N.C.G.S. Open File Report
80-4

CLAYS AND SHALES

OF THE

NORTH CAROLINA PIEDMONT

by

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Raleigh

1980

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Illustrations

ABSTRACT

North Carolina has led the nation in brick production since 1962, and 1979 preliminary figures indicate it has continued its lead with 14 percent of the total U.S. market by producing approximately 1.03 billion bricks valued at $103 million. The state and the U.S. Bureau of Mines established a cooperative program in 1963 to aid in the continuing development of brick capacity and diversity of clay products in North Carolina.

For this program, 380 clay and shale samples were collected from 48 counties in the Piedmont province. The Piedmont includes the state's two major brick producing areas, which are the Triassic basins and the Carolina Slate Belt. Also included are residual clays from miscellaneous rocks and selected sedimentary clays. As a background, 54 clay and shale samples were collected from 25 present or recent brick, pipe, or lightweight agregate producers which were active during the 1960's and 1970's.

A total of 326 clay and shale samples were also collected from new localities, of which 188 show potential value in structural clay product applications. These data are included in this open-file report which is placed in the Geological Survey Section Library.

INTRODUCTION

Traditionally, the bulk of North Carolina's mineral wealth has been in its non-metallic materials, of which clays and shales have been a major part. In 1962, North Carolina became the nation's leading brick producer, and in 1979 it manufactured approximately 1.03 billion bricks valued at $103 million for 14 percent of the total U.S. production.

To aid the producers in a continuing development of North Carolina's brick capacity and help provide for more diversity in the clay products industry, a cooperative program was established by the state and the U.S. Bureau of Mines in 1963. This program provides for the effective coordination of federal and state activities for promoting the exploration and evaluation of local clays and similar non-metallic raw materials for structural clay products and other uses.

On July 25, 1963, two boxes containing 47 clay samples were shipped by motor freight to the Norris Metallurgical Research Laboratory to initiate a long-term, cooperative clay and shale testing program between the U.S. Bureau of Mines and the North Carolina Department of Natural Resources and Community Development, Land Resources Division, Geological Survey Section (formerly the North Carolina Department of Conservation and Development, Division of Mineral Resources). Periodic renewal of this agreement has been made through Fiscal Year 1982.

Under this cooperative agreement, the Geological Survey Section is responsible for: 1) planning and conducting the field work; 2) correlating field, geological, and laboratory data; 3) sampling and delivering samples to a specified laboratory for appropriate pyro-chemical testing to determine the potential economic applications; and 4) publishing the findings of the program. The U.S. Bureau of Mines conducts or provides for testing and related evaluations. Reports of the program findings are reviewed and approved by the U.S. Bureau of Mines prior to publication.

Some clay and shale samples have been collected from all regions of North Carolina; however, this report covers only the Piedmont province. The Piedmont includes the state's two major brick producing areas, which are the Triassic basins and the Carolina Slate Belt. Also included are residual clays from miscellaneous rocks and selected sedimentary deposits. Samples for this report have been collected from 48 Piedmont counties.

Test data have been compiled on 380 clay and shale samples--90 clays and shales from the Triassic basins, 107 residual clays and shales from the Carolina Slate Belt, 145 residual clays from miscellaneous rocks, and 38 sedimentary clays. Of the 380 total samples, 326 are from new localities, of which 188 show a potential value in structural clay product applications.

To provide a background for comparison with materials presently or recently utilized, 54 samples were collected from the 25 producers who were active during the 1960's and 1970's. The terms present use or recent

use apply to the situation at the time the samples were collected. Potential uses indicated for the new localities are limited to the term "structural clay products" by nature of the scope of preliminary testing. To be more specific for potential uses, a more comprehensive testing program would need to be employed.

The clay and shale samples for this report are mostly materials from roadcuts and mines in the surficial weathered zone. Mining excavations generally extend from the surface down to 20- to 30-foot depths.

Samples from the current producers were taken from the ground and blended material from the brick plants' belts or stockpiles and occasionally from the raw materials in the mines. Samples of the recently used materials were collected from inactive or abandoned pits or stockpiles. New localities are predominantly roadcuts in different locations selected to provide samples of residual or sedimentary clays or shales fairly characteristic of the Triassic basins, the Carolina Slate Belt, and the miscellaneous rocks in various parts of the Piedmont as shown on the Geologic Map of North Carolina, 1958. Also, selected samples from Cretaceous and younger sedimentary clays have been included where they appear to have potential value and could be readily sampled.

Sample locations are shown on Plate I, Clays and Shales of the North Carolina Piedmont. This plate is the Piedmont portion of the 1972 revision of the U.S. Geological Survey 1:500,000 scale planimetric base map that was used for the Geologic Map of North Carolina, 1958. Plate I is a general map with overprinted sample sites and selected geologic contacts that should assist in making comparisons of samples with the local geology. This was a reconnaissance survey designed to sample roadcuts and readily available exposures that represent geologic formations and units shown on the state map. Further investigation of the potentials of similar geologic units in the general area are as important as specific sites which may become inaccessible because of limited access roads or local development. Having all the sites on one map should also be of considerable value in evaluating requirements for blending a variety of local clays and shales as well as for transportation of materials to regional industries and markets.

CAUTION: The information presented in this report is preliminary in nature and is not to be construed as an estimate of the size, quality, or value of any clay or shale deposit. Care was taken to make the material collected as representative as possible; however, usually only one sample was taken from most sites. Therefore, the data provided are not sufficient for plant or process design. As indicated earlier, the primary purpose of this report is to identify areas that may contain potential raw materials for the continuing expansion and diversity of North Carolina's clay products industries.

ACKNOWLEDGEMENTS

Grateful appreciation is extended to the many individuals and organizations who contributed information and assistance during the field investigations, laboratory determinations, and preparation of this report. Dr. Jasper L. Stuckey, former State Geologist (deceased August 1, 1979) initiated this cooperative program with the U.S. Bureau of Mines in 1963. The collection of many of the white clays from the Carolina Slate Belt and eastern Piedmont was performed or supervised by S. G. Conrad while he was Assistant State Geologist. After Conrad's appointment as State Geologist in 1964, he relinquished his active field participation; however, he continued his support and helpful suggestions on behalf of the project.

Several Geological Survey Section staff geologists have participated in the sample collection procedure. Along with their other field investigations, J. F. Conley and W. R. Hahman, former staff members, collected samples in various parts of the Piedmont in connection with their geologic mapping and metallogenic studies, respectively. W. F. Wilson cooperated with the State author in the collection of most of the Triassic clay and shale samples. B. J. McKenzie drafted the sample locality map and assisted in preparation of the final report. L. C. Bain edited and typed the first draft. P. F. Game and L. K. Marshall typed the final draft of the report. P. A. Carpenter, E. R. Burt, and R. D. McDaniel assisted in the proofing and review process.

Lawrence E. Shirley, formerly U.S. Bureau of Mines Physical Science Administrator and Liaison Officer for North Carolina and Virginia, provided essential continuing coordination between the state and federal agencies. Vital cooperative support was provided by Robert D. Thomson, Chief, Eastern Field Operation Center, U.S. Bureau of Mines, Pittsburgh, Pennsylvania. The U.S. Bureau of Mines Information Circular 8729, The Bureau of Mines Test Program for Clay and Ceramic Raw Materials, by K. J. Liles and H. Heystek, is a major source of information on the testing procedures and the criteria for the sample evaluations in this report.

Acknowledgement is made for the laboratory tests and evaluations of samples supervised by Marion V. Denny, Physical Research Scientist, U.S. Bureau of Mines, Norris, Tennessee; the late M. E. Tyrell, Physical Research Scientist, and H. Heystek, Supervisory Ceramic Engineer, U.S. Bureau of Mines, Tuscaloosa Research Center, University of Alabama; and Marjorie L. Dewey, Associate Director, Morse Laboratories, Sacramento, California.

Appendix I, Beneficiation of Chemical and Mineral Analysis of Five White Residual Clays, was prepared by Edwin H. Bentzen, III, formerly Mineral Dressing Engineer, North Carolina State University, Minerals Research Laboratory, Asheville, North Carolina, and now with the Colorado School of Mines.

SAMPLE DESCRIPTIONS, CHARACTERISTICS, AND EVALUATIONS

ALAMANCE COUNTY

Eight residual clay samples were collected from different selected locations in Alamance County. Laboratory tests provide comparative information on four samples presently used and indicate the potential uses of four other samples as follows:

Sample No.	Formation	Potential Use
1A - 1	Carolina Slate Belt	Present: Face-brick mixtures.
1A - 2	Carolina Slate Belt	Present: Face-brick mixtures.
1A - 3	Carolina Slate Belt	Present: Face-brick mixtures.
1A - 4	Carolina Slate Belt	Present: Face-brick mixtures.
1A - 5	Carolina Slate Belt	Marginal for structural clay products.
1A - 6	Carolina Slate Belt	Not suitable for structural clay products.
1A - 7	Granite	Structural clay products.
1A - 8	Diorite	Structural clay products.

ALAMANCE COUNTY

SAMPLE: 1A-1

Formation: Carolina Slate Belt, felsic volcanics, mafic volcanics, and mafic intrusive rock.

Location: Hanford Brick Co., Graham, on SW fringe of Graham on S side of Highway I-85 and 0.3 mi E of N.C. Highway 49 at intersection of SR 2303 and 2304.

Description: Sheltered stockpile.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 5 ft over 20-ft section along base of sheltered stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.1%; working properties-moderate plasticity; drying shrinkage-5.0%; dry strength-good; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	24.5	39.0	1.59
1900	Tan	2	5.0	23.1	37.7	1.63
2000	Light brown	3	7.5	17.7	31.5	1.78
2100	Medium brown	4	10.0	9.9	19.8	2.00
2200	Dark brown	5	12.5	3.3	7.2	2.18
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Present Use: Face-brick mixtures; blend of 1/3 each felsic, mafic, and intrusive residual clay being used for brick.

SAMPLE: 1A-2

Formation: Carolina Slate Belt, mafic instrusive rock

Location: Hanford Brick Co., Graham clay pit, 0.4 mi S of SR 2304 and 0.5 mi E of intersection of SR 2304 and N.C. Highway 49; 0.2 mi E of intersection of SR 2304 and 2303 at plant office.

Description: Granular dark-red clay pit, approximately 200 ft square, 4 ft deep on S side to 10 ft deep on N.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 5 ft over 30-ft section along base of 6-ft cut at S end of clay pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.1%; working properties-moderate plasticity; drying shrinkage-5.0%; dry strength-good; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	26.6	42.5	1.60
1900	Tan	2	7.5	26.3	42.1	1.60
2000	Tan	3	10.0	20.4	35.7	1.75
2100	Light brown	4	10.0	18.4	33.3	1.81
2200	Medium brown	5	12.5	16.3	30.5	1.87
2300	Red brown	6	15.0	13.6	26.5	1.95

Other Tests: Not effervescent with HCl.

Present Use: Face-brick mixtures; represents 1/3 of blended composite Hanford Brick Co. uses for manufacture of brick.

ALAMANCE COUNTY - Continued

SAMPLE: 1A-3

Formation: Carolina Slate Belt, mafic volcanics

Location: Hanford Brick Co. Mebane mine main clay pit, approximately 5 mi S of center of Mebane on W side of SR 2131, 1.1 mi S of intersection of SR 2131 and 2132; pit access road runs 0.1 mi W from SR 2131.

Description: Mafic volcanics exposed in 20-ft high working face approximately 300 ft long; approximately at midpoint of pit on second working level; attitude of cleavage-N 70° E, 72° NW.

Type Material: Residual clay
Color: Brown

Sampled Interval: Every 10 ft over 50-ft section at base of 20-ft high working face near middle of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.0%; working properties-moderate plasticity; drying shrinkage-2.5%; dry strength-fair; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	35.7	47.8	1.34
1900	Light brown	2	2.5	34.3	46.6	1.36
2000	Light brown	2	5.0	30.6	44.0	1.44
2100	Medium brown	3	7.5	23.0	37.0	1.61
2200	Dark brown	4	10.0	14.5	26.7	1.84
2300	Dark gray	5	15.0	1.8	4.0	2.26

Other Tests: Not effervescent with HCl.

Present Use: Face-brick mixture; represents 1/3 of blended composite Hanford Brick Co. uses for manufacture of brick.

SAMPLE: 1A-4

Formation: Carolina Slate Belt, felsic volcanics

Location: Hanford Brick Co. Mebane mine main clay pit, approximately 5 mi S of center of Mebane on W side of SR 2131, 1.1 mi S of intersection of SR 2131 and 2132; pit access road runs 0.1 mi W from SR 2131.

Description: Felsic volcanic outcrop exposed in 7- to 15-ft high pit faces mainly in NW end; tri-level bench operation, extends 0.25 mi NW-SE, ranges 300-400 ft wide; attitude of cleavage-N 70° E, 72° NW.

Type Material: Residual clay
Color: Tan

Sampled Interval: Every 5 ft over 15-ft section of 4-ft high pile of reserve material at extreme NW end of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-moderate plasticity; drying shrinkage-2.5%; dry strength-fair; pH-6.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	21.1	34.4	1.63
1900	Tan	2	2.5	20.8	34.1	1.64
2000	Light brown	3	5.0	17.3	29.9	1.73
2100	Medium brown	4	7.5	8.5	16.7	1.97
2200	Dark brown	5	10.0	2.8	5.9	2.11
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Present Use: Face-brick mixtures; represents 1/3 of blended composite Hanford Brick Co. uses for manufacture of brick.

ALAMANCE COUNTY - Continued

SAMPLE: 1A-5

Formation: Carolina Slate Belt, felsic volcanics

Location: Mandale site in SE corner of Alamance Co. in E side of intersection of N.C. Highway 87 and SR 2341 and 1.6 mi NW of N.C. Highway 87 and SR 2102 junction in Mandale.

Description: Gently sloping 3-ft high roadcut; attitude of saprolite cleavage- NE-trending.

Type Material: Residual clay

Color: Dark yellow

Sampled Interval: 4-ft long channel up middle of cut.

Unfired Properties: Water of plasticity-48%; dry shrinkage 7.5%; dry strength-good; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium tan	2	10.0	23.9	39.0	1.63
1900	Medium tan	4	12.5	21.2	35.0	1.65
2000	Yellow orange	6	15.0	18.4	32.8	1.78
2100	Dark tan	7	20.0	5.2	12.6	2.42
2200	Medium brown	7	20.0	5.2	12.6	2.42

Potential Use: Marginal for structural clay products; high shrinkage.

SAMPLE: 1A-6

Formation: Carolina Slate Belt, intermediate volcanics

Location: Snow Camp site in SW Alamance Co. on S side of SR 1005, 0.4 mi W of intersection of SR 1005 and 2371 just W of Snow Camp.

Description: 4- to 10-foot-high roadcut on S side of SR 1005; attitude of saprolite cleavage- NE-trending.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 10 ft over 50-ft section along middle level of cut, near center.

Unfired Properties: Water of plasticity-32%; drying shrinkage-5.0%; dry strength-fair; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium brown	1	5.0	32.5	46.5	1.39
1900	Medium brown	2	5.0	31.9	45.9	1.42
2000	Red brown	3	7.5	30.4	45.4	1.51
2100	Medium brown	4	10.0	30.4	45.3	1.53
2200	Orange brown	4	10.0	29.7	45.2	1.53

Potential Use: Not suitable for structural clay products; high absorption.

ALAMANCE COUNTY - Continued

SAMPLE: 1A-7

Formation: Granite

Location: Union Ridge East site in NE Alamance Co. 3.3 mi ESE of Union Ridge on E side of SR 1729 and S side of N.C. Highway 62.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-3.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	23.5	39.1	1.67
1900	Orange tan	3	5.0	22.4	37.7	1.68
2000	Tan	3	7.5	17.9	32.8	1.83
2100	Light brown	5	7.5	14.4	27.9	1.93
2200	Medium brown	5	10.0	13.8	26.7	1.93
2300	Dark brown	5	10.0	11.1	22.4	2.02

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 1A-8

Formation: Diorite

Location: Union Ridge North site in N-central Alamance Co. 2.5 mi N of center of Union Ridge on SW side of SR 1614 along SW-trending farm road, 200 ft W of SR 1613 intersection.

Description: Roadcut, 1 ft high, 100 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along E side of farm road.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.3%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange	3	7.5	18.5	33.8	1.83
1900	Orange	3	7.5	15.8	30.6	1.94
2000	Light brown	3	10.0	9.8	20.7	2.12
2100	Medium brown	5	12.5	9.2	19.6	2.14
2200	Dark brown	5	15.0	7.4	16.1	2.16
2300	Black	6	15.0	4.2	9.6	2.27

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

ALEXANDER COUNTY

Four residual clay samples were collected from different selected locations in Alexander County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
2A - 1	Hornblende gneiss	Not suitable for structural clay products.
2A - 2	Granite	Not suitable for structural clay products.
2A - 3	Mica gneiss	Not suitable for structural clay products.
2A - 4	Mica schist	Not suitable for structural clay products.

ALEXANDER COUNTY

SAMPLE: 2A-1

Formation: Hornblende gneiss

Location: Stony point site in E-central Alexander Co. 2.5 mi NNW of center of Stony Point on W side of SR 1456, 1.3 mi N of intersection with N.C. Highway 90 and Alexander Railway, 0.1 mi S of Wallace Creek bridge.

Description: Roadcut, irregular, 4-10 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.5%; working properties-short; drying shrinkage 5.0%; dry strength-poor; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Lt. brown	2	5.0	26.4	42.3	1.60
1900	Lt. brown	2	5.0	25.2	41.0	1.63
2000	Lt. brown	2	7.5	23.8	39.4	1.66
2100	Dark brown	2	7.5	20.9	37.9	1.74
2200	Dark brown	3	7.5	19.5	36.5	1.82
2300	Red brown	3	10.0	18.6	33.8	1.94

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 2A-2

Formation: Granite

Location: Hiddenite site in E-central Alexander Co. on E side of SR 1005, 0.7 mi S of Alexander Railway crossing, 0.6 mi S of intersection with N.C. Highway 90 in Hiddenite, and 200 ft S of SR 1641 intersection.

Description: Roadcut, 5 ft high on N end to 10 ft high on S end, 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.0%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	7.5	39.8	52.9	1.33
1900	Orange tan	2	10.0	38.5	51.7	1.33
2000	Orange tan	2	10.0	37.5	51.4	1.35
2100	Dark tan	2	10.0	31.6	50.7	1.50
2200	Dark tan	3	10.0	31.3	46.9	1.52
2300	Light red	3	10.0	30.9	46.9	1.52

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

ALEXANDER COUNTY - Continued

SAMPLE: 2A-3

Formation: Mica gneiss

Location: Hiddenite W site in E-central Alexander Co. 1.1 mi NW of Hiddenite on S side of SR 1498, 0.2 mi E of intersection with SR 1422 and 0.9 mi N of N.C. Highway 90 and Alexander Railway.

Description: Roadcut, 3-4 ft high, 300 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.3%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	33.0	49.3	1.49
1900	Orange tan	2	7.5	31.8	47.3	1.49
2000	Orange tan	3	10.0	24.5	40.9	1.67
2100	Orange tan	3	15.0	19.6	36.1	1.81
2200	Orange tan	3	15.0	19.3	35.6	1.87
2300	Red brown	3	15.0	16.7	35.3	2.12

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft; high shrinkage.

SAMPLE: 2A-4

Formation: Mica schist

Location: Taylorsville site in W-central Alexander Co. 4.8 mi W of Taylorsville on E side of N.C. Highway 127, immediately S of N.C. Highway 90 intersection.

Description: Roadcut, 15 ft high, 300 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.3%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	33.9	47.0	1.39
1900	Tan	2	5.0	32.2	46.3	1.44
2000	Tan	2	10.0	29.2	44.0	1.51
2100	Light brown	2	10.0	27.5	42.6	1.54
2200	Light brown	3	10.0	26.5	42.3	1.58
2300	Red brown	3	15.0	24.6	41.9	1.70

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft; high shrinkage.

ANSON COUNTY

A total of ten shale and residual clay samples were collected from different selected locations in Anson County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
4A - 1	Upper Triassic	Structural clay products.
4A - 2	Upper Triassic	Structural clay products.
4A - 3	Upper Triassic	Structural clay products.
4A - 4	Upper Triassic	Structural clay products.
4A - 5	Upper Triassic	Not suitable for structural clay products.
4A - 6	Upper Triassic	Structural clay products.
4A - 7	Carolina Slate Belt	Structural clay products.
4A - 8	Carolina Slate Belt	Structural clay products.
4A - 9	Granite	Structural clay products.
4A - 10	Mica gneiss	Not suitable for structural clay products.

ANSON COUNTY

SAMPLE: 4A-1

Formation: Upper Triassic, Newark Group

Location: Pee Dee River site, approximately 0.2 mi S of Pee Dee River bridge, 10 mi N of Wadesboro on N.C. Highway 109; crops out intermittently for 9 mi S.

Description: Red-brown shale in 300- to 350-ft long roadcut, 4-15 ft in height, attitude of bedding-NE, 25°SE.

Type Material: Shale

Color: Dark brown

Sampled Interval: Every 10 ft over 100-ft section along middle of cut which is approximately 300-350 ft in length.

Bloating Test: Negative

Unfired Properties: Working properties-plastic; water of plasticity-36.7%; drying shrinkage-5.0%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	7.5	15.5	28.7	1.85
1900	Tan	4	10.0	12.5	24.0	1.92
2000	Brown	5	15.0	2.3	5.4	2.32
2100	Chocolate	5	15.0	0.6	1.4	2.40
2200	---	---	(Expanded)			
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 1900°F); high shrinkage above 1900°F.

