driven Cable tool Other

7. PERMIT NUMBER: MW-13489

8. USE: Residential Public Supply Process Irrigation Air Conditioning Emergency Test Well Monitor Well Replacement

9. WELL DEPTH (completed) Date Started: 3-10-23
510 ft. Date Completed: 3-13-23

10. CASING: Threaded Welded Diam.: 6"
Type: PVC Galvanized Steel Other
6" in. to 39 ft. depth
Height: Above/Below Surface 2.5 ft. Weight sch.40 lb./ft. Drive Shoe? Yes No

11. SCREEN: Type: NA Diam.: Slot/Gauge: Length: Set Between: ft. and ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET Sieve Analysis Yes (please enclose) No

12. STATIC WATER LEVEL ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface. ft. after hrs. Pumping G.P.M. Pumping Test: Yes (please enclose) No Yield:

14. WATER QUALITY Chemical Analysis Yes No Bacterial Analysis Yes No Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) Yes No Installed from ft. to ft. Effective size Uniformity Coefficient

16. WELL GROUTED? Yes No Neat Cement Bentonite Bentonite/Cement Other Depth: From 50 ft. to 0 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ft. direction Type Well Disinfected Yes No Type: Amount:

18. PUMP: Date installed: Not installed Mfr. Name: Model No.: H.P. Volts Length of drop pipe ft. Capacity gpm TYPE: Submersible Jet (shallow) Turbine Jet (deep) Reciprocating Centrifugal

19. WELL DRILLER: Randy Phillips CERT. NO.: 1096-A Address: (Print) 30 Grant Park Place Piedmont, SC 29673 Level: A B C D (circle one) Telephone No.: 864-288-1986 Fax No.: 864-288-2272

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: Randy Phillips Well Driller Date: 4/18/23

If D Level Driller, provide supervising driller's name: