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January 12, 2004

Baxter Evans & Company  
674 Arlington Place  
P.O. Box 4868  
Macon, Georgia 31208

Attn: Baxter Evans

RE: Subsurface Investigation  
Summit at the Mall  
"Tract A"  
Macon, Georgia  
PT&E #2003-124

Gentlemen:

We completed the field portion of this subsurface investigation on December 16, 2003. The following is a report of our findings.

**1. METHOD OF BORING AND SAMPLING:**

A truck mounted drill, mechanically turning a 5 5/8 -inch, hollow stem auger was used to advance four bore holes at locations shown on the enclosed bore hole location sketch. In addition to the location sketch, a boring log of each hole is attached.

Borings B-6 through B-9 were sampled in substantial accordance with "Penetration Test and Split Barrel Sampling of Soils", ASTM D 1586,

current edition. The penetration recorded indicates the number of blows required to effect a 12-inch penetration into the undisturbed soil stratum, using a pin-guided, 140 pound drive hammer falling 30 inches per blow, driving a split barrel sampler having a 2-inch outside diameter. The depth to the beginning of the test is shown on the boring log. Each penetration test extends 18 inches below the indicated beginning depth. The final 12-inch penetration is reported as the blows per foot or the standard penetration.

The use of the standard penetration test (SPT) along with laboratory tests of the soil removed from the sampler enables us to make an assessment of the ability of the soil to support foundations. These tests can also provide information as to the potential stability of open excavations, the permeability of the soil and other soil index properties.

The borings were backfilled on December 16, 2003 after a final check for the presence and depth of subsurface water was made.

Soil samples obtained from the project site are the property of the client. Unless other arrangements are agreed upon in writing, Preston Testing & Engineering Company, Inc. will hold such samples for no more than 180 calendar days from the date Preston Testing & Engineering Company, Inc. issued the first document that includes the data obtained from these samples. After that date, Preston Testing & Engineering Company, Inc. will dispose of samples that are not contaminated by hazardous substances.

## **2. GENERAL FINDINGS:**

The site is located in the Fall Line Hills District of the Coastal Plain Province in Macon, Bibb County, Georgia.

The general area surrounding the location of these test borings is not suitable for the support of conventional shallow foundations due to the presence of old fill. The fill was placed with little or no compactive effort. There is also a substantial amount of debris and organics which is unsuitable for the use as structural fill. We encountered the old fill to a depth of 13.0 feet in this area. These type materials create voids which allow soils to migrate downward causing loss of support for structures resulting in excessive differential and total settlement.

At the location of borings B-6 and B-8 the original soils consisted of sandy silts which were hard in consistency at 15.0 feet. At deeper elevations we encountered very dense fragmented rock.

Boring B-6 was terminated at a depth of 20.0 feet. Borings B-7 and B-9 were terminated at 8.0 feet and 5.0 feet, respectively due to auger refusal in solid fill (debris). Boring B-8 was terminated at a depth of 19.0 feet due to auger refusal in very dense fragmented rock. Below is a tabulation of bore hole termination depths.

DEPTH/ELEVATION ± OF BORE HOLE TERMINATION		
Boring Number	Existing Grade Elevation ±	Depth of Termination (Feet / Elevation ±)
B-6	352	20.0 / 332
B-7	351	8.0 / 343
B-8	351	19.0 / 332
B-9	348	5.0 / 343

\*Terminated in debris.

Boring logs showing the soil profile at each bore hole are attached. The logs show changes in soil strata. The depths to changes should be

considered to be approximate depths of changes based on the best estimate of the driller.

The soil profile shown on each boring log represents soil conditions at that particular boring. The soils between borings should not necessarily be assumed to be similar to those found in the borings.

The methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately represent the strata variations that usually exist between sampling locations.

It is not unusual to find unexpected conditions between test boring locations. Filled in ditches, soft backfill over utilities, rock ledges, trash pits, old fire pits, springs, and expansive clays are just a few of the unexpected conditions that might be discovered during field site preparation.

With the exception of having obtained utility clearances for drilling operations (call before you dig), Preston Testing & Engineering Company, Inc. has obtained no detailed knowledge of the on-site utilities or any other structures beneath the surface of the site.

Subsurface water was noted. The following is a tabulation of the depth (elevation) of this subsurface water.

BORING NUMBER	EXISTING GRADE ELEVATION ±	DEPTH OF SUBSURFACE WATER ATOB (FEET / ELEVATION ±)	DEPTH OF SUBSURFACE WATER 24 HOURS (FEET / ELEVATION ±)
B-6	352	No Free Water Surface Observed	15.5 / 336.5
B-7	351		No Free Water Surface Observed
B-8	351		12.2 / 338.8
B-9	348		No Free Water Surface Observed

**3. ANTICIPATED STRUCTURE:**

It is our understanding that the scope of the project will consist of the following items.

Various types of buildings both office and retail are proposed.

The floor slab will be at 353.65 elevation.

If any of the above proposed scope of work is not correct or has been changed, please let us know so that we can provide additional and/or amended recommendations.

**4. LAB TESTS:**

We secured a bulk soil sample from boring B-7 at a depth of 0 to 4.5 feet. A laboratory classification (ASTM D 2487) along with a one-point standard proctor (ASTM D 698) was performed on this sample. We found this soil to be an SM material (silty sand), with a maximum dry density of 110.0 pcf and an optimum moisture content of 13.0 percent.

## **5. STRUCTURAL DESIGN RECOMMENDATIONS:**

**SUPPLEMENTAL STUDY:** Once design plans are more advanced, we recommend a supplemental test pit study be performed on the site to better determine the extent of the solid fill (debris) along with other problems associated with the fill on the site. The test pits could also help assess the extent of any groundwater related problems on the site, specifically as it pertains to site grading, subgrade stabilization, and permanent underdrain design with the area of the proposed building as well as parking lots. We also recommend a future design meeting between the geotechnical engineer and other design team members to address geotechnical concerns at specific locations. This may allow the footprint of the building to be shifted to avoid foundations being placed in the poor fill conditions. It may be that flexible and/or rigid pavement could be located in the marginal area with less preparation. If this is not an option, the old fill should be removed down to the original soils and the site brought back to the planned elevation with the use of suitable structural fill placed as described in "Site Preparation Recommendations".

### **Foundation Support**

If several inches of settlement can be tolerated, based on the results of the subsurface investigation, our laboratory analysis and after completion of recommended site preparation, the proposed structures may be supported on a reinforced concrete slab on grade. A net maximum allowable bearing pressure of 1500 pounds per square foot may be used in the design of the shallow foundation system.

For frost protection, perimeter turn down slabs should be designed with a minimum embedment depth of 18 inches. The embedment depth should be measured from the base of the footing to the lowest adjacent outside grade.

### **Floor Support**

A four-inch layer of compacted crushed stone should be placed beneath the floor slab to provide a protective cover as well as a uniform working surface.

Expansion and contraction joints should be used to isolate all floor slabs from the load bearing wall and/or isolated columns. This will allow for possible differential movement and diminish the potential of cracking the floor slabs. Provided the slab subgrade is prepared in accordance with our recommendations, a subgrade modulus reaction (K) of 50-75 pounds per cubic inch (pci) may be used for the slab design.

### **Site Preparation Recommendations**

In the event that undercut and/or structural footprints require structural fill to bring the site to grade, we suggest the following procedure.

Remove all organic matter, stumps and other deleterious matter. Predensify the areas to be filled or upon which structures are to be placed. A loaded dump truck or other rubber tired equipment should be used for the predensification. Overlapping passes of the vehicle should be made across the site in one direction and then at right angles to the original direction of rolling. We recommend a proofroll be observed by a geotechnical engineer or his representative prior to the placement of any fill and/or the excavation of any foundations.

Any yielding, pumping or soft areas should be cut out and replaced with fill compacted as described below.

The proposed fill soil should be limited to soils classified in accordance with ASTM D 2487 as GM, GC, SW, SP, SM, SC, ML, and CL. Soils classified as Pt, OH, OL, CH and MH are **not** suitable for



structural fill. The on-site soils from cut sections are suitable for structural fill provided they are at or near their optimum moisture content and free of all debris and/or organics.

The area fill should be spread in loose lifts (layers) of not more than 8 inches. Each lift should be rolled with a vibratory roller, a sheepsfoot roller or a loaded, rubber-tired dump truck, scraper or loader. Each lift should be compacted to a minimum density of 95.0 percent of the maximum dry density as determined in accordance with ASTM D 698, current edition.

The fill soil moisture content should be maintained within 3 percent of the optimum moisture as determined in accordance with ASTM D 698. In the event that the soil is too wet, harrowing, scarifying and aeration should be used to dry the soils to within the required moisture content. If the soil is too dry, a water truck with spreader bar or a spray hose should be used to bring the soil to the proper moisture range. The water should be thoroughly and evenly mixed within the soil prior to compaction. Backfilling of trenches, walls and structures should be done in 6-inch loose lifts. Each lift should be compacted using a mechanical tamp such as a vibratory or impact type compactor.

In general, sandy soils are best compacted with vibratory type compaction equipment. Clayey soils should be compacted with an impact type or sheepsfoot compactor.

Horizontally, the compacted structural fill should extend at least as far outside the perimeter footings as the fill is in depth below the bottom of the footings.

Density tests should be taken throughout the placement of all structural fill.

The bottoms of all footing excavations should be mechanically tamped prior to placement of steel and concrete to assure a uniformly dense support for the footings.

All footing excavations should be tested for bearing value prior to the placement of the reinforcement steel and concrete.

#### **6. PAVING RECOMMENDATIONS:**

All proposed paved sections should be proofrolled. For light duty paving, we suggest that six inches of graded aggregate base be compacted on a prepared subbase. The base course should be compacted to 100% of the maximum dry density as determined in accordance with ASTM D 698. The graded aggregate base course should conform to GA D.O.T. specifications.

The surface course should be two inches of type "E" or "F" hot mix asphaltic concrete mixture conforming to GA D.O.T. specifications.

For heavy duty paving we recommend a 6 inch thick concrete slab 4000 psi / 650 psi flex be placed on a prepared subgrade as described for the light duty paving.

If asphalt pavement is considered for the heavy duty paved sections we recommend a minimum of 8 inches of graded aggregate base course (GAB) be compacted on a prepared subbase. The base should be compacted to 100 percent of the maximum dry density (ASTM D 698). The surface course should be 2 inches of type "E" or "F" hot mix asphalt over 2 inches of B-Binder course.

## 7. LIMITATIONS:

Although these findings are valid only at the locations and to the depths shown, they are useful for alerting the grading contractor to certain specific conditions pertinent to the preparation of the site.

Frequently, the grading contractor has never seen the geotechnical report or recommendations for site preparation. In addition, we see many cases where the specifications and plans do not reflect the recommendations made in the geotechnical report.

We suggest that every effort be made to alert the grading contractor so that he may avoid the problems that arise due to his lack of knowledge of potential site problems.

This report has been prepared for the exclusive use of Baxter Evans & Company for specific application to Summit at the Mall "Tract A" located in Macon, Georgia. Preston Testing & Engineering Company, Inc. has endeavored to comply with generally accepted geotechnical engineering practice common to the local area. Preston Testing & Engineering Company, Inc. makes no other warranty, expressed or implied.

The analyses and [preliminary] recommendations contained in this report are based on data obtained from subsurface exploration. The methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations.

The recommendations included in this report are preliminary, because they have been based in part on assumptions about strata variations

that may be tested only during earthwork and foundation construction for deep foundations. Accordingly, these recommendations should not be applied in the field unless Preston Testing & Engineering Company, Inc. is retained to perform construction observation and thereby provide a complete professional geotechnical engineering service through the observational method. Preston Testing & Engineering Company, Inc. cannot assume responsibility or liability for the adequacy of its preliminary recommendations when they are used in the field without Preston Testing & Engineering Company, Inc. being retained to observe construction.

Do not apply any of this report's conclusions or recommendations if the nature, design, or location of the facilities is changed. If changes are contemplated, Preston Testing & Engineering Company, Inc. must review them to assess their impact on this report's applicability. Also note that Preston Testing & Engineering Company, Inc. is not responsible for any claims, damages, or liability associated with any other party's interpretation of this report's subsurface data or reuse of this report's subsurface data or engineering analyses without the express written authorization of Preston Testing & Engineering Company, Inc..