SAMPLE: 4A-2

Formation: Upper Triassic, Newark Group

Location: Wadesboro site on N.C. Highway 109, 1 mi N of Wadesboro city limit at SR 1715 intersection.

Description: Red-brown shale on W side of road in 5-ft high roadcut, approximately 400 ft long, attitude of bedding-NE, 20°-30°SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft along 200-ft section at base of roadcut.

Bloating Test: Negative

Unfired Properties: Working properties-plastic; water of plasticity-36.7%; drying shrinkage-5.0%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	3	5.0	23.6	37.2	1.58
1900	Reddish tan	3	5.0	23.0	36.3	1.58
2000	Light brown	4	10.0	16.3	28.5	1.75
2100	Brown	5	12.5	12.4	23.2	1.87
2200	Dark brown	5	15.0	7.1	14.5	2.04
2300	Very dk. brown	6	15.0	3.4	7.4	2.18

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); high shrinkage above 2100°F.

ANSON COUNTY - Continued

SAMPLE: 4A-3

Formation: Upper Triassic, Newark Group

Location: Polkton site on U.S. Highway 74, 0.4 mi E of SR 1420 intersection near Pinch Gut Creek 2 mi E of Polkton city limit.

Description: Red-brown shale in 3- to 5-ft high roadcut, approximately 400 ft in length, attitude of bedding-NE, 20°SE.

Type Material: Shale

Color: Chocolate

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Working properties-plastic; water of plasticity-27.0%; drying shrinkage-4.0%; dry strength-good; pH 4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	18.6	32.7	1.75
1900	Tan	3	5.0	16.8	29.8	1.78
2000	Light brown	4	10.0	8.9	18.2	2.04
2100	Brown	5	12.5	6.1	13.1	2.15
2200	Dark brown	6	12.5	1.5	3.4	2.27
2300	Very dk. brown	6	12.5	1.1	2.5	2.30

Potential Use: Structural clay products (e.g., building brick, floor brick at 2000°F-2300°F); slightly high shrinkage above 2000°F.

SAMPLE: 4A-4

Formation: Upper Triassic, Newark Group

Location: White Store site on SR 1228, 0.4 mi NE of intersection with SR 1224, 1.6 mi NE of White Store in SW Anson Co.

Description: Red-brown shale in 4- to 8-ft high gently inclined roadcut approximately 500 ft long, attitude of bedding-NE 15°-20°SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Working properties-plastic; water of plasticity-30.0%; drying shrinkage-5.0%; drying strength-good; pH-6.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	5.0	20.1	33.9	1.69
1900	Light brown	3	5.0	17.9	30.9	1.73
2000	Chocolate	4	12.5	6.8	14.2	2.09
2100	Very dk. brown	6	15.0	3.0	6.6	2.21
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); high shrinkage.

ANSON COUNTY - Continued

SAMPLE: 4A-5

Formation: Upper Triassic, Newark Group

Location: Long Pine site located on SR 1220, 0.3 mi W of intersection with SR 1217, 1.75 mi W of Long Pine in SW corner of Anson Co.

Description: Red-brown shale in 2- to 5-ft high roadcut, approximately 500 ft long, attitude of bedding-N 50°E, 25°SE.

Type Material: Shale

Color: Light red

Sampled Interval: Every 10 ft over 100-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Long working, smooth, plastic; water of plasticity-21.6%; drying shrinkage-5.0%; dry strength-fair; drying characteristics-fair, slight warping, cracks; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	15.0	11.4	21.9	1.92
1900	Tan	3	15.0	9.0	17.9	1.99
2000	Chocolate	5	20.0	4.4	9.5	2.16
2100	Brown	5	20.0	4.4	9.5	2.16
2200	---	---	(Expanded)			
2300	---					

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 4A-6

Formation: Upper Triassic, Newark Group

Location: SR 1225 site on SR 1225, approximately 1.2 mi S of intersection with SR 1224, 2.5 mi W of Long Pine in SW corner or Anson Co.

Description: Red-brown shale in 250- to 300-ft long roadcut, 15-18 ft high, attitude of bedding-N 50°E, 25°SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Long working, smooth, plastic; water of plasticity-23.0%; drying shrinkage-5.0%; dry strength-good; drying characteristics-good, slight scum; pH-7.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	5.0	17.1	31.2	1.82
1900	Light brown	3	5.0	14.1	26.6	1.89
2000	Chocolate	4	10.0	4.0	9.0	2.25
2100	---	---	(Melted)			
2200	---					
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°F); short firing range.

ANSON COUNTY - Continued

SAMPLE: 4A-7

Formation: Carolina Slate Belt, argillite

Location: Lowrys site in SW Anson Co. on S side of SR 1003, 0.6 mi W of N.C. Highway 109 junction at Lowrys.

Description: Roadcut 9 ft high and 300 ft long just E of Jonesboro Fault; attitude of cleavage-NE-trending.

Type Material: Residual clay

Color: Medium yellow

Sampled Interval: Random samples from middle section of cut.

Unfired Properties: Water of plasticity-25.3%; working properties-plastic; drying shrinkage 2.5%; dry strength-good; pH-8.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Light buff	2	2.5	24.8	38.9	1.57
2000	Buff	3	5.0	21.6	36.7	1.69
2100	Orange brown	5	7.5	18.4	32.8	1.78
2200	Lt. red brown	7+	10.0	12.1	23.2	1.92
2300	Medium red brown	7+	12.5	7.2	15.1	2.10

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 4A-8

Formation: Carolina Slate Belt, argillite

Location: Ansonville site in NW Anson Co. on E side of U.S. Highway 52, 0.9 mi N of SR 1632 junction in N edge of Ansonville.

Description: Roadcut 3 ft high and 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Orange

Sampled Interval: Every 20 ft along 100-ft section at S end of cut.

Unfired Properties: Water of plasticity-30.8%; working properties-plastic; dry shrinkage-5.0%; dry strength-good; pH-7.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	3	7.5	24.8	40.2	1.62
2000	Buff	3	7.5	20.6	35.0	1.70
2100	Orange brown	5	10.0	16.9	30.9	1.83
2200	Lt. red brown	7+	15.0	9.2	18.9	2.05
2300	Brown red	7+	15.0	6.1	13.5	2.22

Potential Use: Structural clay products (e.g., building brick at 2100°F); high shrinkage above 2100°F.

ANSON COUNTY - Continued

SAMPLE: 4A-9

Formation: Granite

Location: Lilesville site in E-central Anson Co. 6 mi ESE of center of Lilesville on E side of N.C. Highway 145 and N side of Seaboard Coast Line Railway at W edge of Pee Dee community and 0.6 mi S of U.S. Highway 74.

Description: Roadcut 10 ft high and 400 ft long.

Type Material: Residual clay

Color: Light greenish gray

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.2%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	24.2	39.2	1.62
1900	Tan	3	7.5	23.2	37.7	1.62
2000	Tan	3	10.0	20.2	34.2	1.70
2100	Light brown	3	10.0	18.8	32.9	1.75
2200	Light brown	3	10.0	15.2	30.2	1.81
2300	Red brown	4	10.0	15.2	27.5	1.98

Other Tests & Remarks: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

SAMPLE: 4A-10

Formation: Mica gneiss

Location: Morven site in SE Anson Co. 5.2 mi NE of Morven on W side of N.C. Highway 145, 0.25 mi S of SR 1806 intersection.

Description: Roadcut 8 ft high and 300 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along S end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.0%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-6.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	10.0	33.6	48.1	1.43
1900	Orange tan	2	10.0	33.6	48.0	1.43
2000	Orange tan	2	10.0	29.5	44.4	1.50
2100	Light brown	3	10.0	29.4	44.3	1.51
2200	Light brown	3	12.5	26.4	40.9	1.55
2300	---	---	(Expanded)			

Other Tests & Remarks: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high aborption.

BURKE COUNTY

Seven residual clay samples and one sedimentary clay sample were collected from different selected locations in Burke County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
12B - 1	Mica gneiss	Not suitable for structural clay products.
12B - 2	Mica schist	Not suitable for structural clay products.
12B - 3	Granite	Structural clay products.
12B - 4	Granite gneiss complex	Not suitable for structural clay products.
12B - 5	Cranberry gneiss	Structural clay products.
12B - 6	Unicoi Formation	Not suitable for structural clay products.
12B - 7	Erwin Formation	Not suitable for structural clay products.
12B - 8	Alluvial terrace overlying mica gneiss	Structural clay products.

BURKE COUNTY

SAMPLE: 12B-1

Formation: Mica gneiss

Location: Hildebran site in E-central Burke Co. 1.1 mi W of the center of Hildebran along the N side of the Southern Railway immediately W of the SR 1627 crossing and 300 ft N of U.S. Highway 64-70.

Description: Railway cut 6 ft high and 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along E end of railway cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.5%; working properties-short; drying shrinkage-5.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	23.2	38.8	1.67
1900	Tan	3	5.0	21.7	36.9	1.70
2000	Orange tan	3	7.5	19.0	33.8	1.78
2100	Orange tan	3	10.0	18.5	33.3	1.80
2200	Light brown	3	10.0	17.6	32.8	1.81
2300	Red brown	3	10.0	16.2	30.0	1.85

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 12B-2

Formation: Mica schist

Location: Valdese site in E-central Burke Co. on S side of U.S. Highway 64-70, 1 mi W of center of Valdese, 0.1 mi W of SR 1550 intersection and 0.2 mi N of Southern Railway.

Description: Roadcut, ranges from 5 to 10 ft high, 0.2 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.0%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	31.7	47.0	1.48
1900	Orange tan	3	5.0	29.8	45.7	1.53
2000	Orange tan	3	7.5	28.0	44.0	1.57
2100	Orange tan	3	7.5	26.8	42.9	1.60
2200	Light brown	3	10.0	22.7	40.9	1.73
2300	Red brown	3	10.0	21.8	39.2	1.88

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

BURKE COUNTY- Continued

SAMPLE: 12B-3

Formation: Granite

Location: Enola site in S-central Burke Co. 4 mi SW of the center of Enola on the E side of SR 1918, 2.6 mi SW of the intersection with SR 1919 and 0.2 mi S of Bethlehem Baptist Churc

Description: Roadcut, 10 ft high and 300 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.0%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	32.5	47.6	1.46
1900	Orange tan	3	5.0	30.8	45.1	1.46
2000	Orange tan	3	7.5	27.0	41.8	1.54
2100	Orange tan	3	7.5	26.1	40.8	1.57
2200	Light brown	3	7.5	22.2	37.5	1.69
2300	Red brown	4	10.0	21.3	36.1	1.69

Other Tests: Not effervescent with HCl.

Potential Use: Suitable for structural clay products (e.g., building brick at 2300°F).

SAMPLE: 12B-4

Formation: Granite gneiss complex

Location: Morganton South site in central Burke Co. 2.6 mi SW of the center of Morganton on the N side of SR 1102, 0.3 mi W of the intersection with SR 1107 and 0.6 mi S of Southern Railway.

Description: Roadcut, 3 ft high and 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	10.0	29.7	46.2	1.55
1900	Orange tan	3	10.0	28.0	44.1	1.57
2000	Orange tan	3	15.0	23.8	39.3	1.66
2100	Light brown	3	15.0	19.4	35.1	1.81
2200	Light brown	4	15.0	16.2	30.8	1.90
2300	Red brown	5	20.0	13.6	27.5	2.02

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

BURKE COUNTY - Continued

SAMPLE: 12B-5

Formation: Cranberry gneiss

Location: Oak Hill North site in NW Burke Co. on W side of N.C. Highway 181, 1 mi NW of intersection with SR 1405 and 6.7 mi NNW of center of Oak Hill (straight line).

Description: Roadcut, 30 ft high and 250 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 10 ft over 30-ft section along S end of roadcut (remainder of cut is weathered rock).

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.5%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	25.8	40.7	1.58
1900	Tan	3	5.0	23.8	38.8	1.63
2000	Orange tan	3	10.0	20.2	34.6	1.72
2100	Orange tan	4	10.0	17.3	31.0	1.79
2200	Light red	5	10.0	13.4	28.8	2.06
2300	Dark red	6	12.5	10.0	20.6	2.15

Other Tests: Not effervescent with HCl.

Potential Use: Suitable for structural clay products (e.g., building brick at 2100°F-2300°F); slightly high shrinkage.

SAMPLE: 12B-6

Formation: Unicoi Formation

Location: Jonas Ridge SE site in NW corner of Burke Co. on the SE corner of the intersection of N.C. Highway 181 and Sr 1264, 1.6 mi (straight line) SE of the center of Jonas Ridge.

Description: Roadcut, 15 ft high and 250 ft long.

Type Material: Residual clay

Color: Cream

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-18.2%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

BURKE COUNTY - Continued

SAMPLE: 12B-7

Formation: Erwin Formation

Location: Jonas Ridge site in NW tip of Burke Co. 1 mi W of the center of Jonas Ridge on the S side of SR 1267, 0.1 mi E of intersection with N.C. Highway 183.

Description: Roadcut, 5 ft high and 0.1 mi long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 10 ft over 30-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-16.0%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 12B-8

Formation: Alluvial terrace overlying mica gneiss

Location: Glen Alpine W site in W-central Burke Co. 5 mi W of the center of Glen Alpine on the W side of SR 1233 and S side of Southern Railway crossing and Catawba River at Bridgewater siding, 0.4 mi N of U.S. Highway 70 intersection.

Description: Excavated bench cut, 20-ft high bank, 250 ft long.

Type Material: Sedimentary clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along N end of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	7.5	28.1	44.4	1.58
1900	Orange tan	3	10.0	26.3	41.7	1.58
2000	Orange tan	3	12.5	20.0	35.4	1.77
2100	Light brown	4	12.5	17.1	31.1	1.82
2200	Light brown	4	15.0	14.8	28.8	1.82
2300	Red brown	5	15.0	14.4	26.2	1.95

Other Tests: Not effervescent with HCl.

Potential Use: Suitable for structural clay products (e.g., building brick at 2100°-2300°F); slightly high shrinkage at 2100°F.

CABARRUS COUNTY

Six residual clay samples and one argillite sample were collected from different selected locations in Cabarrus County. Laboratory tests indicate potential uses for five clay samples and provide comparative information on a clay sample and the sample of argillite that are presently being used as follows:

Sample No.	Formation	Potential Use
13C - 1	Carolina Slate Belt	Present: Nonplastic component in face brick mixtures.
13C - 2	Carolina Slate Belt	Not suitable for structural clay products.
13C - 3	Carolina Slate Belt	Structural clay products.
13C - 4	Carolina Slate Belt (Argillite)	Present: Lightweight aggregate.
13C - 5	Granite	Structural clay products.
13C - 6	Syenite	Structural clay products.
13C - 7	Diorite-gabbro	Not suitable for structural clay products.

CABARRUS COUNTY

SAMPLE: 13C-1

Formation: Carolina Slate Belt, argillite

Location: Isenhour Brick & Tile Co., Hammill clay mine, on SW corner of intersection of SR 2416 and 2442, 3 mi SW of Gold Hill.

Description: Bench type pit measures 500 ft by 500 ft and floor is about 30 ft below original surface.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 5 ft over 50-ft width of 200-ft long by 20-ft high layered stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.0%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Present Use: Nonplastic component in face-brick mixtures; 60% of this material was blended with 40% residual red plastic clay at Salisbury for finished brick.

SAMPLE: 13C-2

Formation: Carolina Slate Belt, mafic volcanics

Location: Mount Pleasant site in NE Cabarrus Co. on N side of N.C. Highway 49, 0.6 mi E of SR 1006 junction in Mount Pleasant.

Description: Excavation, 6-10 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Buff

Sampled Interval: Random sample along face of cut.

Unfired Properties: Water of plasticity-38.1%; working properties-plastics; drying shrinkage-5.0%; dry strength-good; pH-7.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Lt. orange brown	1	7.5	30.8	46.2	1.50
2000	Orange brown	2	7.5	27.9	43.8	1.57
2100	Lt. orange brown	3	7.5	27.4	43.3	1.58
2200	Orange brown	5	10.0	23.5	39.2	1.67
2300	Lt. red brown	6	12.5	22.4	38.3	1.71

Potential Use: Not suitable for structural clay products; high absorption.

CABARRUS COUNTY - Continued

SAMPLE: 13C-3

Formation: Carolina Slate Belt, argillite

Location: Georgeville site in SE Cabarrus Co. 1 mi W of Georgeville on E side of SR 1006, 0.2 mi S of N.C. Highway 200 junction.

Description: Roadcut, 8 ft high, 150 ft long; attitude of cleavage- NE-trending, near vertical.

Type Material: Residual clay

Color: Buff

Sampled Interval: Random sample from S end of cut.

Unfired Properties: Water of plasticity-35.8%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-6.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Orange brown	1	2.5	34.7	52.1	1.50
2000	Buff	2	5.0	28.1	44.1	1.51
2100	Lt. orange brown	3	5.0	28.1	42.4	1.57
2200	Orange brown	5	7.5	20.5	34.6	1.69
2300	Red brown	6.5	10.0	18.6	32.7	1.76

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 13C-4

Formation: Carolina Slate Belt, argillite

Location: Carolina Stalite Co. in SE corner of Rowan Co. at the S edge of Gold Hill, 0.1 mi S of SR 1221 and 0.6 mi W of its intersection with U.S. Highway 52; mine is Young Stone Co.'s Gold Hill quarry just SW of the Stalite plant in the edge of Cabarrus Co.

Description: Delivery belt to Stalite plant.

Type Material: Argillite

Color: Gray

Sampled Interval: Every 10 seconds for 1 minute from delivery belt.

Bloating Test: Positive

Unfired Properties: Water of plasticity-19.9%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	0.0	19.6	34.4	1.75
1900	Light brown	3	0.0	17.1	31.1	1.82
2000	Brown	3	2.5	7.2	15.7	2.19
2100	---	---	(Expanded)			

Preliminary Bloating Test: Crushing characteristics-angular; particle size-3/4 inch lumps; retention time-15 minutes.

T °F	Absorption %	Bulk Density gm/cc	Bulk Density Lb/ft^3	Remarks
1900	2.9	2.22	138.5	No expansion
2000	4.2	1.41	88.0	Good pore structure
2100	4.8	.90	56.2	Good pore structure
2200	2.7	.91	56.8	Many large pores, sticky

Other Tests: Not effervescent with HCl.

Present Use: Lightweight aggregate.

CABARRUS COUNTY - Continued

SAMPLE: 13C-5

Formation: Granite

Location: Kannapolis site in NW Cabarrus Co. 4.5 mi SW of center of Kannapolis on E side of SR 1621, 150 ft S of intersection with SR 1622.

Description: Roadcut, 3 ft high and 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.5%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	10.0	30.9	46.0	1.49
1900	Orange tan	3	10.0	30.5	46.0	1.51
2000	Orange tan	3	12.5	21.6	37.5	1.73
2100	Orange tan	4	15.0	16.1	30.6	1.90
2200	Light brown	5	17.5	13.9	26.5	1.90
2300	Red brown	5	20.0	11.5	24.4	2.13

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°F); high shrinkage.

SAMPLE: 13C-6

Formation: Syenite

Location: Concord site in central Cabarrus Co. 4 mi SSW of center of Concord on S side of N.C. Highway 49, 0.5 mi SW of SR 1139 intersection and 0.8 mi W of Southern Railway.

Description: Roadcut, 10 ft high and 0.1 mi long.

Type Material: Residual clay

Color: Dark brown

Sampled Interval: Every 20 ft over 100-ft section along NE end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	18.1	33.3	1.84
1900	Orange tan	3	5.0	15.6	29.7	1.91
2000	Light brown	4	7.5	11.9	23.9	2.01
2100	Light brown	5	10.0	10.9	22.4	2.04
2200	Red brown	6	10.0	6.5	13.4	2.07
2300	Red brown	6	12.5	5.0	11.3	2.26

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick, floor brick at 2000°-2300°F).

CABARRUS COUNTY - Continued

SAMPLE: 13C-7

Formation: Diorite-gabbro

Location: Harrisburg site in SW Cabarrus Co. 1.3 mi E of center of Harrisburg on E side of SR 1158, 1.6 mi S of intersection with N.C. Highway 49 and 0.9 mi S of Rocky River bridge.

Description: Roadcut, 2 ft high and 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.3%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	10.0	24.2	40.7	1.68
1900	Orange tan	3	15.0	24.0	40.3	1.69
2000	Orange tan	4	15.0	15.8	30.8	1.94
2100	Light brown	5	20.0	10.1	21.7	2.15
2200	---	---	(Expanded)			
2300	---	---	---			

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

CALDWELL COUNTY

Six residual clay samples were collected from different selected locations in Caldwell County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
14C - 1	Granite	Not suitable for structural clay products.
14C - 2	Hornblende gneiss	Not suitable for structural clay products.
14C - 3	Mica gneiss	Not suitable for structural clay products.
14C - 4	Mica schist	Not suitable for structural clay products.
14C - 5	Cranberry gneiss	Structural clay products.
14C - 6	Blowing Rock gneiss	Structural clay products.

CALDWELL COUNTY

SAMPLE: 14C-1

Formation: Granite

Location: Kings Creek site in NE Caldwell Co. on S side of N.C. Highway 18, 1 mi SW of SR 1552 intersection in Kings Creek.

