

**GEOTECH COMPANY NAME (ABC Inc.)**

DATE September 31, 2023

Prince George’s County Government  
Dept. of Permitting, Inspection & Enforcement  
9400 Peppercorn Place, Suite 230  
Largo, Maryland 20774

Attn: District Engineer of North/Central/South (pick one) District, Mr. \_\_\_\_\_ -  
\_\_\_\_\_

Re: Name of Development  
Request for Soil-Cement Application for  
○ Road-Name Sta \_\_\_\_\_ to Sta \_\_\_\_\_  
○ Road-Name Sta \_\_\_\_\_ to Sta \_\_\_\_\_  
○ ....  
○ Road-Name Sta \_\_\_\_\_ to Sta \_\_\_\_\_

Permit: 12345-2023-00  
Company Job Number: 6789  
Prince George’s County, Maryland

Dear Mr. \_\_\_\_\_:

Our Geotechnical company, \_\_\_\_\_ (ABC Inc.), has been providing geotechnical engineering and construction observation services for the referenced project located in Prince George’s County. In response to our client’s request, ABC has performed laboratory testing for subgrade soils along the subject roadways and is providing pavement section recommendations in this letter.

**Requirements**

In accordance with a plan entitled \_\_\_\_\_ (Storm Drain & Paving Plan) prepared by \_\_\_\_\_, and dated \_\_\_\_\_, 2024, the subject roadways are classified as Urban Primary Residential (Street 1 Name, Sta. 0+00 to Sta. 11+00) and Urban Secondary Residential (Street 2 Name, Sta. 0+00 to Sta. 6+00) and should be constructed in accordance with the following Prince George’s County DPW&T Standard Paving Sections:

<u>Urban Primary Residential Road (60 ft R.O.W)</u>	
Surface Course Asphalt	1.5 inches
Intermediate Surface Course Asphalt	1.5 inches
Base Course Asphalt	3.0 inches
Graded Aggregate Subbase	6.0 inches

<u>Urban Secondary Residential Road (50 ft. R.O.W)</u>	
Surface Course Asphalt	1.5 inches
Intermediate Surface Course Asphalt	1.5 inches
Base Course Asphalt	3.0 inches
Graded Aggregate Subbase	6.0 inches

Prince George’s County requires that the upper 12 inches of the roadway subgrade planned to be stabilized with cement shall have a minimum California Bearing Ratio (CBR) of 7 by ASTM D-1883, liquid limit less than 40, and a plasticity index less than 12. ABC Inc. has obtained soil samples from the site to determine the suitability of the existing subgrade soils. Roadway subgrade soils not meeting these guidelines should be improved in-place or over excavated by 12 inches and replaced with suitable materials compacted in accordance with the site grading requirements.

**Laboratory Testing**

Three (3) samples of on-site soils were collected from both roads and tested for the purpose of evaluating the roadway subgrade soils. It is ABC’s professional opinion that the samples tested are representative of the subgrade soil along the referenced roadways. Testing for the samples included grain-size analysis, Atterberg Limits, Modified Proctor moisture-density relationship, California Bearing Ratio (CBR), and natural moisture content. The table below presents a summary of laboratory test results with data sheets attached to this report. A sample from (Street 2 Name) \_\_\_\_\_ Sta. 7+50 is included too.

Location	Liquid Limit	Plasticity Index	Natural Moisture (%)	USCS / AASHTO	Maximum Dry Density (pcf)	Optimum Moisture (%)	CBR (%)
Street 1 Name Sta. 5+50	NP	NP	7.1	SM / A-2-4 (0)	NA	NA	N/A
Street 1 Name, Sta. 10+00	NP	NP	10.2	SM / A-2-4 (0)	122.4	11.0	N/A
Street 2 Name, Sta. 4+50	27	9	11.5	SC / A-4(0)	128.4	8.7	20.5

NP – Non-Plastic  
N/A - Not Available

A soil-cement mix design study was performed on soils sampled from (Street 2 Name). Soils were amended with (4) and (6) percent cement by dry unit weight. Samples amended with 4 percent cement by dry unit weight achieved compressive strengths of 250 to 320 psi. Samples amended with 6 percent cement by dry unit weight achieved compressive strengths of 290 to 540 psi.