Although Preston Testing & Engineering Company, Inc. has explored subsurface conditions as part of this program, Preston Testing & Engineering Company, Inc. has not evaluated the site for the potential presence of contaminated soil.

The recommendations stated in this report are preliminary. They are based on information derived through subsurface sampling. No matter how effectively subsurface sampling may be performed, variations between exploration locations are likely and cannot be recognized until exposed during construction. Accordingly,

Preston Testing & Engineering Company, Inc.'s recommendations may be finalized only through Preston Testing & Engineering Company, Inc.'s observation of the project's construction. Preston Testing & Engineering Company, Inc. accepts no responsibility or liability for any party's reliance on Preston Testing & Engineering Company, Inc.'s preliminary recommendations.

The conclusions and recommendations included in this report are based in part upon the data Preston Testing & Engineering Company, Inc. derived from a limited number of soil or groundwater samples obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations will not become evident until construction or further investigation.

If variations or other latent conditions become evident, Preston Testing & Engineering Company, Inc. will reevaluate this report's conclusions and recommendations.

Please call on us if we can be of further service to you on this project.

Very truly yours,  
PRESTON TESTING & ENG. CO., INC.

Willie Goad  
Managing Technician

WTG/cmd

**PRESTON TESTING & ENGINEERING CO., INC.**

CLIENT BAXTER EVANS & COMPANY BORING NO. B-6

PROJECT NAME SUMMIT AT THE MALL - MACON, GEORGIA

BORING LOCATION See Bore Hole Location Sketch

DATUM TOPO HAMMER WT. 140 Pounds HAMMER DROP 30 Inches HOLE DIA. 6 Inches  
 NONE OBSERVED AT TIME OF BORING

SURFACE ELEV. 352± SUBSURFACE WATER DEPTH 15.5' 24 HOURS

DATE STARTED 12-11-03 COMPLETED 12-11-03 BORING METHOD ASTM D 1586

SAMPLES				BORING LOG	
STANDARD PENETRATION (BLOWS PER FOOT)			BLOWS PER FOOT	DEPTH (FEET)	DESCRIPTION
0	50	100			
			14	0	TAN GRAY FINE SANDY MICACEOUS SILT (FILL) (ML)
				1.0	
			15	2.5	GRAY FINE TO MEDIUM SAND; ORGANICS (FILL) (SW)
			6	5.0	
			7	10.0	
				12.0	
			52	15.0	TAN GRAY FINE SANDY MICACEOUS SILT (ORIGINAL) (ML)
				18.0	
					FRAGMENTED ROCK
			100+	20.0	BORING TERMINATED

**PRESTON TESTING & ENGINEERING CO., INC.**

CLIENT BAXTER EVANS & COMPANY BORING NO. B-7

PROJECT NAME SUMMIT AT THE MALL - MACON, GEORGIA

BORING LOCATION See Bore Hole Location Sketch

DATUM TOPO HAMMER WT. 140 Pounds HAMMER DROP 30 Inches HOLE DIA. 6 Inches  
 NONE OBSERVED AT TIME OF BORING

SURFACE ELEV. 351± SUBSURFACE WATER DEPTH NONE OBSERVED 24 HOURS

DATE STARTED 12-15-03 COMPLETED 12-15-03 BORING METHOD ASTM D 1586

SAMPLES				BORING LOG	
STANDARD PENETRATION (BLOWS PER FOOT)		BLOWS PER FOOT	DEPTH (FEET)	DESCRIPTION	
0	50	100			
		6	0		
		13	2.5		TAN GRAY SILTY FINE TO MEDIUM SAND (FILL) (SM)
			4.5		
			5.0		BLACK SILTY FINE TO MEDIUM SAND, BRICK, CONCRETE, ORGANICS (FILL) (SM/DEBRIS)
			8.0		BORING TERMINATED (AUGER REFUSAL IN CONCRETE/SOLID (FILL))