Description: Roadcut, 9 ft high and 0.1 mi long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.3%; working properties-short; drying shrinkage-2.5%; dry strength-fair; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	34.8	48.8	1.40
1900	Orange tan	2	7.5	32.8	46.3	1.41
2000	Orange tan	2	10.0	30.4	44.2	1.45
2100	Light brown	2	10.0	29.8	44.1	1.50
2200	Light brown	2	10.0	26.3	42.3	1.61
2300	Red brown	3	12.5	25.1	40.7	1.62

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 14C-2

Formation: Hornblende gneiss

Location: Kings Creek North site in NE Caldwell Co. on E side of SR 1552, 1.4 mi N of intersection with N.C. Highway 18 in Kings Creek and 0.2 mi N of SR 1551 intersection.

Description: Roadcut, 15 ft high and 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

CALDWELL COUNTY - Continued

SAMPLE: 14C-3

Formation: Mica gneiss

Location: Granite Falls site in SE corner of Caldwell Co. 1.4 mi SE of the center of Granite Falls at SW end of SR 1101, 0.4 mi SW of intersection with U.S. Highway 321-A and 0.1 mi E of Carolina & Northern Railway.

Description: Borrow pit, 6 ft deep and 50 ft by 100 ft in diameter.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 10 ft over 50-ft section along E face of borrow pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.9%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	33.0	47.8	1.45
1900	Orange tan	2	7.5	32.0	46.4	1.45
2000	Orange tan	3	10.0	27.0	42.4	1.56
2100	Orange tan	3	12.5	23.8	38.7	1.63
2200	Light brown	3	12.5	21.0	36.5	1.74
2300	Red brown	3	15.0	20.6	36.2	1.76

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 14C-4

Formation: Mica schist

Location: Saw Mills site in SE Caldwell Co. 1 mi NW of the center of Saw Mills on the NW end of SR 1119, 0.5 mi NW of its intersection with SR 1130 in Saw Mills and 0.1 mi W of Carolina & Northwestern Railway.

Description: Roadcut, 3 ft high and 150 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.2%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	0.0	34.7	48.8	1.41
1900	Orange tan	2	5.0	32.5	46.6	1.43
2000	Orange tan	2	7.5	30.4	44.9	1.47
2100	Orange tan	2	7.5	28.8	42.5	1.48
2200	Light red	2	10.0	27.9	41.9	1.50
2300	Dark red	2	10.0	25.2	39.1	1.55

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

CALDWELL COUNTY - Continued

SAMPLE: 14C-5

Formation: Cranberry gneiss

Location: Collettsville site in W-central Caldwell Co. on W side of N.C. Highway 90, 1.2 mi W of SR 1337 intersection in Collettsville and 0.3 mi N of SR 1356's southern intersection.

Description: Roadcut, 15 ft high and 350 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.5%; working properties-plastics; drying shrinkage-5.0%; dry strength-good; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	28.0	42.2	1.51
1900	Tan	3	5.0	27.3	42.2	1.54
2000	Light brown	3	5.0	22.0	36.5	1.66
2100	Light brown	3	7.5	20.5	34.7	1.69
2200	Dark red	5	10.0	17.4	30.9	1.78
2300	Dark brown	6	10.0	13.8	26.5	1.91

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 14C-6

Formation: Blowing Rock gneiss

Location: Globe site in NW Caldwell Co. on NW side of SR 1367, 0.6 mi NE of intersection with SR 1362 in Globe.

Description: Roadcut, 10 ft high and 200 ft long.

Type Material: Residual clay

Color: Dark brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.4%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	25.6	41.0	1.60
1900	Orange tan	3	5.0	22.7	37.7	1.66
2000	Light brown	3	7.5	18.0	32.4	1.80
2100	Light brown	3	10.0	15.1	28.4	1.83
2200	Light red	3	10.0	14.8	27.1	1.88
2300	Dark red	4	12.5	12.4	25.0	2.02

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F); slightly high shrinkage.

CASWELL COUNTY

Nine residual clay samples were collected from different selected locations in Caswell County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
17C - 1	Carolina Slate Belt	Not suitable for structural clay products.
17C - 2	Carolina Slate Belt	Not suitable for structural clay products.
17C - 3	Mica gneiss	Marginal for structural clay products.
17C - 4	Gabbro	Marginal for structural clay products.
17C - 5	Ultramafic	Marginal for structural clay products.
17C - 6	Granite	Not suitable for structural clay products.
17C - 7	Diorite	Structural clay products.
17C - 8	Mica schist	Structural clay products.
17C - 9	Mica gneiss	Structural clay products.

CASWELL COUNTY

SAMPLE: 17C-1

Formation: Carolina Slate Belt, intermediate volcanics

Location: Frogsboro site in E-central Caswell Co. 1 mi NE of Frogsboro on E side of SR 1702.

Description: Roadcut, 2 ft high, 0.1 mi long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 5 ft over 30-ft section near center of cut.

Unfired Properties: Water of plasticity-44%; drying shrinkage-7.5%; dry strength-good; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange brown	6.5	15.0	14.7	28.5	1.94
1900	---					
2000	Dark brown	7+	20.0	9.2	20.0	2.17
2100	Dark brown	7+	22.5	4.3	11.4	2.65

Remarks: Test tile #2 blew at 1900°F. The texture of this clay is so fine that an exceptionally slow firing was required to keep it from blowing up.

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 17C-2

Formation: Carolina Slate Belt, intermediate volcanics

Location: Topnot site in E-central Caswell Co. on W side of N.C. Highway 86, 1.5 mi S of Topnot and 0.2 mi N of SR 1730.

Description: Ditch along W side of road; attitude of cleavage- NE-trending, near vertical.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 5 ft over 20-ft section in road ditch.

Unfired Properties: Water of plasticity-42%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown orange	2	12.5	32.3	48.5	1.50
1900	Dark tan	3	12.5	28.0	42.3	1.51
2000	Dark tan	4	15.0	25.0	41.3	1.65
2100	Medium tan	5	15.0	20.8	38.1	1.83
2200	Gray red	6.5	17.5	19.6	35.9	1.83

Potential Use: Not suitable for structural clay products; high shrinkage at maturity.

CASWELL COUNTY - Continued

SAMPLE: 17C-3

Formation: Mica gneiss

Location: Red House site in NE Caswell Co. on N side of SR 1558, 2.65 mi W of its intersection with N.C. Highway 119 in Red House.

Description: Roadcut, 200 ft long, 2 ft high.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along face of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.6%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown	3	2.5	20.4	35.8	1.75
1900	Brown	3	2.5	19.9	35.4	1.77
2000	Brown	3	2.5	19.5	34.5	1.78
2100	Dark brown	5	2.5	14.6	28.0	1.92
2200	Brown-black	8	5.0	2.8	6.2	2.22
2300	---	---	(Melted)			

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°F); short firing range.

SAMPLE: 17C-4

Formation: Gabbro

Location: Leasburg site in E-central Caswell Co. on E side of SR 1561, 1 mi N of its intersection with U.S. Highway 158 in Leasburg.

Description: Roadcut, 200 ft long, 1 to 2 ft high.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.5%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown	3	2.5	20.3	36.8	1.82
1900	Brown	3	2.5	20.0	36.5	1.82
2000	Brown	3	2.5	19.6	36.0	1.84
2100	Dark brown	5	5.0	13.8	27.5	2.00
2200	Brown-black	8	5.0	2.9	6.3	2.17
2300	---	---	(Melted)			

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°F); short firing range.

CASWELL COUNTY - Continued

SAMPLE: 17C-5

Formation: Ultramafic

Location: Frogsboro SW site in SE Caswell Co. on N side of SR 1712, 0.5 mi SW of intersection with SR 1702 in Frogsboro.

Description: Field and rock outcrop 20 ft long and 1 ft high.

Type Material: Residual soil

Color: Brown

Sampled Interval: Three test holes 10 ft apart, 1 ft deep adjacent to rock outcrop.

Bloating Test: Negative

Unfired Properties: Water of plasticity-17.5%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown	3	0.0	22.5	38.6	1.72
1900	Brown	3	0.0	21.7	37.9	1.75
2000	Brown	3	0.0	20.1	35.6	1.77
2100	Dark brown	5	2.5	10.9	22.7	2.07
2200	---	---	(Melted)			
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°F); very short firing range.

SAMPLE: 17C-6

Formation: Granite

Location: Ridgeville site in SE corner of Caswell Co., 1.3 mi S of Ridgeville on NW corner of intersection of SR 1702 with SR 1722.

Description: Roadcut, 200 ft long, 3 ft high.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut on SR 1722.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.2%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-3.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	23.1	38.4	1.66
1900	Tan	3	0.0	22.6	37.5	1.66
2000	Tan	3	0.0	21.8	36.7	1.68
2100	Tan	3	2.5	19.1	33.8	1.76
2200	Light brown	3	2.5	18.2	32.1	1.77
2300	Gray	3	5.0	17.2	31.2	1.78

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 17C-7

Formation: Diorite

Location: Fitch site in S-central Caswell Co. on W side of SR 1156, 0.8 mi S of Fitch and 0.2 mi N of N.C. Highway 62.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 feet over 100-ft section along N end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.6%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	16.9	30.6	1.79
1900	Orange tan	3	2.5	16.7	29.8	1.81
2000	Light brown	3	5.0	15.0	27.5	1.84
2100	Light brown	5	5.0	14.0	26.3	1.86
2200	Dark brown	6	7.5	6.1	12.5	2.06
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

SAMPLE: 17C-8

Formation: Mica schist

Location: Cherry Grove site in SW Caswell Co. on S side of SR 1133, 0.2 mi W of SR 1128 intersection and 1.2 mi E of SR 1129 intersection at Cherry Grove.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.8%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	24.0	40.0	1.67
1900	Orange tan	3	5.0	23.6	39.5	1.67
2000	Light brown	3	7.5	20.2	35.6	1.77
2100	Light brown	5	10.0	17.8	32.9	1.84
2200	Dark brown	5	10.0	17.6	32.4	1.84
2300	Dark red	5	12.5	15.4	29.2	1.89

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

CASWELL COUNTY - Continued

SAMPLE: 17C-9

Formation: Mica gneiss

Location: Pelham site in NW corner of Caswell Co. on S side of SR 1341, 0.8 mi SE from SR 1353 intersection on S side of Pelham.

Description: Roadcut, 3 ft high, 250 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.9%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	7.5	31.1	45.8	1.47
1900	Orange tan	3	7.5	29.9	44.4	1.49
2000	Light brown	5	7.5	19.8	34.4	1.74
2100	Light brown	5	15.0	15.9	29.3	1.84
2200	Dark brown	5	15.0	13.6	26.4	1.94
2300	Dark red	6	17.5	10.7	21.6	2.02

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F); high shrinkage above 2000°F.

CATAWBA COUNTY

One sedimentary clay sample and four residual clay samples were collected from different selected locations in Catawba County. Laboratory tests provide comparative information for the sedimentary clay presently used and indicate the potential uses of the four residual clay as follows:

Sample No.	Formation	Potential Use
18C - 1	Catawba River floodplain clay	Present: Brick component.
18C - 2	Granite	Structural clay products.
18C - 3	Kings Mountain Group	Not suitable for structural clay products.
18C - 4	Hornblende gneiss	Not suitable for structural clay products.
18C - 5	Mica gneiss	Not suitable for structural clay products.

CATAWBA COUNTY

SAMPLE: 18C-1

Formation: Catawba River floodplain clay

Location: Statesville Brick Co., Mackie Tract mine in E-central Catawba Co. on W bank of Catawba River 0.3 mi S of U.S. Highway 64-70 bridge.

Description: Stockpile at plant.

Type Material: Sedimentary clay

Color: Tan

Sampled Interval: Random sample along face of stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.4%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	0.0	21.4	36.5	1.71
1900	Light brown	3	0.0	20.4	35.4	1.73
2000	Brown	4	2.5	16.8	30.8	1.83
2100	Brown	6	5.0	12.2	23.7	1.93
2200	Dark brown	6	7.5	6.2	13.0	2.04
2300	Dark gray	6.5	7.5	2.8	5.8	2.12

Other Tests: Not effervescent with HCl.

Present Use: Structural clay products (e.g., building brick, floor brick at 2000°-2300°F).

SAMPLE: 18C-2

Formation: Granite

Location: Catawba SW site in E-central Catawba Co. 3.6 mi SW of center of the town of Catawba on the SE side of SR 1809, 0.5 mi SW of the SR 1810 intersection and 0.6 mi SW of N.C. Highway 10 intersection.

Description: Roadcut, 2 ft high, 400 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.5%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	24.6	39.8	1.61
1900	Tan	3	5.0	23.9	39.3	1.64
2000	Orange tan	3	5.0	16.5	29.9	1.81
2100	Orange tan	3	5.0	16.3	27.5	1.84
2200	Light red	3	7.5	14.9	27.4	1.85
2300	Light red	5	7.5	14.5	27.0	1.86

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

CATAWBA COUNTY - Continued

SAMPLE: 18C-3

Formation: Kings Mountain Group

Location: Chronicle site in SE Catawba Co. 2 mi WNW of Chronicle on E side of SR 1857, 0.2 mi N of SR 1855 intersection.

Description: Roadcut, irregular, 5 to 10 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	37.2	50.6	1.36
1900	Orange tan	2	5.0	36.6	50.0	1.37
2000	Orange tan	2	5.0	32.5	46.8	1.44
2100	Light red	2	5.0	29.5	44.6	1.51
2200	Light red	3	7.5	27.3	41.7	1.53
2300	Dark red	3	7.5	25.0	41.2	1.65

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 18C-4

Formation: Hornblende gneiss

Location: Conover site in central Catawba Co. 1.7 mi SE of the center of Conover on the W side of SR 1739 immediately W of Southern Railway and 0.8 mi SW of intersection with SR 1734.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.3%; working properties-short; drying defects-none; drying shrinkage-2.5%; dry strength-poor; pH-6.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

CATAWBA COUNTY - Continued

SAMPLE: 18C-5

Formation: Mica gneiss

Location: Hickory site in NW Catawba Co. 4 mi E of the center of Hickory on the W side of SR 1441, 0.15 mi N of SR 1007 and Southern Railway.

Description: Roadcut, 3 ft high, 100 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 10 ft over 30-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.1%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	28.3	44.2	1.56
1900	Tan	2	7.5	26.0	41.6	1.60
2000	Tan	2	7.5	23.6	38.7	1.64
2100	Light brown	3	10.0	20.7	36.2	1.75
2200	Dark brown	3	12.5	18.9	35.4	1.79
2300	Red brown	3	12.5	17.9	32.1	1.88

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

CHATHAM COUNTY

A total of twenty shale and residual clay samples were collected from different selected locations in Chatham County. Laboratory tests provide comparative information and potential uses for five samples presently used and indicate potential uses for fifteen additional samples as follows:

Sample No.	Formation	Potential Use
19C - 1	Upper Triassic	Present: Brick.
19C - 2	Upper Triassic	Present: Brick and tile.
19C - 3	Upper Triassic	Present: Pipe.
19C - 4	Upper Triassic	Present: Brick.
19C - 5	Upper Triassic and granite	Present: Brick.
19C - 6	Upper Triassic	Structural clay products.
19C - 7	Upper Triassic	Not suitable for structural clay products.
19C - 8	Upper Triassic	Not suitable for structural clay products.
19C - 9	Upper Triassic	Structural clay products.
19C - 10	Upper Triassic	Structural clay products.
19C - 11	Upper Triassic	Structural clay products.
19C - 12	Upper Triassic	Structural clay products.
19C - 13	Upper Triassic	Structural clay products.
19C - 14	Carolina Slate Belt	Not suitable for structural clay products.
19C - 15	Carolina Slate Belt	Structural clay products.
19C - 16	Carolina Slate Belt	Structural clay products.
19C - 17	Carolina Slate Belt	Structural clay products.
19C - 18	Upper Triassic	Structural clay products.
19C - 19	Upper Triassic	Structural clay products.
19C - 20	Granite	Structural clay products.

CHATHAM COUNTY

SAMPLE: 19C-1

Formation: Upper Triassic, Newark Group, Cumnock and Pekin Formations

Location: Cherokee Brick Co., Brickhaven mine 1.5 mi N of Brickhaven and 0.4 mi N of a point on SR 1916 that is 0.7 mi N of intersection with SR 1924. The plant is 0.4 mi W of Brickhaven on SR 1923.

Description: The pit is a roughly circular area approximately 2000 ft across and of irregular depth that averages around 20 ft; approximately 4 ft of yellow-brown overburden overlies the red-brown shale and the few thin brown sandstone lenses being mined; attitude of bedding-NE, 15° SE.

Type Material: Shale

Color: Light brown

Sampled Interval: Every 10 ft over 100 ft along base of sheltered stockpile at plant.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	21.6	37.2	1.72
1900	Light brown	3	5.0	17.6	31.7	1.80
2000	Brown	4	7.5	9.3	18.6	2.00
2100	Dark brown	5	10.0	3.7	8.1	2.20
2200	Dark brown	6	10.0	2.5	5.6	2.26
2300	---	---	(Expanded)			

Present Use: Brick.

SAMPLE: 19C-2

Formation: Upper Triassic, Newark Group, Sanford Formation

Location: Chatham Brick & Tile Co., Division of Sanford Brick Corp. Gulf mine. Plant is on E edge of Gulf and N end of SR 2146, 0.7 mi N of junction with U.S. Highway 421; mine is on N side of U.S. Highway 421 and extends from 0.2 to 0.8 mi W of SR 2164 junction.

Description: Pit parallels U.S. Highway 421, is of irregular shape that averages 3000 by 300 ft, and is 20 ft deep; red-brown shale, 2-20 ft thick, is interbedded with 6-in to 4-ft thick brown sandstone. Present face at center of pit is all shale, but sandstone is 15% of total material exposed in pit; attitude of bedding-N 75-80° E, 15° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft from 100-ft section at base of plant's sheltered stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-8.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	2.5	18.8	34.0	1.81
1900	Light brown	4	5.0	12.5	24.7	1.97
2000	Chocolate	5	10.0	5.9	13.2	2.24
2100	Dark brown	6	10.0	1.7	4.0	2.32
2200	---	---	(Expanded)			
2300	---					

Present Use: Brick and tile.

CHATHAM COUNTY - Continued

SAMPLE: 19C-3

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Pomona Pipe Products Co., Gulf mine, just N of plant. The plant is at W edge of Gulf on N side of U.S. Highway 421, 1.3 mi W of junction with SR 1007.

Description: Roughly square pit is quite irregular in shape but averages 1500 by 1500 ft and 40 ft deep; red-brown shale, 5-20 ft thick, is interbedded with 20% thin beds of red-brown sandstone, attitude of bedding-formation badly faulted but generally NE, 10-45° SE.

Type Material: Shale

Color: Brown

Sampled Interval: Ground material from plant belt to pug mill.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-7.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pink tan	3	12.5	20.7	36.1	1.74
1900	Tan	3	12.5	14.7	27.8	1.89
2000	Chocolate	4	15.0	8.2	17.1	2.09
2100	Dark brown	5	20.0	3.9	9.0	2.30
2200	Dark brown	6	20.0	2.5	5.9	2.35
2300	---	---	(Expanded)			

Present Use: Pipe.

SAMPLE: 19C-4

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Boren Clay Products Co., Gulf mine, at W edge of Gulf on N side of U.S. Highway 421, 1.2 mi W of junction with SR 1007 and just N of Southern Railroad underpass.

Description: Roughly square pit is very irregular in shape but averages 1500 by 1500 ft and is about 40 ft deep; 5- to 30-ft thick red-brown shale is interbedded with 15% red-brown sandstone in 1- to 2-ft thick layers; attitude of bedding-NE, 10-15° SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft from 100 ft of outloading belt to railroad cars.

Bloating Test: Negative

Unfired Properties: Water of plasticity-19.9%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-6.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	3	2.5	20.9	36.2	1.73
1900	Tan	3	2.5	14.8	27.9	1.88
2000	Light brown	4	5.0	10.1	20.5	2.03
2100	Dark brown	5	5.0	5.6	12.4	2.21
2200	Dark brown	6	10.0	4.1	9.3	2.27
2300	Very dk. brown	6	10.0	2.5	5.8	2.32

Present Use: Brick.

CHATHAM COUNTY - Continued

SAMPLE: 19C-5

Formation: Upper Triassic, Newark Group, Pekin Formation (shale) and granite (residual clay)

Location: Boren Clay Products Co., Pleasant Garden plant, on N side of Pleasant Garden on W side of N.C. Highway 22 at SR 3420 junction.

Description: Material used is blend of 50% Triassic shale & 50% residual clay. Shale is same as 19C-4; clay is granite residuum from pit located 0.2 mi W of plant. Pit is 500 ft long in N-S direction, 200 ft wide, and 15 ft deep.

Type Material: Shale and residual clay blend

Color: Tan

Sampled Interval: From belt to pug mill.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	22.3	37.6	1.69
1900	Tan	3	5.0	18.2	32.5	1.79
2000	Light brown	4	10.0	14.1	26.8	1.90
2100	Chocolate	5	10.0	10.6	21.1	1.99
2200	Chocolate	5	10.0	9.7	19.7	2.03
2300	Dark brown	6	10.0	6.1	13.1	2.15

Present Use: Brick.

SAMPLE: 19C-6

Formation: Upper Triassic, Newark Group

Location: Merritt Chapel site on W side of SR 1008, 1 mi N of Farrington.

Description: 2- to 3-ft high roadcut in red-brown shale on W side of SR 1008; attitude of bedding-N 10-12° E.