**Pavement Recommendations**

Our observations and test results indicate the subgrade soils in the referenced portion of (The Development Name) meet the County requirements. It is ABC’s understanding that significant construction traffic will be accessing the site during future phases. The standard paving

sections are not intended to support concentrated construction traffic. Based on conversations with the Client, GTA recommends that the subgrade soils of roadways of the future phases be amended with cement to improve pavement support. If cement is used to modify the subgrade soils, graded aggregate subbase can be waived by DPIE on urban roads with right-of-ways less than 60 feet.

Based on the previous laboratory testing, an average spread rate of 47 pounds (approximately 4 percent by dry unit weight) of cement per square yard mixed to a depth of twelve inches would be appropriate to improve the on-site subgrade soils. ABC recommends using the following pavement section:

**Recommended Paving Sections with Modified Subgrade**

<b>Urban Primary Residential Road</b>	<b>Thickness (inches)</b>
Surface Asphalt	1.5
Intermediate Asphalt	1.5
Base Asphalt	3.0
Graded Aggregate Subbase (GASB)	6.0
Modified Subgrade (treated with 4% cement)	12.0

<b>Urban Secondary Residential Road</b>	<b>Thickness (inches)</b>
Surface Asphalt	1.5
Intermediate Asphalt	1.5
Base Asphalt	3.0
Modified Subgrade (treated with 4% cement)	12.0

ABC representative should be present during a proof roll of the subgrade soils in these areas prior to the start of the soil modification operation. The effectiveness of soil-cement modification is highly dependent on the degree of pulverization and full-depth hydration. Multiple passes of the reclaimer may be required to produce a uniform soil-cement mixture. ABC recommends that the treated areas remain free from heavy traffic for a three to seven days cure period, based on field conditions. DPIE requires a 7-day curing duration. Shorter duration of 3 to 6 days may be accepted if approved by on site ABC technician in coordination with DPIE site Inspector. Curing duration shorter than 3 days are not permitted.

Construction of the cement-modified soil subgrade should generally follow Section 502 of Maryland State Highway Administration specifications. Quality assurance testing will be performed during construction to verify that the modified soils and the pavement construction meet the project specifications, Prince George's County *Soil-Cement General Requirements* and DPIE *Soil-Cement Approval Conditions*.

**Construction Observations**

ABC will provide a technician on site full-time for observation and testing of the subgrade modification process and an engineer or a project engineer may make site visits to review the work. In addition, Prince George's County inspectors should be notified one business day in advance about subgrade stabilization and/or proof-rolling.

(Development Name)

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The following QC plan should be observed or performed by ABC prior to and during soil modification.

1. Proof roll with a fully loaded dump truck prior to spreading cement to locate unstable subgrade conditions within 2 feet of the surface.
2. Perform shallow test pits to evaluate unstable areas and determine instability cause and depth.
3. Confirm that the subgrade materials are consistent with materials tested in ABC's laboratory
4. Receive cement tanker material tickets to confirm cement type and amount in tons per load.
5. Check dimensions of spread areas to verify recommended spread rate in pounds per square yard.
6. Observe reclaimer operations to confirm mixing depth of 12 inches and adequate mixing/hydration to produce a uniform mixture of soil and cement above the optimum moisture content.
7. Observe timely full-depth compaction by sheepsfoot equipment, fine grading and sealing by smooth drum roller to achieve minimum compaction and design surface grades before the soil cement begins to harden.
8. Sample soil cement and fabricate cylindrical specimens for compressive strength testing.
9. Perform nuclear gauge testing to determine in-place density and compaction.
10. Maintain surface moist and free from traffic for a three to seven-day cure period based on field conditions.
11. Observe proof roll with a fully loaded dump truck to confirm soil cement hardness and subgrade support.
12. Prepare a QC report for DPIE Inspector per the County *Soil-Cement General Requirements*.

### **Underdrain Recommendations**

DPIE requires all urban roads to have continuous longitudinal underdrains along both sides. For rural roads, the placement of underdrains is limited to 25 feet on each side of the SD inlets placed at the topographic low points of the proposed roadways. Underdrains should be installed in general accordance with Prince George's County DPWT Std. 300.13 and as indicated/noted on the applicable DPWT standard for Urban Primary Road, Std.100.06, and DPWT standard for Urban Secondary Road, Std. 100.07.

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Seal & Signature

Encl.

- Particle Size Distribution Test Results (ASTM D421, D422, D2216, D2217 and D4318).
- Moisture Density Relationship Test Results (ASTM D 698-12 Method B Standard).
- California Bearing Ratio (CBR) Test Results at 97% max. density (ASTM D1883-16).