PTE NO. 2003-124

**PRESTON TESTING & ENGINEERING CO., INC.**

CLIENT BAXTER EVANS & COMPANY BORING NO. B-8

PROJECT NAME SUMMIT AT THE MALL - MACON, GEORGIA

BORING LOCATION See Bore Hole Location Sketch

DATUM TOPO HAMMER WT. 140 Pounds HAMMER DROP 30 Inches HOLE DIA. 6 Inches  
 NONE OBSERVED AT TIME OF BORING

SURFACE ELEV. 351± SUBSURFACE WATER DEPTH 12.2' 24 HOURS

DATE STARTED 12-15-03 COMPLETED 12-15-03 BORING METHOD ASTM D 1586

SAMPLES				BORING LOG	
STANDARD PENETRATION (BLOWS PER FOOT)			BLOWS PER FOOT	DEPTH (FEET)	DESCRIPTION
0	50	100			
			11	0	TAN GRAY MICACEOUS SILTY FINE SAND (F8LL) (SM)
				1.0	
			10	2.5	GRAY SILTY FINE TO MEDIUM SAND, ORGANICS (FILL) (SM)
				3.0	
				4.5	TAN GRAY FINE SANDY MICACEOUS SILT (FILL) (ML)
			6	5.0	
				9.0	BROWN BLACK CLAYEY FINE TO MEDIUM SAND, ORGANICS (FILL) (SC)
			2	10.0	
				13.0	GRAY FINE TO MEDIUM SAND, ORGANICS (FILL) (SW)
				15.0	TAN GRAY FINE SANDY MICACEOUS SILT (ORIGINAL) (ML)
			46	15.0	
				19.0	BORING TERMINATED (AUGER REFUSAL IN ROCK)







**SOIL CLASSIFICATION**

Client: Baxter Evans & Company

January 12, 2004

Project: Summit at the Mall "Tract A" - Macon, GA

PT&E No.: 2003-124

Date Sampled: 12-15-03

Sampled From: B-7, 0'-4.5"

<b>(ASTM D 4318)</b>		
<b>Liquid Limit</b> 38	<b>Plastic Limit</b> 27	<b>Plastic Index</b> 11
<b>ASTM D 1140</b>		
<b>Percent Finer Than No. 200 Sieve</b> 40.9		
<b>ASTM D 2487</b>		
<b>Soil Classification Group Symbol</b> SM	<b>Soil Description</b> Silty Sand	

Remarks:

PRESTON TESTING & ENGINEERING CO., INC.



**FAMILY OF CURVES METHOD FOR DETERMINING  
MAXIMUM DENSITY OF SOILS**

CLIENT: Baxter Evans & Company

January 12, 2004

PROJECT: Summit at the Mall "Tract A"

PT&E NO.: 2003-124

SAMPLE DESCRIPTION: Tan Gray Silty Fine to Medium  
Sand

TEST SPEC.: ASTM D-698

MAXIMUM DRY DENSITY FROM FAMILY OF CURVES: 110.0

OPTIMUM MOISTURE CONTENT FROM FAMILY OF CURVES: 13.0

DATE SAMPLED: 12-15-03

SAMPLED FROM: Boring B-7, 0.'-4.5'

DATE TESTED: 12-19-03

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**ONE POINT PROCTOR RESULTS**

WET DENSITY: 121.4

MOISTURE CONTENT: 11.1

FAMILY OF CURVES USED: "B"

PRESTON TESTING & ENGINEERING CO., INC.

A handwritten signature in black ink, appearing to be a stylized name, is written over a horizontal line.

**SOIL FRACTIONS**

<u>Term</u>	<u>Size Range</u>
Cobbles	Above 3"
Gravel	
Coarse	3" to 3/4"
Fine	3/4" to No. 4 Sieve
Sand	
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines	
Clay-Silt	Below No. 200 sieve
Gravel - Naturally occurring aggregates	
Crushed Stone - Man-made aggregates such as crushed granite	

### SOIL FRACTIONS

<u>Term</u>	<u>Size Range</u>
Cobbles	Above 3"
Gravel	
Coarse	3" to 3/4"
Fine	3/4" to No. 4 Sieve
Sand	
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines	
Clay-Silt	Below No. 200 sieve

Gravel - Naturally occurring aggregates

Crushed Stone - Man-made aggregates such as crushed granite