Type Material: Shale

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	16.7	30.4	1.82
1900	Tan	4	10.0	9.6	20.0	2.08
2000	Light brown	4	10.0	5.7	12.9	2.26
2100	Chocolate	5	12.5	3.3	7.9	2.37
2200	Chocolate	6	12.5	2.9	6.9	2.39
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick, floor brick at 1900°F-2200°F); slightly high shrinkage above 2000°F.

CHATHAM COUNTY - Continued

SAMPLE: 19C-7

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Shaddox Creek site on S side of U.S. Highway 1, 2.5 mi W of Merry Oaks and 0.2 mi E of intersection with SR 1972.

Description: Roadcut 6-8 ft high; red-brown shale exposed along S side of U.S. Highway 1 for approximately 0.3 mi; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft along 100-ft section at base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-15.6%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	0.0	20.1	33.2	1.65
1900	Light brown	2	0.0	20.0	33.1	1.70
2000	Brown	2	0.0	15.7	27.9	1.80
2100	Dark brown	3	5.0	13.7	24.9	1.80
2200	---	---	(Expanded)			
2300	---					

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 19C-8

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Merry Oaks site on NE side of Merry Oaks 0.1 mi W of junction of old U.S. Highway 1 and new U.S. Highway 1.

Description: Abandoned highway borrow pit; approximately 7 acres of red-brown shale and brown sandstone; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 200-ft section along edge of highway right-of-way.

Bloating Test: Negative

Unfired Properties: Long working, smooth, plastic; water of plasticity-27.6%; drying shrinkage-14.0%; dry strength-good; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	15.0	20.4	34.2	1.68
1900	Tan	3	15.0	16.8	30.1	1.79
2000	Light brown	4	20.0	8.4	17.4	2.07
2100	Dark brown	5	22.5	2.1	4.9	2.34
2200	---	---	(Expanded)			
2300	---					

Potential Use: Not suitable for structural clay products; high shrinkage.

CHATHAM COUNTY - Continued

SAMPLE: 19C-9

Formation: Upper Triassic, Newark Group, Sanford Formation (?)

Location: Corinth site on SR 1912, 2 mi NE of Corinth and 1 mi N of SR 1914 junction.

Description: 6- to 8-ft high roadcut of red-brown shale which is exposed intermittently for approximately 2 mi along SR 1912; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft along 100-ft section at base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.2%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	18.3	31.8	1.74
1900	Tan	3	2.5	16.1	29.0	1.80
2000	Light brown	4	5.0	12.4	24.0	1.93
2100	Brown	5	10.0	2.5	5.8	2.31
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°F); abrupt vitrification (2000°-2100°F).

SAMPLE: 19C-10

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: SR 1912 site on W side of SR 1912, 0.2 mi S of Merry Oaks and SR 1011 junction.

Description: 5- to 10-ft high roadcut of red-brown shale which outcrops intermittently along SR 1912 for 2.5 mi to S; same shale outcrops along SR 1924 from junction with SR for 1 mi to SW; attitude of bedding-NE, 15° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	21.2	34.5	1.63
1900	Tan	3	5.0	19.5	32.6	1.67
2000	Light brown	4	7.5	14.7	26.6	1.81
2100	Chocolate	5	10.0	4.9	10.6	2.16
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); abrupt vitrification (2000°-2100°F).

CHATHAM COUNTY - Continued

SAMPLE: 19C-11

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Ralph Seagroves site on N side of SR 2145, 5.6 mi E of Gulf and 0.6 mi N of SR 2150 junction.

Description: 4-ft high roadcut of red-brown shale which outcrops for 0.5 mi toward SR 2150 junction; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 100-ft section at base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	23.2	36.3	1.57
1900	Tan	3	5.0	21.8	34.7	1.59
2000	Tan	4	5.0	18.0	30.1	1.67
2100	Chocolate	5	10.0	8.0	15.9	1.99
2200	Dark brown	6	12.5	3.6	7.9	2.20
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F).

SAMPLE: 19C-12

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Gulf site located on SR 2153, 2.8 mi NE of center of Gulf and 0.5 mi N of SR 2145 junction.

Description: On E side of SR 2153, 5- to 7-ft high roadcut; red-brown shale outcrops along road for approximately 0.5 mi; attitude of bedding-NE, 10-12° SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-0.0%; dry strength-fair; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	24.8	38.8	1.57
1900	Tan	3	5.0	21.4	34.4	1.61
2000	Tan	3	5.0	16.7	28.9	1.73
2100	Chocolate	4	10.0	6.2	12.9	2.08
2200	Dark brown	5	10.0	5.8	12.1	2.09
2300	Dark brown	5	10.0	2.6	5.7	2.20

Potential Use: Structural clay products (e.g., building brick, floor brick at 2100°-2300°F).

CHATHAM COUNTY - Continued

SAMPLE: 19C-13

Formation: Upper Triassic, Newark Group

Location: U.S. Highway 64 site located on N side of U.S. Highway 64, 1.3 mi W of Chatham-Wake County line.

Description: 4- to 12-ft high roadcut approximately 200 ft in length on N side of highway.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	22.2	35.0	1.58
1900	Tan	3	5.0	22.1	34.9	1.58
2000	Light brown	3	5.0	19.8	32.5	1.64
2100	Brown	4	5.0	15.9	27.7	1.74
2200	Dark brown	6	12.5	8.7	17.0	1.96
2300	Very dk. brown	6	12.5	3.5	7.2	2.06

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 19C-14

Formation: Carolina Slate Belt, mafic volcanic

Location: Siler City E site in W-central Chatham Co. on S side of U.S. Highway 64, 7 mi E of U.S. Highway 421 junction in Siler City and 0.5 mi E of SR 2170 intersection.

Description: Large roadcuts 0.2 mi long and 15-20 ft high; attitude of cleavage-NE-trending.

Type Material: Residual clay

Color: Red-brown

Sampled Interval: Every 20 ft over 100-ft section along base and near center of cut on S side of road.

Unfired Properties: Water of plasticity-36%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Yellow brown	2	10.0	29.5	47.8	1.62
1900	Medium gray red	3	12.5	26.1	43.3	1.66
2000	Medium tan	4	12.5	25.2	42.3	1.68
2100	Medium tan	6	15.0	20.2	39.0	1.92
2200	Gray red	7	15.0	18.5	35.5	1.93

Potential Use: Not suitable for structural clay products; high absorption.

CHATHAM COUNTY - Continued

SAMPLE: 19C-15

Formation: Carolina Slate Belt, felsic volcanics

Location: Siler City NW site in NW Chatham Co. on NW side of SR 1310, 0.05 mi NE of intersection with U.S. Highway 421 and about 4 mi NW of U.S. Highway 421-U.S. Highway 64 junction in Siler City.

Description: Roadcut 2 ft high and 150 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Light yellow

Sampled Interval: Every 5 ft over 25-ft section along middle elevation near center of cut.

Unfired Properties: Water of plasticity-30%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Lt. brown orange	2	7.5	23.9	38.0	1.57
1900	Brown orange	3	7.5	23.6	37.5	1.61
2000	Dark tan	4	7.5	20.0	34.2	1.71
2100	Dark tan	6	7.5	17.0	30.8	1.81
2200	Gray red	7	10.0	16.3	30.1	1.89

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F).

SAMPLE: 19C-16

Formation: Carolina Slate Belt, mafic volcanics

Location: Pittsboro site in E-central Chatham Co. on NE corner of U.S. Highway 64-SR 1572 intersection 2.3 mi E of U.S. Highway 64-U.S. Highway 15 junction at Courthouse in Pittsboro.

Description: Roadcut 4 ft high and 20 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Dark yellow

Sampled Interval: Every 10 ft over 100-ft section beginning at U.S. Highway 64 ditch and extending N along base of cut on SR 1572.

Unfired Properties: Water of plasticity-38.1%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-8.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Orange brown	3	10.0	22.3	37.9	1.70
2000	Lt. orange brown	3	10.0	20.2	36.4	1.80
2100	Orange brown	5	12.5	17.5	33.9	1.85
2200	Lt. red brown	7	15.0	16.8	32.3	2.02
2300	Red brown	7+	15.0	14.0	29.7	2.12

Potential Use: Structural clay products (e.g., building brick at 2100°F); high shrinkage above 2100°F.

CHATHAM COUNTY - Continued

SAMPLE: 19C-17

Formation: Carolina Slate Belt, felsic volcanics

Location: Carbonton West site in SW Chatham Co. 4 mi W of Carbonton on NW corner of N.C. Highway 42-SR 2303 intersection.

Description: Roadcut 6 ft high and 150 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Dark yellow

Sampled Interval: Every 10 ft over 100-ft section along base at S end of cut on W side of SR 2303.

Unfired Properties: Water of plasticity-40.5%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	1	5.0	33.9	47.5	1.40
2000	Buff	2	7.5	26.7	41.9	1.57
2100	Medium orange	3	7.5	25.2	40.8	1.62
2200	Lt. red brown	6	10.0	17.5	31.2	1.78
2300	Red brown	7	12.5	12.8	24.6	1.92

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 19C-18

Formation: Upper Triassic, Newark Group

Location: R. M. Reams site 1 in NE Chatham Co. on N side of SR 1742, 0.7 mi NW of intersection with SR 1743, 4.2 mi SE of center of Farrington.

Description: Terrace in field.

Type Material: Clay

Color: Buff

Sampled Interval: Test pit

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.7%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	20.3	34.6	1.71
1900	Orange tan	3	5.0	18.9	32.5	1.71
2000	Dark tan	3	5.0	15.0	27.4	1.82
2100	Light brown	5	10.0	14.3	26.4	1.85
2200	Dark brown	5	10.0	12.2	23.2	1.90
2300	Dark red	5	10.0	10.7	20.6	1.93

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

CHATHAM COUNTY - Continued

SAMPLE: 19C-19

Formation: Upper Triassic, Newark Group

Location: R. M. Reams site 2 in NE Chatham Co. on S side of SR 1742, 0.4 mi W of intersection with SR 1743, 4.5 mi SE of center of Farrington.

Description: Terrace in field.

Type Material: Shale

Color: Red

Sampled Interval: Test pit

Bloating Test: Negative

Unfired Properties: Water of plasticity-18.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	0.0	17.0	29.3	1.73
1900	Tan	3	0.0	16.1	28.3	1.75
2000	Light brown	3	2.5	11.9	22.1	1.86
2100	Light brown	3	2.5	10.6	20.2	1.92
2200	Dark brown	5	2.5	8.0	16.0	2.00
2300	Dark brown	6	5.0	4.8	9.9	2.07

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 19C-20

Formation: Granite

Location: Bynum site in NE Chatham Co. on E side of U.S. Highway 15-501, 0.5 mi NE of center of Bynum and 0.2 mi S of intersection with SR 1713.

Description: Roadcut 10 ft high and 400 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-41.1%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	31.4	47.1	1.50
1900	Orange tan	3	7.5	29.5	45.6	1.54
2000	Light brown	5	10.0	16.0	30.9	1.93
2100	Light brown	5	15.0	13.7	27.5	2.00
2200	Dark brown	5	20.0	12.1	25.0	2.06
2300	Dark red	6	20.0	11.9	25.0	2.10

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2000°F); high shrinkage above 2000°F.

CLEVELAND COUNTY

A total of six samples composed of weathered feldspar concentrate, clay and weathered feldspar concentrate, and residual clay were collected from different selected locations in Cleveland County. Laboratory tests provide comparative information for 3 samples presently used and indicate potential uses of 3 additional samples as follows:

Sample No.	Formation	Potential Use
23C - 1	Mica gneiss	Present: Face-brick component.
23C - 2	Mica gneiss and imported clay	Present: Face brick.
23C - 3	Mica gneiss (?)	Present: Brick and tile.
23C - 4	Cherryville quartz monzonite	Structural clay products.
23C - 5	Mica gneiss	Not suitable for structural clay products.
23C - 6	Toluca quartz monzonite	Not suitable for structural clay products.

CLEVELAND COUNTY

SAMPLE: 23C-1

Formation: Mica gneiss

Location: Kings Mountain Brick Co. clay plant in SE Cleveland Co. 3.2 mi SW of center of Kings Mountain on S side of intersection of N.C. Highway 216 and SR 2304.

Description: Stockpile of raw material.

Type Material: Weathered feldspar concentrate

Color: White

Sampled Interval: Random sample from stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.3%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pink	1	0.0	35.8	47.8	1.34
1900	Pink	1	0.0	34.2	46.6	1.36
2000	Pink	1	0.0	30.3	43.4	1.43
2100	Pink	3	0.0	26.1	39.7	1.53
2200	Light gray	3	2.5	23.2	36.6	1.58
2300	Light gray	4	5.0	16.9	29.4	1.74

Other Tests: Not effervescent with HCl.

Present Use: Face-brick component.

SAMPLE: 23C-2

Formation: Mica gneiss and imported clay

Location: Kings Mountain Brick Co. brick plant in SE Cleveland Co. 6 mi SW of center of Kings Mountain just W of intersection of U.S. Highway 29 and SR 2238.

Description: Raw brick from belt.

Type Material: Clay and weathered feldspar concentrate

Color: Gray

Sampled Interval: Random brick from belt.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.5%; working properties-plastic; drying shrinkage-0.0%; dry strength-fair; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light pink	2	0.0	24.8	37.2	1.50
1900	Light pink	2	0.0	24.0	36.5	1.52
2000	Light pink	3	2.5	18.9	30.8	1.63
2100	Light pink	5	5.0	15.6	26.7	1.71
2200	Light gray	6	5.0	11.9	21.4	1.80
2300	Light gray	6	5.0	9.7	18.2	1.88

Other Tests: Not effervescent with HCl.

Present Use: Face brick.

CLEVELAND COUNTY - Continued

SAMPLE: 23C-3

Formation: Mica gneiss (?)

Location: Bennett Brick and Tile Co. plant in SE Cleveland Co. at SW edge of Kings Mountain on E side of SR 2256, 0.6 mi S of U.S. Highway 74.

Description: Blended material from belt to stockpile.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 10 seconds for 1 minute from belt to stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-0.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown	3	0.0	20.7	37.0	1.79
1900	Brown	3	2.5	19.3	35.1	1.82
2000	Brown	4	5.0	16.9	32.0	1.89
2100	Brown	5	5.0	15.1	29.2	1.93
2200	Dark brown	6	7.5	8.8	18.2	2.08
2300	Brown black	7	10.0	2.9	6.5	2.19

Other Tests: Not effervescent with HCl.

Present Use: Brick and tile.

SAMPLE: 23C-4

Formation: Cherryville quartz monzonite

Location: Beason Creek site in SE Cleveland Co. on S side of Beason Creek and SW side of SR 2246, 0.8 mi S of its intersection with SR 2243, 5.8 mi WSW of intersection of U.S. Highway 74 and N.C. Highway 216 in Kings Mountain.

Description: Roadcut, 500 ft long, 8 ft high.

Type Material: Residual clay

Color: White

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.7%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light pink	3	0.0	21.8	35.6	1.63
1900	Light pink	3	0.0	21.3	35.4	1.66
2000	Light pink	3	0.0	18.7	32.1	1.72
2100	Off-white	4	2.5	16.4	29.1	1.77
2200	Off-white	6	2.5	14.8	26.7	1.80
2300	Off-white	6	5.0	12.3	22.7	1.84

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building bricks at 2100°-2300°F).

CLEVELAND COUNTY - Continued

SAMPLE: 23C-5

Formation: Mica gneiss

Location: Boiling Springs site in SW Cleveland Co. 1.2 mi ESE of center of Boiling Springs on W side of SR 1149, 0.5 mi S of its intersection with N.C. Highway 150.

Description: Roadcut, 0.2 mi long, slopes down from maximum of 12 ft high near center to 2 ft high near ends.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 120-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.7%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	1	0.0	25.5	40.9	1.60
1900	Light brown	1	0.0	24.8	40.4	1.63
2000	Light brown	1	0.0	23.9	39.5	1.65
2100	Light brown	3	0.0	23.2	38.8	1.67
2200	Brown	3	2.5	22.3	37.3	1.67
2300	Dark brown	3	2.5	21.0	36.1	1.72

Other Tests & Remarks: Not effervescent with HCl; low plasticity; high maturing temperature.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 23C-6

Formation: Toluca quartz monzonite

Location: Toluca site in NE corner of Cleveland Co. 0.9 mi NW of the center of Toluca on SE side of N.C. Highway 10, 0.3 mi SW of its intersection with N.C. Highway 27.

Description: Roadcut, 250 ft long, slopes down gradually from height of 4 ft near middle to road level at ends.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.3%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

DAVIDSON COUNTY

Five residual clay samples were collected from different selected locations in Davidson County. Laboratory tests indicate potential uses for five of the samples and provide comparative information for one sample presently used as follows:

Sample No.	Formation	Potential Use
29D - 1	Carolina Slate Belt	Not suitable for structural clay products.
29D - 2	Carolina Slate Belt	Structural clay products.
29D - 3	Carolina Slate Belt	Present: Sole component in brick industry.
29D - 4	Diorite-gabbro	Structural clay products.
29D - 5	Granite	Not suitable for structural clay products.

DAVIDSON COUNTY

SAMPLE: 29D-1

Formation: Carolina Slate Belt, mafic volcanics

Location: Lexington site in E-central Davidson Co. on S side of U.S. Highway 64 approximately 4.5 mi E of U.S. Highway 29-70 junction at E edge of Lexington and 1.2 mi E of SR 2227 intersection.

Description: Roadcut 8 ft high and 250 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Dark orange

Sampled Interval: Every 10 ft over 100-ft section along middle elevation near center of cut.

Unfired Properties: Water of plasticity-44.9%; working properties-plastic; drying shrinkage-7.5%; dry strength-excellent; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Orange brown	3	10.0	29.5	45.4	1.54
2000	Lt. orange brown	3	12.5	26.4	43.8	1.66
2100	Medium orange	5	15.0	22.6	40.0	1.77
2200	Lt. red brown	7	20.0	13.5	28.1	2.08
2300	Red brown	7+	20.0	11.4	24.4	2.14

Potential Use: Not suitable for structural clay products; high shrinkage at maturity.

SAMPLE: 29D-2

Formation: Carolina Slate Belt, argillite

Location: Denton site in SE Davidson Co. just SW of Denton on NE corner of intersection of SR 1002 and SR 2349, on W side of railroad.

Description: Roadcut 2 ft high and 100 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Orange brown

Sampled Interval: Every 5 ft over 100-ft section along middle of cut.

Unfired Properties: Water of plasticity-36.7%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Lt. orange brown	3	7.5	23.3	36.8	1.58
2000	Lt. orange brown	3	10.0	19.5	35.3	1.81
2100	Lt. red brown	6	12.5	15.7	30.6	1.95
2200	Lt. red brown	7+	15.0	8.1	17.1	2.12
2300	Medium red brown	7+	17.5	6.5	14.4	2.21

Potential Use: Structural clay products (e.g., building brick at 2100°F); high shrinkage above 2100°F.

DAVIDSON COUNTY - Continued

SAMPLE: 29D-3

Formation: Carolina Slate Belt, mafic & felsic volcanics & argillite

Location: Cunningham Brick Co. plant approximately 6 mi E of U.S. Highway 64-29 junction at NE edge of Lexington; on E side of SR 2115, 1 mi N of intersection with U.S. Highway 64.

Description: Belt to pug mill.

Type Material: Residual clay

Color: Light tan

Sampled Interval: Random intervals from belt over 5-minute period.

Unfired Properties: Water of plasticity-37.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Orange brown	2	5.0	19.6	32.3	1.65
2000	Orange brown	3	10.0	15.3	26.9	1.76
2100	Red brown	5	12.5	10.7	20.4	1.91
2200	Dark brown	7.5	15.0	3.2	7.0	2.19

Present Use: Sole component in the brick industry.

SAMPLE: 29D-4

Formation: Diorite-gabbro

Location: Welcome S site in N-central Davidson Co. 3 mi S of center of Welcome on S side of SR 1457, 0.7 mi W of intersection with U.S. Highway 52 and Winston-Salem South Bound Railway.

Description: Roadcut, 4 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.0%; working properties-short; drying shrinkage-2.5%; dry strength-fair; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	30.8	45.2	1.47
1900	Orange tan	3	5.0	30.8	45.2	1.47
2000	Tan	3	5.0	25.9	41.2	1.59
2100	Light brown	4	7.5	21.1	35.9	1.70
2200	Red brown	4	10.0	19.3	33.9	1.76
2300	Gray	4	10.0	16.0	29.8	1.86

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

DAVIDSON COUNTY - Continued

SAMPLE: 29D-5

Formation: Granite

Location: Welcome N site in N-central Davidson Co. 5.5 mi N of the center of Welcome on the E side of SR 1713, 0.7 mi SE of U.S. Highway 52 and on W side of Winston-Salem South Bound Railway.

Description: Roadcut, 2 ft high, 150 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.8%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	0.0	35.1	47.1	1.34
1900	Orange tan	2	2.5	32.2	44.6	1.39
2000	Tan	2	2.5	31.6	44.6	1.41
2100	Light brown	2	2.5	28.4	41.8	1.47
2200	Medium brown	2	5.0	26.1	39.5	1.51
2300	Red brown	2	5.0	22.1	35.2	1.59

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; poor bond.

DAVIE COUNTY

One shale sample and four samples of residual clay were collected from different selected sites in Davie County. Laboratory tests indicate potential uses for these materials as follows:

Sample No.	Formation	Potential Use
30D - 1	Upper Triassic	Marginal for structural clay products.
30D - 2	Granite-diorite	Not suitable for structural clay products.
30D - 3	Diorite-gabbro	Not suitable for structural clay products.
30D - 4	Granite	Not suitable for structural clay products.
30D - 5	Mica gneiss	Not suitable for structural clay products.

DAVIE COUNTY

SAMPLE: 30D-1

Formation: Upper Triassic, Newark Group

Location: Steelman Creek site on SR 1327, 0.2 mi NE of SR 1002 junction; 1.6 mi SE of Lone Hickory; in NW corner of Davie County.

Description: Red-brown shale in 4- to 8-ft high gently inclined roadcut, approximately 200-300 ft long; attitude of bedding-NE strike, low angle dip to NW.

Type Material: Shale

Color: Light red

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fine; drying characteristics, good, slight warping; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	10.0	29.2	43.3	1.48
1900	Tan	3	10.0	25.2	39.6	1.57
2000	Tan	3	10.0	19.4	33.5	1.73
2100	Light brown	4	15.0	16.5	29.9	1.81
2200	Brown	5	15.0	14.2	26.8	1.89
2300	Dark brown	6	17.5	9.3	19.0	2.04

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°-2200°F); high shrinkage after 2200°F.

SAMPLE: 30D-2

Formation: Granite-diorite

Location: Redland site on S side of I-40, 0.7 mi W of intersection with N.C. Highway 801 in NE Davie Co. and 1.7 mi NE of center of Redland.

Description: Roadcut, 30-70 ft high, 0.3 mi long; samples from base to top at highest point; soft weathered rock outcropping in lower 20 ft of cut; darker red clay at top of cut; lineation trending NE, near-vertical dip.

Type Material: Clay

Color: Red brown

Sampled Interval: Every 10 ft up face of 70-ft high cut.

Unfired Properties: Water of plasticity-40.6%; working properties-plastic; drying shrinkage-7.5%; dry strength-fair.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Lt. reddish brown	2	7.5	33.0	44.1	1.34
2100	Grayish reddish brown	3	9.0	31.6	43.3	1.36
2200	Grayish reddish brown	3	9.0	31.0	43.1	1.40
2300	Dk. Grayish red	3	9.0	30.4	43.0	1.41

Potential Use: Not suitable for structural clay products; too soft.

DAVIE COUNTY - Continued

SAMPLE: 30D-3

Formation: Diorite-gabbro

Location: Maine site on S side of I-40, 0.2 mi W of junction with SR 1407 in central Davie Co. 1.2 mi NNW of center of Maine.

Description: Roadcut, 0.1 mi long, 20 ft high.

Type Material: Residual clay

Color: Lt. red brown

Sampled Interval: Every 5 ft up face of cut.

Unfired Properties: Water of plasticity-52.7%; working properties-plastic; drying shrinkage-10.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	3	10.0	32.1	43.2	1.35
2100	Grayish reddish orange	4	10.0	28.2	39.3	1.39
2200	Lt. reddish brown	5	12.5	27.8	38.7	1.40
2300	Grayish red	7	12.5	26.4	37.4	1.42

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 30D-4

Formation: Granite

Location: Salem Church site on S side of I-40, 0.2 mi W of intersection with SR 1143 at Salem Church in SW Davie Co.

Description: Roadcut, 0.3 mi long, 15-20 ft high; lineations NE-trending, steeply dipping.

Type Material: Residual clay

Color: Light red brown

Sampled Interval: Every 20 ft over 100-ft section along base of cut.
Unfired Properties: Water of plasticity-49.5%; working properties-plastic; drying shrinkage-7.5%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	2	7.5	34.9	47.0	1.35
2100	Lt. grayish red	3	10.0	34.0	45.7	1.35
2200	Grayish red	3	10.0	27.3	40.4	1.48
2300	Grayish red	4	12.5	24.6	37.7	1.53

Potential Use: Not suitable for structural clay products; high absorption.

DAVIE COUNTY - Continued

SAMPLE: 30D-5

Formation: Mica gneiss

Location: Mocksville West site in SW Davie Co. on S side of N.C. Highway 901 just E of SR 1158 and 7.6 mi W of center of Mocksville.

Description: Roadcut, 6 ft high, 150 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.2%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	29.2	44.3	1.52
1900	Orange tan	3	2.5	28.8	44.2	1.53
2000	Tan	3	2.5	28.4	44.0	1.55
2100	Light brown	3	5.0	22.9	38.6	1.69
2200	Medium brown	3	7.5	22.6	38.2	1.69
2300	Red brown	3	7.5	21.9	37.3	1.70

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

DURHAM COUNTY

A total of sixteen shale and residual clay samples were collected from different selected locations in Durham County. Laboratory tests provide comparative information for two samples presently used and indicate the potential uses of fourteen additional samples as follows:

Sample No.	Formation	Potential Use
32D - 1	Upper Triassic	Present: Brick and tile.
32D - 2	Upper Triassic	Present: Brick.
32D - 3	Upper Triassic	Structural clay products.
32D - 4	Upper Triassic	Structural clay products.
32D - 5	Upper Triassic	Structural clay products.
32D - 6	Upper Triassic	Structural clay products.
32D - 7	Upper Triassic	Structural clay products.
32D - 8	Upper Triassic	Structural clay products.
32D - 9	Upper Triassic	Structural clay products.
32D - 10	Upper Triassic	Structural clay products.
32D - 11	Upper Triassic	Not suitable for structural clay products.
32D - 12	Upper Triassic	Structural clay products.
32D - 13	Upper Triassic	Structural clay products.
32D - 14	Carolina Slate Belt	Structural clay products.
32D - 15	Carolina Slate Belt	Not suitable for structural clay products.
32D - 16	Granite	Structural clay products.

DURHAM COUNTY

SAMPLE: 32D-1

Formation: Upper Triassic, Newark Group

Location: Borden Brick & Tile Co., Durham mine, 0.3 mi SE of Durham city limit on W side of intersection of U.S. Highway 70 bypass and U.S. Highway 70 business.

Description: Pit 1--irregular shaped, approximately 800 by 200 yd and 10 yd deep; long dimension oriented from U.S. Highway 70 to SW. Pit 2--100 by 50 yd and 6 yd deep, 0.1 mi SW of pit 1. Both pits contain 10- to 20-ft thick red-brown shale interbedded with 2- to 10-ft thick buff to purple sandstone; attitude of bedding-NE, 10-20° SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 100-ft section along base of plant's sheltered stockpile of ground materials.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-7.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	5.0	16.9	29.1	1.72
1900	Light brown	3	5.0	15.7	27.5	1.75
2000	Brown	4	5.0	12.3	22.7	1.85
2100	Dark brown	6	12.5	3.3	7.3	2.22
2200	---	---	(Expanded)			
2300	---					

Present Use: Brick and tile.

SAMPLE: 32D-2

Formation: Upper Triassic, Newark Group

Location: Triangle Brick Co., N mine, 7 mi S of Durham city limit, 0.5 m W of N.C. Highway 55, just N of the Wake-Durham Co. line.

Description: Dozer cut 100 ft long by 30 ft wide by 20 ft deep in red-brown shale, attitude of bedding-N 10° E, 10° SE.

Type Material: Shale

Color: Red

Sampled Interval: Loose shale from both sides of cut approximately 30 ft apart.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	4	10.0	13.1	25.5	1.94
1900	Tan	4	10.0	12.7	24.8	1.95
2000	Brown	5	15.0	4.3	10.0	2.32
2100	---	---	(Expanded)			
2200	---					
2300	---					

Present Use: Brick.

DURHAM COUNTY - Continued

SAMPLE: 32D-3

Formation: Upper Triassic, Newark Group

Location: S. L. Gattis site on SR 1110, 0.8 mi SE of Chapel Hill city limit and 0.8 mi S of N.C. Highway 54 junction on W side of road (old Raleigh road).

Description: Unconsolidated red-brown shales exposed in 4-ft high roadcut; attitude of bedding-NE, 25° SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 5 ft over 40-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-7.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	15.7	29.3	1.87
1900	Tan	4	5.0	14.3	26.7	1.87
2000	Brown	5	7.5	7.8	16.4	2.10
2100	Dark brown	6	15.0	2.7	6.7	2.46
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 1900°-2100°F); high shrinkage at 2100°F.

SAMPLE: 32D-4

Formation: Upper Triassic, Newark Group

Location: Geer Street site, approximately 1 mi NE of Durham city limit on NW side of Geer St, SR1670, 0.8 mi NE of junction with U.S. Highway 70 bypass.

Description: 10-ft high roadcut exposing red-brown shale; attitude of bedding-NE, 15-20° SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	10.0	15.2	27.9	1.84
1900	Light brown	3	10.0	15.0	27.6	1.84
2000	Brown	4	12.5	8.6	17.7	2.06
2100	Dark brown	5	15.0	3.3	8.7	2.65
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); slightly high shrinkage at maturity.

DURHAM COUNTY - Continued

SAMPLE: 32D-5

Formation: Upper Triassic, Newark Group

Location: H. F. Dehart site 1.2 mi SE of Durham city limit on W side of SR 1675, 0.8 mi N of SR 1800 (Cheek Road) junction.

Description: 4-ft high roadcut approximately 100 ft long, red-brown shale; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft along base of 100-ft long roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	4	5.0	15.6	28.9	1.85
1900	Chocolate	5	10.0	7.4	15.8	2.14
2000	---	---	(Melted)			
2100	---					
2200	---					
2300	---					

Potential Use: Structural clay products (e.g., building brick at 1800°-1900°F).

SAMPLE: 32D-6

Formation: Upper Triassic, Newark Group

Location: L. W. Carden site 2.3 mi SE of Durham city limit on S side of SR 1822, 0.15 mi E of SR 1671 junction.

Description: Red-brown shale in 8-ft high roadcut; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 100-ft section at base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	7.5	17.8	30.2	1.69
1900	Light brown	3	7.5	16.8	28.1	1.72
2000	Brown	4	7.5	13.5	24.5	1.82
2100	Chocolate	6	15.0	6.8	13.9	2.05
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°F); high shrinkage at 2100°F.

DURHAM COUNTY - Continued

SAMPLE: 32D-7

Formation: Upper Triassic, Newark Group

Location: Jimmy Keith site 10 mi E of Durham on E side of SR 1807, 0.3 mi N of N.C. Highway 98 junction.

Description: Red-brown shale in 4-ft high roadcut; outcrops along road for 0.3 mi from site to N.C. Highway 98; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft along 100-ft section at base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	20.4	33.1	1.59
1900	Tan	2	5.0	20.5	32.5	1.62
2000	Light brown	3	5.0	18.0	29.7	1.65
2100	Brown	4	7.5	12.0	21.8	1.81
2200	Very dk. brown	5	10.0	3.3	7.0	2.11
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

SAMPLE: 32D-8

Formation: Upper Triassic, Newark Group

Location: Willie Hicks site 5.7 mi SE of Durham city limit on SR 1902, 0.9 mi SE of N.C. Highway 98 junction and 0.3 mi NW of SR 1903 junction.

Description: Red-brown shale on roadcut 6-8 ft high and about 200 ft long; attitude of bedding-NNE, 15° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-6.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	2	5.0	17.7	31.3	1.73
1900	Light brown	2	5.0	17.6	30.9	1.76
2000	Brown	3	5.0	17.3	29.9	1.77
2100	Dark brown	4	5.0	14.6	26.1	1.79
2200	Black	5	7.5	2.4	4.4	1.84
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick at 2100°F); abrupt vitrification between 2100°-2200°F.

DURHAM COUNTY - Continued

SAMPLE: 32D-9

Formation: Upper Triassic, Newark Group

Location: Nelson site on S side of SR 1973, 0.4 mi E of SR 1959 junction at Cedar Fork Church in Nelson.

Description: Red-brown shale exposed in 6- to 8-ft high roadcut on S side of SR 1959; crops out in ditches for 0.3 mi along road; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red brown

Sampled Interval: Every 20 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	4.0	22.0	35.6	1.60
1900	Tan	3	4.0	21.6	34.6	1.62
2000	Light brown	3	4.0	19.5	32.2	1.65
2100	Brown	5	10.0	10.9	20.7	1.70
2200	Olive black	5	10.0	3.1	5.3	1.90
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

SAMPLE: 32D-10

Formation: Upper Triassic, Newark Group

Location: H. L. Page site 1.5 mi E of Nelson on S side of SR 1972, just E of SR 1973 junction.

Description: Red-brown shale in 6- to 8-ft high roadcut; 200- to 250-ft exposure with intermittent outcrops for 0.4 mi E to Wake Co. line; attitude of bedding- NE-trending.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 50-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Lt. red brown	2	5.0	21.5	35.2	1.64
1900	Light brown	2	5.0	20.0	33.0	1.65
2000	Brown	3	5.0	16.6	28.6	1.72
2100	Chocolate	5	10.0	9.8	18.9	1.93
2200	Dark brown	6	12.5	3.4	7.6	2.23
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

DURHAM COUNTY - Continued

SAMPLE: 32D-11

Formation: Upper Triassic, Newark Group

Location: NC 751 site about 5 mi SW of Durham city limit on E side of NC 751, 1 mi S of N.C. Highway 54 junction.

Description: Red-brown shale in 4-ft high roadcut; crops out approximately 400 ft along road.

Type Material: Shale

Color: Light tan

Sampled Interval: Every 25 ft over 150-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.0%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	10.0	17.3	31.4	1.81
1900	Light brown	3	10.0	14.0	27.1	1.93
2000	Brown	4	15.0	6.2	13.7	2.21
2100	Chocolate	5	20.0	3.4	7.9	2.28
2200	Dark brown	6	20.0	2.9	6.6	2.34
2300	---	---	(Melted)			

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 32D-12

Formation: Upper Triassic, Newark Group

Location: Overnite site at Durham city limit on E side of U.S. Highway 70, 0.4 mi N of N.C. Highway 98 junction, just N of Overnite Transfer Co.

Description: Red-brown shale exposed in 6-ft high roadcut on E side of U.S. Highway 70 for approximately 1 mi; attitude of bedding-N 10° E, low-angle dip to SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.0%; working properties-short; drying shrinkage-5.0%; dry strength-good; pH-7.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	5.0	13.9	25.5	1.83
1900	Brown	3	5.0	12.5	23.4	1.87
2000	Chocolate	4	7.5	7.8	15.7	2.01
2100	Dark brown	5	10.0	1.9	4.3	2.29
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick, floor brick at 2100°-2200°F).

DURHAM COUNTY - Continued

SAMPLE: 32D-13

Formation: Upper Triassic, Newark Group

Location: Camp Butner site on SR 1004, 0.2 mi W of intersection with SR 1630 approximately 2.6 mi SE of Willardville.

Description: Red-brown shale in 5-ft high roadcut that is approximately 200 ft long; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	5.0	16.3	29.6	1.82
1900	Brown	4	5.0	11.0	21.6	1.96
2000	Chocolate	5	10.0	5.6	12.1	2.16
2100	Dark brown	6	15.0	1.7	4.0	2.33
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 1900°-2000°F).

SAMPLE: 32D-14

Formation: Carolina Slate Belt, felsic volcanics

Location: Orange Factory site in NW Durham Co. about 2 mi W of Orange Factory on N side of SR 1475, 0.25 mi W of intersection with U.S. Highway 501.

Description: Roadcut, 3 ft high, 0.1 mi long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Light orange

Sampled Interval: Every 20 ft over 100-ft section along middle elevation at E end of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Yellow orange	2	10.0	33.3	50.0	1.50
1900	Yellow orange	3	10.0	27.5	42.6	1.55
2000	Dark tan	4	12.5	24.8	40.9	1.65
2100	Dark tan	6	15.0	19.2	35.5	1.85
2200	Lt. gray red	7	15.0	14.7	30.7	2.09

Potential Use: Marginal for structural clay products (e.g., building brick at 2000°F); high shrinkage.

DURHAM COUNTY - Continued

SAMPLE: 32D-15

Formation: Carolina Slate Belt, intermediate volcanics

Location: Rougemont site located in extreme NE section of Durham Co. on S side of SR 1471, 1.5 mi E of junction with U.S. Highway 501 in Rougemont.

Description: Roadcut, 4 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Light orange brown

Sampled Interval: Every 10 ft over 100-ft section along middle elevation near center of cut.

Unfired Properties: Water of plasticity-39%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown orange	2	7.5	30.3	45.4	1.49
1900	Dark tan	3	7.5	28.9	44.2	1.53
2000	Medium tan	4	10.0	24.5	40.1	1.60
2100	Yellow orange	6	12.5	23.2	39.2	1.73
2200	Gray red	7	15.0	19.4	36.1	1.86

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 32D-16

Formation: Granite

Location: Bahama site in N Durham Co. 3 mi NNE of Bahama on N side of SR 1603, 0.3 mi W of intersection with SR 1607.

Description: Roadcut, 4 ft high, 150 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.6%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	28.7	44.0	1.53
1900	Tan	3	5.0	25.0	40.8	1.61
2000	Light brown	5	10.0	14.9	28.3	1.90
2100	Light brown	5	10.0	14.4	27.6	1.91
2200	Dark brown	5	12.5	13.2	25.4	1.93
2300	Dark red	6	15.0	10.4	21.4	2.05

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2000°-2200°F); high shrinkage at 2300°F.

FORSYTH COUNTY

Three residual clay samples were collected from different selected locations in Forsyth County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
34F - 1	Mica gneiss	Not suitable for use in structural clay products.
34F - 2	Granite	Structural clay products.
34F - 3	Diorite-gabbro	Marginal for structural clay products.

FORSYTH COUNTY

SAMPLE: 34F-1

Formation: Mica gneiss

Location: Rural Hall site in N-central Forsyth Co. 1.3 mi E of center of Rural Hall on W side of SR 1908, 0.1 mi S of N.C. Highway 65.

Description: Roadcut, 6 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.7%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange	3	10.0	31.2	47.5	1.52
1900	Orange tan	3	10.0	29.6	46.8	1.58
2000	Light brown	4	10.0	22.4	39.3	1.75
2100	Medium brown	5	20.0	12.6	26.7	2.11
2200	Dark brown	5	20.0	10.4	23.3	2.23
2300	Red brown	6	22.5	9.6	21.4	2.24

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for use in structural clay products.

SAMPLE: 34F-2

Formation: Granite

Location: Clemmons E site in S-central Forsyth Co. 4.5 mi E of the center of Clemmons on the S side of SR 3036, 0.2 mi W of SR 2902 intersection.

Description: Roadcut, 6 ft high, 200 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.3%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	20.4	34.9	1.71
1900	Tan	3	0.0	20.4	34.9	1.71
2000	Tan	3	0.0	17.5	31.6	1.81
2100	Light brown	4	2.5	14.8	27.6	1.87
2200	Medium brown	5	5.0	13.4	25.7	1.92
2300	Red brown	6	5.0	10.6	20.8	1.97

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building bricks at 2100°-2300°F).

FORSYTH COUNTY - Continued

SAMPLE: 34F-3

Formation: Diorite-gabbro

Location: West Bend site in SW corner of Forsyth Co. on S side of SR 1001, 0.4 mi S of intersection with U.S. Highway 421.

Description: Roadcut, 5 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-43.9%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	30.6	46.2	1.51
1900	Orange tan	3	7.5	29.9	46.0	1.54
2000	Light brown	3	10.0	25.5	41.7	1.63
2100	Light brown	3	15.0	19.6	35.8	1.83
2200	Brown	5	15.0	17.5	33.3	1.90
2300	Red brown	5	15.0	15.8	30.6	1.94

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building bricks at 2200°-2300°F); high shrinkage at 2200°-2300°F.

FRANKLIN COUNTY

Five residual clay samples were collected from different selected sites in Franklin County. Laboratory tests indicate potential uses of the samples as follows:

Sample No.	Formation	Potential Use
35F - 1	Carolina Slate Belt	Not suitable for structural clay products.
35F - 2	Carolina Slate Belt	Not suitable for structural clay products.
35F - 3	Carolina Slate Belt	Structural clay products.
35F - 4	Granite	Structural clay products.
35F - 5	Mica gneiss	Not suitable for structural clay products.

FRANKLIN COUNTY

SAMPLE: 35F-1

Formation: Carolina Slate Belt, felsic volcanics

Location: Portis gold mine site, N pit, on S side of N.C. Highway 561, 0.2 mi W of Nash Co. line.

Description: Barren red erosion gullies on N side of plant site.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 10 ft over 50-ft section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.1%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 35F-2

Formation: Carolina Slate Belt, felsic volcanics

Location: Portis gold mine site, S pit, on S side of N.C. Highway 561, 0.2 mi W of Nash Co. line and approximately 0.3 mi SW of plant site on S side of small stream.

Description: Barren clay and saprolite around abandoned mine site; area is steeply gullied to 20- to 25-ft depths.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 2 ft up 20-ft face of ravine.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.5%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

FRANKLIN COUNTY - Continued

SAMPLE: 35F-3

Formation: Carolina Slate Belt, intermediate volcanics

Location: Pilot site on SE Franklin Co. on SW corner of U.S. Highway 64-SR 1739 intersection 3.6 mi E of U.S. Highway 64-N.C. Highway 39 junction in Pilot.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 200-ft section S from U.S. Highway 64 ditch along W side of SR 1739; random elevations sampled.

Unfired Properties: Water of plasticity-34.3%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown orange	2	7.5	32.2	48.6	1.51
1900	Brown orange	2	7.5	28.9	44.7	1.53
2000	Dark orange	3	7.5	27.6	44.2	1.62
2100	Lt. red brown	5	10.0	21.4	37.5	1.75
2200	Brown red	6	12.5	20.5	37.3	1.82

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

SAMPLE: 35F-4

Formation: Granite

Location: Louisburg site in central Franklin Co. 2 mi W of intersection with U.S. Highway 401 on N side of N.C. Highway 56 and 0.4 mi E of intersection with SR 1114, adjacent to Seaboard Coastline Railroad, 2.8 mi SW of center of Louisburg.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.8%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	28.1	42.0	1.49
1900	Tan	3	5.0	26.7	40.5	1.52
2000	Tan	3	5.0	20.2	33.8	1.68
2100	Light brown	5	5.0	19.2	32.4	1.69
2200	Light brown	5	7.5	18.2	30.9	1.70
2300	Salmon	5	7.5	15.7	27.9	1.78

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

FRANKLIN COUNTY - Continued

SAMPLE: 35F-5

Formation: Mica gneiss

Location: Franklinton site in W Franklin Co. 0.4 mi W of U.S. Highway 1 intersection at Franklinton on N side of N.C. Highway 56.

Description: Roadcut, 6 ft high, 300 ft long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.6%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	29.4	41.6	1.42
1900	Tan	3	2.5	28.2	41.7	1.48
2000	Tan	3	2.5	25.0	38.3	1.53
2100	Light brown	5	5.0	24.8	38.3	1.53
2200	Light brown	5	7.5	23.6	37.2	1.58
2300	Light brown	6	7.5	22.4	35.9	1.60

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high absorption.

GASTON COUNTY

Seven residual clay samples were collected from different selected locations in Gaston County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
36G - 1	Diorite-gabbro	Not suitable for structural clay products.
36G - 2	Mica schist	Not suitable for structural clay products.
36G - 3	Granite	Not suitable for structural clay products.
36G - 4	Mica gneiss	Not suitable for structural clay products.
36G - 5	Hornblende gneiss	Not suitable for structural clay products.
36G - 6	Kings Mountain Group	Not suitable for structural clay products.
36G - 7	Cherryville quartz monzonite	Not suitable for structural clay products.

GASTON COUNTY

SAMPLE: 36G-1

Formation: Diorite-gabbro

Location: Mount Holly site in E-central Gaston Co. 1 mi WNW of center of Mount Holly at SE end of Kendrick St. 0.1 mi SW of N.C. Highway 27 at entrance to abandoned bee-hive brick plant on Seaboard Coast Line RR.

Description: Roadcut remnant, 3-4 ft high piles.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 5 ft over 20-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	29.3	46.2	1.58
1900	Orange tan	2	7.5	26.4	42.7	1.61
2000	Orange tan	3	7.5	26.2	42.7	1.63
2100	Light brown	3	10.0	24.0	40.3	1.68
2200	Light brown	3	10.0	20.3	37.9	1.86
2300	Red brown	3	10.0	20.0	35.3	1.76

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 36G-2

Formation: Mica schist

Location: Gastonia site in E-central Gaston Co. 4.7 mi NE of center of Gastonia on E side of SR 2200, 0.7 mi N of SR 2332 in Rex community and 0.3 mi N of abandoned railway crossing.

Description: Roadcut, 15 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-42.0%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 36G-3

Formation: Granite

Location: Lucia site in NE corner of Gaston Co. 1.2 mi ENE of Lucia on N side of SR 1909, 100 ft W of Piedmont and Northern Railway and 1.4 mi E of N.C. Highway 16.

Description: Roadcut, 2 ft high, 150 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	31.6	47.4	1.50
1900	Orange tan	2	5.0	27.6	43.8	1.59
2000	Orange tan	2	7.5	23.9	40.0	1.67
2100	Light brown	3	10.0	19.3	35.5	1.84
2200	Light brown	3	10.0	18.3	33.9	1.85
2300	Red brown	3	12.5	17.1	32.3	1.89

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 36G-4

Formation: Mica gneiss

Location: Alexis site in NE Gaston Co. 1 mi SE of center of Alexis on E side of N.C. Highway 27 and Seaboard Coast Line Railway 100 ft S of intersection with SR 1828.

Description: Roadcut, 5 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.4%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	40.0	52.6	1.32
1900	Orange tan	2	5.0	35.3	49.3	1.40
2000	Orange tan	2	7.5	33.0	47.8	1.45
2100	Orange tan	3	10.0	27.8	43.5	1.56
2200	Light brown	3	10.0	24.5	40.3	1.65
2300	Dark red	3	10.0	17.6	32.1	1.82

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

GASTON COUNTY - Continued

SAMPLE: 36G-5

Formation: Hornblende gneiss

Location: Dallas site in N-central Gaston Co. 2.8 mi N of center of Dallas on S side of SR 1802, 0.9 mi NW of intersection with SR 1001 and 0.3 mi W of Carolina and Northern Railway crossing.

Description: Roadcut, 10 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Greenish brown

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut, near middle.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products, no bond.

SAMPLE: 36G-6

Formation: Kings Mountain Group

Location: Bessemer City site in W-central Gaston Co. 2 mi WSW of center of Bessemer City on S bank of Southern Railway 100 ft W of SR 1401 crossing and 200 ft N of N.C. Highway 161.

Description: Railway cut, 10 ft high, 250 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of railway cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	38.5	51.1	1.33
1900	Orange tan	2	5.0	37.8	50.6	1.34
2000	Orange tan	2	5.0	35.7	48.8	1.37
2100	Light brown	2	5.0	34.2	48.8	1.43
2200	Dark red	3	5.0	28.7	44.0	1.53
2300	Dark red	3	7.5	19.7	33.8	1.72

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

GASTON COUNTY - Continued

SAMPLE: 36G-7

Formation: Cherryville quartz monzonite

Location: Cherryville site in NW Gaston Co. 1.9 mi WSW of the center of Cherryville on S side of SR 1470, 0.3 mi W of intersection of SR 1426 and 0.1 mi S of Seaboard Coast Line Railway.

Description: Roadcut, 3 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-45.6%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	38.6	52.6	1.35
1900	Orange tan	2	5.0	34.3	48.6	1.42
2000	Orange tan	3	10.0	26.0	41.5	1.60
2100	Light brown	3	15.0	18.7	33.9	1.81
2200	Light red	3	15.0	16.5	30.9	1.87
2300	Dark red	4	15.0	14.9	28.3	1.91

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

GRANVILLE COUNTY

A total of eight shale and residual clay samples were collected from different selected sites in Granville County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
39G - 1	Upper Triassic	Not suitable for structural clay products.
39G - 2	Upper Triassic	Not suitable for structural clay products.
39G - 3	Carolina Slate Belt	Structural clay products.
39G - 4	Carolina Slate Belt	Structural clay products.
39G - 5	Carolina Slate Belt	Not suitable for structural clay products.
39G - 6	Gabbro	Structural clay products.
39G - 7	Granite	Structural clay products.
39G - 8	Mica gneiss	Not suitable for structural clay products.

GRANVILLE COUNTY

SAMPLE: 39G-1

Formation: Upper Triassic, Newark Group

Location: Hester site on E side of U.S. Highway 15, 0.15 mi SW of SR 1635, 3.85 mi NE of Hester.

Description: Red-brown shale in 2- to 5-ft high gently inclined roadcut that is 100-150 ft long; attitude of bedding-NE, 15° SE.

Type Material: Shale

Color: Dark brown

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	10.0	16.9	26.9	1.59
1900	Light brown	3	12.5	9.3	19.2	2.07
2000	Brown	4	17.5	2.5	5.9	2.31
2100	Dark brown	5	17.5	1.6	3.8	2.37
2200	Dark brown	6	17.5	1.3	3.0	2.39
2300	---	---	(Expanded)			

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 39G-2

Formation: Upper Triassic, Newark Group

Location: Tar River site on SR 1633 approximately 2.9 mi SE of the village of Tar River; 0.7 mi W of intersection with N.C. Highway 96.

Description: Red-brown shale in 2- to 3-ft high roadcut, 250-300 ft long; attitude of bedding-NE, 15-20° SE.

Type Material: Shale

Color: Light red

Sampled Interval: Every 20 ft over 200-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.8%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	10.0	27.9	43.7	1.57
1900	Light brown	3	12.5	24.4	40.6	1.66
2000	Light brown	4	15.0	17.2	32.3	1.88
2100	Brown	6	20.0	12.5	25.7	2.05
2200	Brown	6	20.0	11.1	23.4	2.10
2300	Dark brown	6	20.0	8.0	17.8	2.22

Remarks: Good color; high shrinkage; a heavy clay; slight warping; addition of alkali would improve clay.

Potential Use: Not suitable for structural clay products; high shrinkage.

GRANVILLE COUNTY - Continued

SAMPLE: 39G-3

Formation: Carolina Slate Belt, felsic volcanics

Location: Berea site in W-central Granville Co. on S side of U.S. Highway 158, 0.7 mi E of Person-Granville Co. line and 3 mi W of Berea.

Description: Roadcut, gently sloping, 5 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Light yellow

Sampled Interval: Every 20 ft over 60-ft section along E end of cut at base.

Unfired Properties: Water of plasticity-31%; working properties-plastic; drying shrinkage-5.0%; dry strength-excellent; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Lt. yellow orange	2	7.5	21.4	36.0	1.68
1900	Lt. yellow orange	3	7.5	20.8	35.6	1.71
2000	Yellow orange	4	10.0	19.4	34.3	1.77
2100	Lt. yellow orange	5	10.0	17.1	32.3	1.89
2200	Lt. yellow orange	5	10.0	17.1	32.3	1.89

Potential Use: Structural clay products (e.g., building bricks at 2000°-2200°F).

SAMPLE: 39G-4

Formation: Carolina Slate Belt, intermediate volcanics

Location: Oak Hill site in NW Granville Co. on SW side of N.C. Highway 96 approximately 3 mi SE of Oak Hill and across road from cemetery 1.3 mi SE of SR 1415.

Description: Roadcut, 6 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 10 ft over 50-ft section at N end of cut.

Unfired Properties: Water of plasticity-39%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Yellow orange	2	10.0	30.5	46.4	1.52
1900	Yellow orange	2	10.0	29.5	44.8	1.52
2000	Brown orange	3	12.5	24.5	39.7	1.62
2100	Yellow orange	4	12.5	22.9	39.1	1.71
2200	Yellow orange	5	12.5	20.3	35.7	1.76

Potential Use: Structural clay products (e.g., building bricks at 2200°F).

GRANVILLE COUNTY - Continued

SAMPLE: 39G-5

Formation: Carolina Slate Belt, mafic volcanics

Location: Stovall site in extreme NE corner of Granville Co. 1.4 mi E of Stovall on the S side of SR 1430.

Description: Roadcut, 3-4 ft high, 0.1 mi long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Light red brown

Sampled Interval: Every 5 ft over 30-ft section at E end of cut.

Unfired Properties: Water of plasticity-42%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Yellow orange	2	15.0	28.5	49.9	1.75
1900	Yellow orange	3	15.0	23.5	39.2	1.67
2000	Medium tan	4	15.0	22.2	38.6	1.62
2100	Medium tan	5	20.0	20.0	36.0	1.93
2200	Gray red	7	20.0	12.7	26.4	2.08

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 39G-6

Formation: Gabbro

Location: Bullock site in NE Granville Co. 3 mi NW of Bullock on E side of SR 1446, 0.3 mi S of intersection with SR 1443.

Description: Roadcut, 5 ft high, 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.4%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	25.6	41.3	1.61
1900	Orange tan	3	5.0	25.2	41.1	1.63
2000	Light brown	5	7.5	18.9	34.3	1.79
2100	Light brown	5	10.0	18.9	33.8	1.82
2200	Dark brown	5	10.0	18.0	32.8	1.82
2300	Red brown	5	12.5	15.7	29.7	1.89

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building bricks at 2000°-2300°F).

GRANVILLE COUNTY - Continued

SAMPLE: 39G-7

Formation: Granite

Location: Oxford site in central Granville Co. 4 mi S of center of Oxford on N side of SR 1134, 0.3 mi W of U.S. Highway 15 and on E side of I-85.

Description: Roadcut, 2 ft high, 100 ft long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft along face of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.8%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	15.2	28.4	1.86
1900	Orange tan	3	5.0	13.8	26.4	1.92
2000	Light brown	3	7.5	11.9	23.5	1.97
2100	Medium brown	5	10.0	11.2	22.1	1.97
2200	Dark brown	5	12.5	3.7	8.3	2.19
2300	Dark brown	6	12.5	1.5	3.2	2.25

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building bricks at 2100°-2300°F).

SAMPLE: 39G-8

Formation: Mica gneiss

Location: Grissom site in SE corner of Granville Co. on E side of SR 1717, 0.25 mi N of SR 1711 intersection in Grissom.

Description: Roadcut, 3 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft from 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.4%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	30.3	44.0	1.45
1900	Tan	2	5.0	28.9	42.3	1.46
2000	Tan	2	5.0	27.0	41.3	1.53
2100	Light brown	2	5.0	24.8	38.9	1.57
2200	Medium brown	2	5.0	23.3	37.5	1.61
2300	Dark red	2	7.5	22.3	36.2	1.62

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; poor bond.

GUILFORD COUNTY

Five residual clay samples were collected from selected sites in Guilford County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
41G - 1	Carolina Slate Belt	Not suitable for structural clay products.
41G - 2	Carolina Slate Belt	Structural clay products.
41G - 3	Granite	Structural clay products.
41G - 4	Mica schist	Structural clay products.
41G - 5	Mica gneiss	Not suitable for structural clay products.

GUILFORD COUNTY

SAMPLE: 41G-1

Formation: Carolina Slate Belt, intermediate volcanics

Location: Climax site in SE Guilford Co. 0.9 mi E of N.C. Highway 62 and N.C. Highway 22 junction at E edge of Climax; on N side of N.C. Highway 62 0.2 mi W of SR 3380 intersection.

Description: Roadcut, 3 ft high, 0.1 mi long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 5 ft over 25-ft section along base and near center of cut.

Unfired Properties: Water of plasticity-47%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium brown	2	15.0	28.1	46.4	1.63
1900	Medium brown	3	15.0	28.1	45.8	1.65
2000	Medium tan	6	15.0	27.6	45.8	1.66
2100	Orange brown	7	20.0	14.9	33.7	2.26
2200	Light purple	7+	22.5	10.3	23.7	2.29

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 41G-2

Formation: Carolina Slate Belt

Location: Gibsonville site in E-central Guilford Co. 1.6 mi SW of center of Gibsonville on E side of N.C. Highway 61-100, 0.2 mi N of junction of N.C. Highways 100 and 61.

Description: Roadcut, 3 ft high, 300 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange	3	5.0	32.0	48.5	1.51
1900	Orange brown	3	5.0	30.8	47.8	1.55
2000	Light brown	5	10.0	20.2	36.8	1.82
2100	Medium brown	5	15.0	15.4	30.8	2.00
2200	Dark brown	5	15.0	13.3	27.5	2.06
2300	Red brown	6	15.0	11.3	24.5	2.16

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2000°F); high shrinkage above 2000°F.

GUILFORD COUNTY - Continued

SAMPLE: 41G-3

Formation: Granite

Location: Mcleansville site in E-central Guilford Co. 1 mi E of center of Mcleansville on W side of SR 2755, 0.1 mi S or SR 2746.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.1%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	33.3	49.3	1.48
1900	Orange tan	4	5.0	31.1	47.1	1.51
2000	Orange tan	4	7.5	27.9	43.3	1.55
2100	Light red	5	10.0	16.8	32.1	1.91
2200	Light red	5	12.5	14.7	28.8	1.96
2300	Red	5	15.0	13.5	26.9	2.00

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); high shrinkage at 2300°F.

SAMPLE: 41G-4

Formation: Mica schist

Location: Rudd site in N-central Guilford Co. 1.5 mi NE of Rudd on E side of SR 2526 and 0.7 mi SW of intersection with U.S. Highway 29.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.8%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	29.8	46.3	1.55
1900	Orange tan	4	5.0	27.8	44.8	1.61
2000	Orange tan	4	5.0	25.0	41.3	1.65
2100	Light brown	5	10.0	15.5	30.2	1.94
2200	Light brown	5	12.5	14.9	29.4	1.98
2300	Red brown	6	15.0	12.4	26.0	2.10

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); high shrinkage at 2300°F.

GUILFORD COUNTY - Continued

SAMPLE: 41G-5

Formation: Mica gneiss

Location: Stokesdale site in NW corner of Guilford Co. 2.5 mi W of U.S. Highway 158 jct. with N.C. Highway 65 on W side of Stokesdale, on E side of SR 2038, 0.4 mi S of N.C. Highway 65.

Description: Roadcut, 3-4 ft high, 0.5 mi long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	2.5	31.1	46.3	1.49
1900	Light tan	2	2.5	29.7	44.9	1.51
2000	Light tan	3	2.5	28.2	42.9	1.52
2100	Light brown	3	5.0	22.2	35.6	1.60
2200	Light brown	3	5.0	21.4	35.2	1.65
2300	Light red	3	5.0	19.7	33.8	1.72

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

HALIFAX COUNTY

Four residual clay samples were collected from different selected locations in Halifax County. Laboratory tests provide comparative information on one sample presently used and indicate a potential for the other three samples as follows:

Sample No.	Formation	Potential Use
42H - 1	Carolina Slate Belt	Present: Face-brick mixtures.
42H - 2	Carolina Slate Belt	Not suitable for structural clay products.
42H - 3	Granite	Not suitable for structural clay products.
42H - 4	Mica gneiss	Not suitable for structural clay products.

HALIFAX COUNTY

SAMPLE: 42H-1

Formation: Carolina Slate Belt, felsic and mafic volcanics

Location: Nash Brick Co. Ita plant, on W side of SR 1339, 0.5 mi SE of Ita in SW corner of Halifax Co.

Description: Plant stockpile, composite of 8 different layers of material; colors range from deep red to buff, gray, and brown; attitude of cleavage in area-N 60°E, 50°NW.

Type Material: Residual clay

Color: Tan

Sampled Interval: Caught portions of sample every 10 seconds over 60-second period from conveyor belt to brick plant.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.9%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	20.4	34.7	1.70
1900	Tan	2	2.5	18.3	32.4	1.77
2000	Light brown	3	7.5	12.9	25.2	1.95
2100	Red brown	4	10.0	5.9	12.8	2.17
2200	Dark brown	5	10.0	3.0	6.7	2.23
2300	Dark brown	6	10.0	2.1	4.4	2.10

Other Tests: Not effervescent with HCl.

Present Use: Face-brick mixtures.

SAMPLE: 42H-2

Formation: Carolina Slate Belt, felsic volcanics

Location: White Oak site on S side of SR 1338, 0.5 mi W of its intersection with SR 1343 in White Oak.

Description: Roadcut about 300 ft long and 10 ft high on both sides of road.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.5%; working properties-plastic; drying shrinkage-2.5%; dry strength-low; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

HALIFAX COUNTY - Continued

SAMPLE: 42H-3

Formation: Granite

Location: Roanoke Rapids site in N-central Halifax Co. 6 mi WSW of center of Roanoke Rapids on E side of SR 1424, 0.7 mi N of U.S. Highway 158 intersection.

Description: Roadcut, 4 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along N end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.7%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	0.0	26.2	40.7	1.55
1900	Orange tan	3	0.0	25.8	40.0	1.56
2000	Orange tan	3	2.5	24.4	39.2	1.65
2100	Orange tan	3	2.5	22.5	37.2	1.65
2200	Light brown	3	5.0	19.5	33.8	1.73
2300	Salmon	3	5.0	18.9	32.9	1.74

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 42H-4

Formation: Mica gneiss

Location: Littleton site in NW Halifax Co. on N side of U.S. Highway 158, 3.5 mi NE of intersection with N.C. Highway 4 in Littleton and 0.9 mi NE of SR 1409 intersection.

Description: Roadcut, 5 ft high, 100 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft face of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.8%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	33.6	47.4	1.41
1900	Tan	3	2.5	33.0	46.7	1.41
2000	Tan	3	5.0	32.4	46.6	1.44
2100	Light brown	3	7.5	26.9	42.0	1.57
2200	Medium brown	4	7.5	23.9	38.8	1.63
2300	Dark red	4	10.0	23.1	38.1	1.65

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high absorption.

HARNETT COUNTY

A total of eleven samples of phyllite (shale) and clay were collected from eight locations in Harnett County. Laboratory tests provide comparative information on the four samples recently used and indicate potential uses for seven additional samples as follows:

Sample No.	Formation	Potential Use
43H - 1	Carolina Slate Belt	Recent: Shrinkage control in face-brick mixtures.
43H - 2	Carolina Slate Belt	Recent: Nonplastic component in face-brick mixtures; unsuccessful use for lightweight aggregate.
43H - 3	Blend of sedimentary clay and Carolina Slate Belt	Recent: Face brick.
43H - 4	Sedimentary river clay	Recent: Face brick.
43H - 5	Carolina Slate Belt	Not suitable for structural clay products.
43H - 6	Tuscaloosa Formation (?)	Structural clay products.
43H - 7	Tuscaloosa Formation (?)	Structural clay products.
43H - 8	Tuscaloosa Formation (?)	Structural clay products.
43H - 9	Carolina Slate Belt	Not suitable for structural clay products.
43H - 10	Mica gneiss	Not suitable for structural clay products.
43H - 11	Hornblende gneiss	Not suitable for structural clay products.

HARNETT COUNTY

SAMPLE: 43H-1

Formation: Carolina Slate Belt, felsic volcanic phyllite

Location: Heritage Brick Co. (formerly Norwood Brick Co.) shale mine 0.9 mi NW of U.S. Highway 421 in Lillington; on N side of SR 1257; company inactive in 1979.

Description: Pit circular at surface, approximately 300 ft in diameter, generally 40 ft deep; in W part of pit smaller pit 30 ft by 60 ft by 20 ft deep has been excavated; attitude of cleavage and laminations-N 35°E, 45°NW.

Type Material: Weathered phyllite (shale)

Color: Yellow

Sampled Interval: Every 10 ft along bottom of 40-ft face at N side of pit over a 60-ft section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	33.9	47.1	1.39
1900	Tan	2	2.5	31.1	45.4	1.46
2000	Light brown	2	5.0	25.6	40.7	1.59
2100	Medium brown	3	7.5	20.8	35.6	1.71
2200	Dark brown	4	10.0	9.0	18.6	1.97
2300	Dark brown	5	12.5	2.5	4.9	2.07

Other Tests: Not effervescent with HCl.

Recent Use: Shrinkage control in face-brick mixtures.

SAMPLE: 43H-2

Formation: Carolina Slate Belt, felsic volcanic phyllite

Location: Heritage Brick Co. (formerly Norwood Brick Co.) shale mine 0.9 mi NW of U.S. Highway 421 in Lillington on N side of SR 1257; company inactive in 1979.

Description: Pit circular at surface, approximately 300 ft in diameter, generally 40 ft deep; in W part of pit smaller pit 30 ft by 60 ft deep has been excavated; attitude of cleavage and laminations-N 35°E, 45°NW.

Type Material: Fresh phyllite (shale)

Color: Gray

Sampled Interval: Every 20 ft over 80-ft section along floor at N side of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.5%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Recent Use: Nonplastic component in face-brick mixtures; unsuccessful use for lightweight aggregate.

HARNETT COUNTY - Continued

SAMPLE: 43H-3

Formation: Carolina Slate Belt, felsic volcanic phyllite and sedimentary river clay.

Location: Heritage Brick Co. (formerly Norwood Brick Co.) plant on N side of U.S. Highway 401-421 in N edge of Lillington and on W side of Cape Fear River; company inactive in 1979.

Description: 15-ft high stockpile in sheltered storage.

Type Material: Sedimentary clay and phyllite (shale) blend

Color: Gray

Sampled Interval: Every 5 ft over 30-ft section around base of stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.1%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	5.0	19.0	33.3	1.75
1900	Light tan	3	5.0	17.9	32.0	1.79
2000	Light brown	4	7.5	14.5	27.4	1.89
2100	Medium brown	5	10.0	12.1	23.8	1.96
2200	Dark brown	6	10.0	4.5	9.5	2.11
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Recent Use: Face brick.

SAMPLE: 43H-4

Formation: Sedimentary river clay

Location: Heritage Brick Co. (formerly Norwood Brick Co.) plant on N side of U.S. Highway 401-421 in N edge of Lillington and W side of Cape Fear River; company inactive in 1979.

Description: Stockpile in sheltered storage; 75% of this "Ideal" river clay is mixed with 25% Norwood shale.

Type Material: Sedimentary clay

Color: Tan

Sampled Interval: Every 10 ft over 60-ft section along middle of stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.8%; working properties-moderate plasticity; drying shrinkage-5.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	5.0	18.0	32.2	1.79
1900	Dark tan	2	5.0	16.3	30.0	1.84
2000	Light brown	3	7.5	13.6	26.0	1.91
2100	Medium brown	4	7.5	12.1	23.7	1.96
2200	Dark brown	5	10.0	7.2	15.1	2.10
2300	Dark gray	6	12.5	2.1	5.2	2.46

Other Tests: Not effervescent with HCl.

Recent Use: Face brick.

HARNETT COUNTY - Continued

SAMPLE: 43H-5

Formation: Carolina Slate Belt, felsic volcanic phyllite

Location: Tripp site on farm road 0.3 mi NW of SR 1436 and 0.7 mi E of U.S. Highway 401, approximately 2 mi N of Lillington.

Description: Benched excavation on hillside, 10-15 ft high, 400 ft long from E to W and feathers out in approximately 200 ft to the N; attitude of laminations and bedding-N 50° E, vertical to 70° NW, one syncline has N plunge.

Type Material: Phyllite (shale)

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section in 5-ft high face of small 130-ft wide bench on N side of 400-ft long by 200-ft wide bench.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.9%; working properties-low plasticity; drying shrinkage-2.5%; dry strength-poor; pH-6.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 43H-6

Formation: Cretaceous, Tuscaloosa Formation or possibly younger

Location: Johnsonville Site on N side of N.C. Highway 27, 0.4 mi W of Johnsonville and just W of SR 1106.

Description: Roadcut, 6 ft high, on N side of road.

Type Material: Sedimentary clay

Color: Light gray

Sampled Interval: Every 5 ft over 20-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.9%; working properties-moderate plasticity; drying shrinkage-5.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Cream	2	5.0	21.9	37.2	1.70
1900	Cream	2	5.0	21.9	37.2	1.70
2000	Cream	3	7.5	21.0	36.5	1.74
2100	Cream	4	7.5	18.7	33.7	1.80
2200	Ivory	5	10.0	13.7	26.0	1.90
2300	Buff	6	12.5	11.3	23.4	2.07

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building bricks at 2100°-2300°F);

HARNETT COUNTY - Continued

SAMPLE: 43H-7

Formation: Cretaceous, Tuscaloosa Formation or possibly younger

Location: Becker County Sand & Gravel Co., Senter Plant, located at E end of SR 2020 approximately 1 mi E of U.S. Highway 401 and 4.5 mi SE of center of Lillington.

Description: Pit; 1-2 ft of sand and topsoil and 10-15 ft of clay overlaying 25- to 30-ft strata of sand and gravel; horizontal bedding.

Type Material: Sedimentary clay

Color: Yellow

Sampled Interval: Blend of 2 grab samples 10 ft apart along dragline cut at NW corner of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	5.0	18.6	32.7	1.76
1900	Dark tan	2	5.0	18.0	32.4	1.80
2000	Dark tan	3	7.5	15.4	28.8	1.87
2100	Light brown	4	7.5	14.0	26.7	1.91
2200	Brown	5	7.5	12.3	24.0	1.95
2300	Dark brown	6	10.0	10.9	21.9	2.01

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 43H-8

Formation: Cretaceous, Tuscaloosa Formation or possibly younger

Location: Becker County Sand & Gravel Co., Senter Plant, located at E end of SR 2020 approximately 1 mi E of U.S. Highway 401 and 4.5 mi SE of center of Lillington.

Description: Overburden strippings, 100 yd long by 60 ft high pile of clay and topsoil.

Type Material: Sedimentary clay

Color: Tan

Sampled Interval: Every 10 ft up 60-ft high face at NW end of overburden pile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	17.8	31.3	1.76
1900	Tan	2	5.0	15.9	28.8	1.81
2000	Tan	3	7.5	12.2	23.3	1.91
2100	Light brown	4	7.5	9.7	19.3	1.99
2200	Brown	5	10.0	7.8	15.8	2.03
2300	Gray brown	6	10.0	6.5	13.8	2.12

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

HARNETT COUNTY - Continued

SAMPLE: 43H-9

Formation: Carolina Slate Belt, felsic volcanics

Location: Angier site in NE edge of town of Angier on N side of SR 1502, 0.3 mi NE of junction with SR 1500.

Description: Ditch and bank exposing 2-ft high face on N side of road; extends under thin veneer of sandy Coastal Plain soil; white clay occurs for 0.5 mi NE along SR 1502.

Type Material: Residual clay

Color: White tan

Sampled Interval: Every ft over 3-ft section along middle elevation of bank, near center.

Unfired Properties: Water of plasticity-28%; drying shrinkage-2.5%; dry strength-poor; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Lt. reddish brown	1	2.5	40.6	31.2	1.26
1900	Lt. reddish brown	1	2.5	35.5	45.8	1.29
2000	Pale yellowish pink	1	2.5	33.0	46.2	1.36
2100	Pale yellowish pink	1	2.5	32.8	44.9	1.41
2200	White	1	5.0	32.2	45.7	1.42

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 43H-10

Formation: Mica gneiss

Location: Lillington North site in N-central Harnett Co. 9.3 mi N of center of Lillington on N side of SR 1415, 0.7 mi W of U.S. Highway 401 intersection and Norfolk Southern Railway at Rawls.

Description: Roadcut, 6 ft high, 300 ft long.

Type Material: Residual clay

Color: Beige

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.3%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	38.8	51.1	1.32
1900	Tan	2	5.0	35.3	48.2	1.36
2000	Tan	2	5.0	31.6	45.1	1.43
2100	Orange tan	2	5.0	28.6	43.0	1.51
2200	Light brown	3	5.0	25.5	40.0	1.57
2300	Red brown	3	10.0	19.8	33.9	1.71

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

HARNETT COUNTY - Continued

SAMPLE: 43H-11

Formation: Hornblende gneiss

Location: Mamers site in NW Harnett Co. 4 mi NW of the center of Mamers on W side of SR 1265, 1.4 mi N of junction with SR 1266.

Description: Roadcut, 3 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.6%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	12.5	33.0	49.2	1.49
1900	Orange tan	3	12.5	29.6	46.8	1.58
2000	Orange tan	3	15.0	24.5	41.0	1.67
2100	Orange tan	4	15.0	18.1	34.7	1.92
2200	Light brown	4	20.0	9.3	20.5	2.20
2300	Red brown	4	25.0	9.0	20.5	2.27

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

IREDELL COUNTY

Eight residual clay samples and one blend of residual clay, sedimentary clay, and shale were collected from different selected sites in Iredell County. Laboratory tests provide comparative information on two presently used samples and indicate potential uses for seven additional materials as follows:

Sample No.	Formation	Potential Use
49I - 1	Mica gneiss	Not suitable for structural clay products.
49I - 2	Hornblende gneiss	Structural clay products.
49I - 3	Mica gneiss	Not suitable for structural clay products.
49I - 4	Mica gneiss	Not suitable for structural clay products.
49I - 5	Hornblende gneiss	Not suitable for structural clay products.
49I - 6	Blend of mica gneiss residuum, river clay, and Carolina Slate Belt	Present: Brick.
49I - 7	Mica gneiss	Present: Part of brick mixture.
49I - 8	Diorite-gabbro	Not suitable for structural clay products.
49I - 9	Granite	Not suitable for structural clay products.

IREDELL COUNTY

SAMPLE: 49I-1

Formation: Mica gneiss

Location: Cool Springs site 1.2 mi NW of Cool Springs on SE side of SR 2163 and I-40 interchange in E Iredell Co.

Description: SE quarter of interchange grading at 10 ft depth below original surface; attitude of lineations- NE-trending, steeply dipping.

Type Material: Residual clay

Color: Orange brown

Sampled Interval: Every 10 ft over 100-ft section along floor of cut.

Unfired Properties: Water of plasticity-55.2%; working properties-plastic; drying shrinkage-12.5%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	3	12.5	31.5	46.5	1.47
2100	Lt. reddish brown	6	17.5	28.5	43.8	1.54
2200	Moderate reddish brown	6	20.0	21.5	35.9	1.67
2300	Dk. grayish red	7	20.0	17.8	31.9	1.79

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 49I-2

Formation: Hornblende gneiss

Location: Vance site about 1 mi N of center of Vance on N side of I-40 and 0.6 mi SW of intersection with SR 2166.

Description: Roadcut, 0.1 mi long, 35 ft high; hornblende gneiss crops out in lower 15 ft; attitude of lineations- NE-trending, near vertical dip.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Unfired Properties: Water of plasticity-33.8%; working properties-plastic; drying shrinkage-10.0%; dry strength-fair.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	4	10.0	20.0	31.4	1.57
2100	Moderate reddish brown	4	10.0	18.6	31.0	1.66
2200	Moderate reddish brown	5	10.0	14.3	26.2	1.78
2300	Dark grayish reddish brown	7	12.5	10.4	18.6	1.83

Potential Use: Structural clay products (e.g., building brick, floor brick at 2000°-2300°F).

IREDELL COUNTY - Continued

SAMPLE: 49I-3

Formation: Mica gneiss

Location: Oswalt site 1.7 mi S of center of Oswalt on W side of U.S. Highway 21, 0.1 mi N of junction with SR 1312 in S Iredell Co.

Description: Roadcut on W side of U.S. Highway 21, 15 ft high, 0.1 mi long; attitude of lineations- NE-trending, steeply dipping.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 3 ft up 15-ft face of cut.

Unfired Properties: Water of plasticity-46.9%; working properties-plastic; drying shrinkage-12.5%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Moderate yellowish pink	3	12.5	28.2	38.7	1.37
2100	Moderate yellowish pink	6	12.5	24.3	35.4	1.46
2200	Lt. reddish brown	6	12.5	23.4	34.7	1.48
2300	Light grayish reddish brown	6	12.5	22.9	34.4	1.50

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 49I-4

Formation: Mica gneiss

Location: Harmony site 0.5 mi W of Harmony on N side of N.C. Highway 901 in N Iredell Co.

Description: Roadcut, 0.15 mi long, 15 ft high; attitude of lineations- NE-trending.

Type Material: Residual clay

Color: Orange brown

Sampled Interval: At E end, every 3 ft up 15-ft face of roadcut.

Unfired Properties: Water of plasticity-51.7%; working properties-plastic; drying shrinkage-15.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	3	15.0	33.0	48.5	1.47
2100	Lt. reddish brown	5	15.0	33.0	48.4	1.47
2200	Lt. reddish brown	5	17.5	24.9	40.0	1.61
2300	Moderate reddish brown	5	17.5	22.9	37.9	1.65

Potential Use: Not suitable for structural clay products; high shrinkage and absorption.

IREDELL COUNTY - Continued

SAMPLE: 49I-5

Formation: Hornblende gneiss

Location: Union Grove site 1.4 mi W of Union Grove on NW corner of junction of N.C. Highway 901 with SR 1809 in NW Iredell Co.

Description: Roadcut, 6 ft high; attitude of lineations- NE-trending.

Type Material: Residual clay

Color: Orange brown

Sampled Interval: Every ft up 6-ft face of cut on N side of road.

Unfired Properties: Water of plasticity-40.4%; working properties-short; drying shrinkage plastic basis-8.5%; dry strength-poor; drying properties-poor.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 49I-6

Formation: Blend of mica gneiss residuum (49I-7), Catawba River clay (18C-2), and Carolina Slate Belt argillite (80R-1)

Location: Statesville Brick Co. plant in SW Iredell Co. 9.8 mi WSW of the center of Statesville at the S end of SR 1377.

Description: Stockpile of ground and blended material.

Type Material: Residual clay and sedimentary clay and shale

Color: Tan

Sampled Interval: Random sample from stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.9%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	0.0	23.8	39.5	1.66
1900	Light brown	3	0.0	21.0	36.6	1.74
2000	Light brown	3	2.5	18.6	33.3	1.79
2100	Brown	5	5.0	14.0	27.0	1.93
2200	Dark brown	6	7.5	10.6	21.4	2.03
2300	Brown-black	7	10.0	2.8	6.4	2.25

Other Tests: Not effervescent with HCl.

Present Use: Brick.

IREDELL COUNTY - Continued

SAMPLE: 49I-7

Formation: Mica gneiss

Location: Statesville Brick Co. Statesville mine in SW Iredell Co. 10 mi WSW of the center of Statesville, 0.3 mi W of SR 1502, 0.3 mi S of its junction with I-40.

Description: Stockpile at plant.

Type Material: Residual clay

Color: Orange

Sampled Interval: Random sample along face of stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.8%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Brown	2	0.0	30.2	45.9	1.52
1900	Brown	2	0.0	29.2	45.2	1.55
2000	Brown	2	2.5	26.4	42.5	1.61
2100	Brown	3	5.0	24.8	40.8	1.64
2200	Brown	3	5.0	22.5	38.2	1.70
2300	Dark brown	3	7.5	17.5	32.4	1.80

Other Tests: Not effervescent with HCl.

Present Use: Part of brick mixture.

SAMPLE: 49I-8

Formation: Diorite-gabbro

Location: Elmwood site in E-central Iredell Co. on W side of SR 2311, 200 ft N of junction with U.S. Highway 70 and Southern Railway.

Description: Roadcut, 6 ft high, 250 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-44.0%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	10.0	34.3	50.7	1.48
1900	Orange tan	3	10.0	31.8	47.9	1.51
2000	Orange tan	3	10.0	27.7	44.4	1.60
2100	Orange tan	3	15.0	20.2	37.5	1.86
2200	Light brown	3	15.0	16.5	33.3	2.02
2300	Red brown	3	20.0	13.6	28.0	2.06

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage; too soft.

IREDELL COUNTY - Continued

SAMPLE: 49I-9

Formation: Granite

Location: Mooresville site in SE Iredell Co. on E side of SR 2395 adjacent to Southern Railway, 4.2 mi NE of center of Mooresville and 0.3 mi SW of SR 2362 junction at Mazeppa.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-44.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	41.0	53.2	1.30
1900	Orange tan	3	10.0	33.7	47.9	1.42
2000	Orange tan	3	10.0	32.4	47.1	1.43
2100	Orange tan	3	10.0	31.3	44.9	1.46
2200	Light brown	3	12.5	27.2	41.8	1.54
2300	Red brown	3	15.0	21.6	35.5	1.65

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

JOHNSTON COUNTY

Six residual clay samples and two sedimentary clay samples were collected from different selected sites in Johnston County. Laboratory tests provide comparative information for two samples recently used and indicate potential uses of six additional samples as follows:

Sample No.	Formation	Potential Use
51J - 1	Carolina Slate Belt	Not suitable for structural clay products.
51J - 2	Tuscaloosa Formation (?)	Recent: Tile.
51J - 3	Tuscaloosa Formation (?)	Recent: Tile.
51J - 4	Carolina Slate Belt	Structural clay products.
51J - 5	Carolina Slate Belt	Structural clay products.
51J - 6	Hornblende gneiss	Not suitable for structural clay products.
51J - 7	Granite	Not suitable for use in structural clay products.
51J - 8	Mica gneiss	Not suitable for structural clay products.

JOHNSTON COUNTY

SAMPLE: 51J-1

Formation: Carolina Slate Belt, felsic tuff

Location: Mitchner property on NW side of SR 1913, 1.6 mi NE of intersection with U.S. Highway 70, 0.2 mi N of bridge over Reedy Cr., 2 mi. N of center Smithfield.

Description: Roadcut exposure of gray to cream-colored clay, overlain by sand and gravel of Tuscaloosa Formation (?); attitude of cleavage-N 50° E, 60° NW(?).

Type Material: Residual clay

Color: Cream

Sampled Interval: Upper 6 in. of clay directly beneath contact with sand and gravel.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.0%; working characteristics-short, smooth; drying shrinkage-0.0%; dry strength-fair; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 51J-2

Formation: Tuscaloosa Formation (?)

Location: Crumpler Brick and Tile Co., Smithfield clay pit on W side of Neuse R. about 6 mi S of center of Smithfield at end of SR 1184, 1.3 mi NE of intersection with SR 1009.

Description: Mottled light gray and light orange clay layer; reported to underlie 50+ acres in layer 8-20 ft thick and averages about 12 ft; attitude-near horizontal.

Type Material: Clay

Color: Yellow

Sampled Interval: From covered stockpile of ground material blended with additive.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.2%; working properties-moderate plasticity; drying shrinkage-5.0%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	5	7.5	16.0	29.4	1.84
1900	Tan	6	10.0	9.7	19.5	2.01
2000	Tan	6	10.0	6.9	14.4	2.09
2100	Light brown	6	15.0	4.9	10.5	2.15
2200	Red brown	7	15.0	0.9	2.1	2.29
2300	---	---	(Expanded)			

Recent Use: Tile.

JOHNSTON COUNTY - Continued

SAMPLE: 51J-3

Formation: Tuscaloosa Formation (?)

Location: Crumpler Brick and Tile Co., Smithfield clay pit on W side of Neuse R. about 6 mi S of center of Smithfield at end of SR 1184, 1.3 mi NE of intersection with SR 1009.

Description: Mottled light gray and light orange clay layer; reported to underlie 50+ acres in layer 8-20 ft thick and averages about 12 ft; attitude-near horizontal.

Type Material: Clay

Color: Yellow

Sampled Interval: From covered stockpile of ground material.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.1%; working properties-moderate plasticity; drying shrinkage-5.0%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	4	7.5	13.9	26.1	1.88
1900	Tan	4	7.5	9.3	18.8	2.02
2000	Tan	6	10.0	6.6	13.9	2.10
2100	Light brown	6	10.0	4.5	9.8	2.17
2200	Red brown	7	12.5	1.5	3.4	2.28
2300	---	---	(Expanded)			

Recent Use: Tile.

SAMPLE: 51J-4

Formation: Carolina Slate Belt, felsic volcanics

Location: Hares Crossroads site in NE Johnston Co. on S side of N.C. Highway 42, 0.7 mi W of N.C. Highway 39 junction at Hares Crossroads and 0.2 mi W of Little River bridge.

Description: Roadcut, 5-8 ft high, 0.1 mi long; attitude of cleavage- N- to NE-trending.

Type Material: Residual clay

Color: Orange

Sampled Interval: Random sample over 100-ft section near middle of cut.

Unfired Properties: Water of plasticity-42.2%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Orange brown	2	7.5	35.9	50.6	1.41
2000	Orange brown	2	7.5	31.8	48.0	1.51
2100	Orange brown	3	10.0	27.3	43.4	1.59
2200	Lt. red brown	6	12.5	21.1	36.6	1.73
2300	Brown red	7	12.5	20.9	36.5	1.75

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

JOHNSTON COUNTY - Continued

SAMPLE: 51J-5

Formation: Carolina Slate Belt

Location: Bethel Church site in W-central Johnston Co. on McCullens Branch 0.5 mi E by farm road from point on SR 1551 which is 0.4 mi N of its intersection with SR 1312 at Bethel Church.

Description: Stream valley

Type Material: Residual clay

Color: White

Sampled Interval: Test pit

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.6%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-6.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Cream	2	0.0	34.5	44.3	1.27
1900	Cream	2	0.0	34.3	43.5	1.28
2000	Cream	3	0.0	32.1	42.4	1.32
2100	Ivory	3	0.0	29.5	40.7	1.38
2200	Gray	5	2.5	20.2	31.5	1.56
2300	Gray	5	2.5	15.7	26.1	1.67

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 51J-6

Formation: Hornblende gneiss

Location: Austins Pond site in W-central Johnston Co. 2.7 mi E of Drug Store community on S side of N.C. Highway 42, 0.1 mi E of intersection with SR 1549 at Austins Pond.

Description: Roadcut, 0.1 mi long, 4-5 ft high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.7%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-7.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	22.5	37.2	1.65
1900	Orange tan	3	5.0	22.0	36.7	1.67
2000	Light brown	3	5.0	17.8	32.0	1.80
2100	Light brown	3	7.5	15.9	29.2	1.83
2200	Medium brown	3	7.5	14.5	27.1	1.87
2300	Red brown	3	7.5	13.7	25.7	1.87

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

JOHNSTON COUNTY - Continued

SAMPLE: 51J-7

Formation: Granite

Location: Swift Creek site in W-central Johnston Co. on N side of N.C. Highway 42, 0.5 mi W of Swift Creek and 1.2 mi W of intersection with SR 1525.

Description: Roadcut, 300 ft long, slopes down from height of 15 ft at middle to road level at ends.

Type Material: Residual clay

Color: Orange

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.8%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for use in structural clay products.

SAMPLE: 51J-8

Formation: Mica gneiss

Location: Buffalo Creek site in W-central Johnston Co. on S side of N.C. Highway 42, 0.2 mi E of intersection with N.C. Highway 50.

Description: Roadcut, 0.1 mi long, ranges up from road level at ends to 25 ft height at middle.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-42.7%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	0.0	45.6	53.2	1.17
1900	Light brown	2	0.0	44.2	52.9	1.20
2000	Light brown	2	2.5	41.7	51.2	1.23
2100	Light brown	2	2.5	39.8	50.6	1.27
2200	Light brown	2	5.0	37.5	48.8	1.30
2300	Light brown	2	5.0	36.5	48.7	1.33

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

LEE COUNTY

Nine shale samples and one residual clay sample were collected from different selected locations in Lee County. Laboratory tests provide comparative information for three samples presently used and indicate potential uses of the seven additional samples as follows:

Sample No.	Formation	Potential Use
53L - 1	Upper Triassic	Present: Brick and tile.
53L - 2	Upper Triassic	Present: Brick and tile.
53L - 3	Upper Triassic	Present: Brick and tile.
53L - 4	Upper Triassic	Structural clay products.
53L - 5	Upper Triassic	Structural clay products.
53L - 6	Upper Triassic	Structural clay products.
53L - 7	Upper Triassic	Structural clay products.
53L - 8	Upper Triassic	Structural clay products.
53L - 9	Upper Triassic	Structural clay products.
53L - 10	Carolina Slate Belt	Structural clay products.

LEE COUNTY

SAMPLE: 53L-1

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Lee Brick & Tile Co., Sanford mine, on E side of U.S. Highway 15-501, 6 mi. N of center of Sanford 0.2 mi S of junction of SR 1466 and U.S. Highway 15-501,

Description: Very irregular pit measures about 1300 ft east-west by 700 ft north-south by 40 ft deep; thin yellow-brown to buff overburden covers beds of red-brown shale 10-25 ft thick interbedded with lenses of red-brown to brown arkosic sandstone 2-10 ft thick. Sandstone comprises 25% of material. Attitude of bedding-N 20° W, 12° SW.

Type Material: Shale
Color: Dark red

Sampled Interval: Every 10 ft along 100-ft section at base of ground material in plant's sheltered stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-17.6%; working properties-short; drying shrinkage-5.0%; dry strength-good; pH-6.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	16.0	28.6	1.79
1900	Tan	3	4.0	13.2	24.7	1.87
2000	Tan	4	5.0	9.9	19.7	1.99
2100	Light brown	5	5.0	5.9	12.6	2.14
2200	Dark brown	6	7.0	3.4	7.7	2.26
2300	---	---	(Melted)			

Present Use: Brick and tile.

SAMPLE: 53L-2

Formation: Upper Triassic, Newark Group, Sanford and Pekin Formations

Location: Borden Brick & Tile Co.; Sanford plant utilizes blend from 2 pits. Pit 1--at plant, 0.4 mi N of Sanford city limit, and 0.25 mi W of SR 1415. Pit 2--0.2 mi S of SR 1416, 0.25 mi E of SR 1415 junction, and 1 mi NE of plant. (0.6 mi N of SR 1560)

Description: Pit 1 is irregular in shape, 300 ft by 150 ft by 20 ft deep; 2-7 ft of yellow-brown overburden covers red-brown shale; thin lenses of brown sandstone, sandy shales, and conglomerates make up 15% of exposure. Three abandoned pits cover 300- by 500-ft area about 40 ft deep. Pit 2 contains same kind of materials as Pit 1 except non-shales are 30% of exposure; pit is roughly 600 ft square and 20 ft deep; currently main source of shale for plant; attitude of bedding-Pit 1-N 60°E, 15°SE; Pit 2-N 75°W, 21°SW, (faulting in area, overall strike and dip questionable).

Type Material: Shale
Color: Red brown

Sampled Interval: Every 10 ft over 100-ft section along base of plant's sheltered stockpile of ground materials.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	18.6	32.6	1.73
1900	Tan	3	2.5	17.8	30.7	1.73
2000	Brown	4	5.0	17.5	30.3	1.75
2100	Chocolate	5	10.0	6.5	13.5	2.08
2200	Dark brown	6	10.0	2.7	6.1	2.25
2300	---	---	(Expanded)			

Present Use: Brick and tile.

LEE COUNTY - Continued

SAMPLE: 53L-3

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Sanford Brick & Tile Co., Colon mine. Plant on E side of SR 1415-1420 junction at Colon; mine 0.5 mi SW of SR 1415-1420 junction.

Description: Current pit is 1500 ft by 1000 ft by 30-35 ft deep; 3-4 ft of brownish-orange soil covers red-brown shale; a few lenses of reddish-brown sandstone are exposed; some water in SW corner of pit; attitude of bedding-N 15°E, very low angle SE dip (almost horizontal).

Type Material: Shale

Color: Dark red

Sampled Interval: Every 5 ft over 50-ft section along base of plant's sheltered stockpile of ground material.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.2%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-6.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	2.0	19.6	33.2	1.70
1900	Tan	3	2.0	17.6	30.7	1.75
2000	Light brown	4	5.0	13.4	24.9	1.86
2100	Chocolate	5	10.0	5.8	12.3	2.11
2200	Very dk. brown	6	10.0	2.5	5.7	2.28
2300	---	---	(Melted)			

Present Use: Brick and tile.

SAMPLE: 53L-4

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Rosser site 1.3 mi N of Rosser on E side of SR 1002, 0.1 mi N of SR 1425 junction.

Description: Red-brown shale in 2- to 6-ft high roadcut; crops out intermittently from sample site for 1.3 mi to Rosser; attitude of bedding, NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.4%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	3	4.0	16.2	29.6	1.82
1900	Reddish tan	3	4.0	15.5	28.7	1.85
2000	Brown	4	9.0	9.9	20.1	2.03
2100	Chocolate	5	12.0	2.3	5.4	2.36
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F).

LEE COUNTY - Continued

SAMPLE: 53L-5

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Osgood site on S side of SR 1424, 0.1 mi E of intersection with SR 1423 at Osgood.

Description: Red-brown shale in 10-ft high roadcut; crops out intermittently over 2 mi radius; attitude of bedding-NE, 15°SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along base of gently sloping roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	2	0.0	24.3	38.3	1.57
1900	Reddish tan	3	5.0	21.2	34.5	1.63
2000	Light brown	4	10.0	17.1	29.8	1.74
2100	Chocolate	5	10.0	7.9	16.1	2.04
2200	Dark brown	6	12.5	2.8	6.3	2.26
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 2000°-2200°F).

SAMPLE: 53L-6

Formation: Upper Triassic, Newark Group, Sanford Formation

Location: Cumnock site 0.2 mi S of Cumnock on SR 1403, 0.1 mi E of Saint Pauls Church.

Description: Red-brown shale in 5- to 7-ft high roadcut; exposed along road to SE intermittently for 1.5 mi; attitude of bedding-NE, 10-20° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.8%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-6.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	18.9	31.6	1.67
1900	Tan	3	5.0	17.4	30.3	1.74
2000	Light brown	4	10.0	10.9	21.2	1.89
2100	Light brown	5	10.0	10.2	20.2	1.95
2200	Very dk. brown	6	10.0	1.8	3.8	1.98
2300	Dark gray	6	10.0	1.6	3.0	2.10

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); abrupt vitrification between 2100°-2200°F.

LEE COUNTY - Continued

SAMPLE: 53L-7

Formation: Upper Triassic, Newark Group, Sanford Formation

Location: James Wicker site approximately 4 mi SW of Cumnock on E side of SR 1007, 0.5 mi N of NC Highway 42 junction.

Description: Red-brown shale in 4- to 7-ft roadcut; crops out intermittently along SR 1007 for approximately 2 mi; attitude of bedding NE, 5-10° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	20.3	33.5	1.65
1900	Tan	3	5.0	17.6	30.6	1.74
2000	Chocolate	5	12.5	2.3	5.4	2.25
2100	Chocolate	6	12.5	2.0	4.5	2.35
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., floor brick at 2000°-2100°F).

SAMPLE: 53L-8

Formation: Upper Triassic, Newark Group, Sanford Formation

Location: West Sanford site 0.1 mi W of Sanford city limit on E side of U.S. Highway 1, 0.2 mi N of N.C. Highway 42 interchange.

Description: Red-brown shale in 15- to 20-ft high roadcut; exposed intermittently for approximately 2 mi radius; attitude of bedding-NE, 5-15° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Working properties-short; drying shrinkage-0.0%; dry strength-good; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	25.4	40.2	1.58
1900	Tan	2	2.5	24.1	39.3	1.63
2000	Tan	3	2.5	20.2	35.3	1.75
2100	Brown	4	5.0	7.8	17.1	2.19
2200	Chocolate	6	7.5	6.7	14.7	2.19
2300	Very dk. brown	6	7.5	5.8	12.8	2.21

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

LEE COUNTY - Continued

SAMPLE: 53L-9

Formation: Upper Triassic, Newark Group, Sanford Formation

Location: Center Church site on W side of SR 1007, 1.2 mi N of SR 1303 junction at Center Church in SW Lee County.

Description: Red-brown shale in 5- to 10-ft high gently inclined roadcut; exposed along SR 1007 intermittently for 0.3 mi to S and for 6 mi to N; attitude of bedding-NE, 10-15° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.6%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-3.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	26.5	41.4	1.56
1900	Tan	3	5.0	24.2	38.7	1.60
2000	Tan	3	5.0	19.7	33.8	1.71
2100	Brown	4	7.5	14.7	27.4	1.87
2200	Chocolate	5	10.0	11.6	23.0	1.98
2300	Very dk. gray	6	15.0	3.0	7.1	2.35

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); high absorption at 2300°F.

SAMPLE: 53L-10

Formation: Carolina Slate Belt, felsic volcanics

Location: Blacknel site in NE Lee Co. on SE side of S.R. 1466, 0.6 mi W of SR 1469 junction just W of Blacknel.

Description: Roadcut, 5 ft high, 400 ft long; attitude of cleavage- NE-trending, steeply dipping.

Type Material: Residual clay

Color: Dry, light orange; wet, dark orange

Sampled Interval: Every 20 ft over 100-ft section starting at W side of driveway at center of cut and working W.

Unfired Properties: Water of plasticity-37.8%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Light buff	3	10.0	25.7	40.3	1.57
2000	Orange yellow	3	12.5	21.9	36.8	1.68
2100	Light buff	5	12.5	18.8	32.9	1.75
2200	Yellow orange	7	15.0	14.4	26.9	1.87
2300	Yellow red	7	15.0	14.1	26.5	1.88

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°-2300°F); high shrinkage.

LINCOLN COUNTY

Five residual clay samples were collected from different selected sites in Lincoln County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
55L - 1	Granite	Not suitable for structural clay products.
55L - 2	Kings Mountain Group	Not suitable for struct. clay products.
55L - 3	Mica gneiss	Structural clay products.
55L - 4	Cherryville quartz monzonite	Not suitable for structural clay products.
55L - 5	Toluca quartz monzonite	Not suitable for structural clay products.

LINCOLN COUNTY

SAMPLE: 55L-1

Formation: Granite

Location: Iron Station site in SE Lincoln Co. 1 mi NW of the center of Iron Station on E side of SR 1317 and on SW side of Seaboard Coast Line Railway 0.4 mi S of intersection with SR 1318 at railroad crossing.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.4%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	28.2	44.3	1.57
1900	Tan	3	5.0	25.4	41.3	1.63
2000	Tan	3	7.5	22.7	38.4	1.68
2100	Orange tan	3	10.0	20.7	36.8	1.78
2200	Light brown	3	10.0	18.1	33.3	1.84
2300	Red brown	3	10.0	16.5	31.3	1.89

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 55L-2

Formation: Kings Mountain Group

Location: Lincolnton East site in central Lincoln Co. 3 mi E of the center of Lincolnton on S side of SR 1322, 0.3 mi E of intersection with SR 1001 and 0.7 mi S of Seaboard Coast Line Railway.

Description: Roadcut, 4 ft high, 150 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-48.5%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	7.5	41.2	56.3	1.37
1900	Orange tan	3	10.0	33.7	50.8	1.51
2000	Orange tan	3	15.0	18.9	36.7	1.94
2100	Light brown	4	20.0	12.6	27.9	2.21
2200	Light brown	4	20.0	9.1	21.4	2.36
2300	Red brown	4	25.0	7.1	17.9	2.51

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

LINCOLN COUNTY - Continued

SAMPLE: 55L-3

Formation: Mica gneiss

Location: Lincolnton North site in N-central Lincoln Co. 5.9 mi N of center of Lincolnton on N side of SR 1275 adjacent to Carolina and Northwestern Railway and 0.5 mi E of intersection with SR 1274.

Description: Roadcut, 2 ft high, 150 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	10.0	30.1	47.2	1.57
1900	Orange tan	3	10.0	28.0	44.6	1.59
2000	Orange tan	3	10.0	26.3	43.1	1.64
2100	Orange tan	3	10.0	22.0	39.1	1.78
2200	Light brown	4	12.5	19.7	36.9	1.88
2300	Red brown	4	12.5	16.9	32.8	1.93

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 55L-4

Formation: Cherryville quartz monzonite

Location: Crouse site in S-central Lincoln Co. 0.6 mi NE of center of Crouse on N side of SR 1175, 0.4 mi NE of intersection with SR 1176 and on S side of Carolina and Northwestern Railway.

Description: Roadcut, 7 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-6.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	10.0	28.9	44.3	1.52
1900	Tan	3	10.0	28.2	42.9	1.53
2000	Tan	3	10.0	23.1	38.4	1.66
2100	Tan	3	10.0	21.8	37.1	1.70
2200	Orange tan	3	12.5	19.1	33.8	1.77
2300	Salmon	3	12.5	15.2	27.9	1.84

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

LINCOLN COUNTY - Continued

SAMPLE: 55L-5

Formation: Toluca quartz monzonite

Location: Toluca SE site in W-central edge of Lincoln Co. 3.3 mi SE of Toluca on W side of SR 1141, 0.5 mi S of SR 1139.

Description: Roadcut, 6 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-43.0%; working properties-short; drying shrinkage-5.0%; dry strength-fair; pH-7.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	40.4	53.7	1.33
1900	Orange tan	2	5.0	37.0	50.0	1.35
2000	Orange tan	3	7.5	36.4	49.8	1.37
2100	Orange tan	3	7.5	31.5	46.7	1.48
2200	Light brown	3	7.5	28.3	44.1	1.56
2300	Red brown	3	10.0	25.5	40.9	1.61

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

McDOWELL COUNTY

Four samples of residual clay and one sample of sedimentary clay were collected from different selected locations in McDowell County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
56M - 1	Granite gneiss	Not suitable for structural clay products.
56M - 2	Shady dolomite	Not suitable for structural clay products.
56M - 3	Mica gneiss	Structural clay products.
56M - 4	Henderson granite gneiss	Not suitable for structural clay products.
56M - 5	Alluvial terrace overlying mica gneiss	Structural clay products.

McDOWELL COUNTY

SAMPLE: 56M-1

Formation: Granite gneiss

Location: Dysartsville site in SE McDowell Co. on E side of N.C. Highway 226, 0.3 mi S of intersection with SR 1798 and 0.6 mi NW of SR 1802 intersection, Dysartsville.

Description: Roadcut, 0.1 mi long, 4-10 ft high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section near middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.4%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 56M-2

Formation: Shady dolomite

Location: Ashford site in NE McDowell Co. on W side of U.S. Highway 221, 0.4 mi SW of intersection with SR 1578 and 3.6 mi SW of SR 1560 intersection in Ashford.

Description: Roadcut, 300 ft long, 8 ft high in middle, slopes to road level at ends.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section near middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.3%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 56M-3

Formation: Mica gneiss

Location: Old Fort site in SW McDowell Co. approximately 4 mi NE of center of Old Fort 0.4 mi SE of U.S. Highway 70 on SR 1229 on N side of Southern Railway crossing.

Description: Roadcut, 15 ft high, 100 ft long, on side road.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along face of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.8%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	0.0	29.9	44.7	1.49
1900	Tan	3	0.0	24.2	39.2	1.62
2000	Tan	3	0.0	23.4	38.5	1.64
2100	Brown	3	2.5	16.5	30.4	1.84
2200	Brown	3	5.0	15.1	28.4	1.88
2300	Dark brown	4	7.5	5.6	12.1	2.17

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

SAMPLE: 56M-4

Formation: Henderson granite gneiss

Location: Moffitt Hill site in SW corner of McDowell Co. 1.2 mi S of Moffitt Hill on N side of SR 1128, 200 ft E of the intersection with SR 1103.

Description: Roadcut, 200 ft long, slopes down from 6 ft height near middle of cut to road level at ends.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.8%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

McDOWELL COUNTY - Continued

SAMPLE: 56M-5

Formation: Alluvial terrace overlying mica gneiss

Location: Nebo site in E-central McDowell Co. on W side of SR 1763, 3.7 mi ESE of Nebo and 0.4 mi SW from U.S. Highway 70 intersection in Burke Co. where SR number is 1156, 0.8 mi NE of I-40.

Description: Stream channel behind trailer 100 yd W of road, 3 ft deep.

Type Material: Sedimentary clay

Color: White

Sampled Interval: Test pit in stream bank.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Peach	3	10.0	29.6	44.4	1.50
1900	Peach	3	10.0	26.4	41.4	1.57
2000	Pink	3	10.0	24.5	38.8	1.58
2100	Pink	4	10.0	20.7	35.5	1.71
2200	Ivory	4	12.5	17.9	32.6	1.83
2300	Ivory	4	15.0	17.3	31.0	1.79

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick, structural tile at 2100°-2300°F); high shrinkage at 2300°F.

MECKLENBURG COUNTY

Three residual clay samples were collected from selected sites in Mecklenburg County. Laboratory tests indicate potential uses of the sampled materials as follows:

Sample No.	Formation	Potential Use
60M - 1	Carolina Slate Belt	Marginal for structural clay products.
60M - 2	Diorite-gabbro	Marginal for structural clay products.
60M - 3	Granite	Not suitable for structural clay products.

MECKLENBURG COUNTY

SAMPLE: 60M-1

Formation: Carolina Slate Belt, mafic volcanics

Location: Mint Hill site in E-central Mecklenburg Co. on S side of N.C. Highway 218, 1.1 mi E of SR 3106 junction on E side of Mint Hill.

Description: Roadcut, 10 ft high, 300 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Dry, orange; wet, red brown

Sampled Interval: Random samples over 100-ft section near center of cut.

Unfired Properties: Water of plasticity-38.4%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Orange brown	3	10.0	25.4	41.1	1.62
2000	Lt. orange brown	3	10.0	19.3	34.7	1.80
2100	Medium orange	3	15.0	18.6	34.6	1.86
2200	Lt. red brown	7	15.0	13.4	26.1	1.95
2300	Red brown	7	17.5	11.9	24.2	2.03

Potential Use: Marginal for structural clay products (e.g., building brick at 2200°-2300°F); high shrinkage.

SAMPLE: 60M-2

Formation: Diorite-gabbro

Location: Croft site in N-central Mecklenburg Co. at S edge of Croft on N side of SR 2485, 300 ft E of N.C. Highway 115 and adjacent to Southern Railway.

Description: Roadcut, 1 ft high, 100 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-42.0%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	10.0	31.5	48.6	1.54
1900	Orange tan	3	10.0	27.6	44.6	1.62
2000	Orange tan	3	12.5	24.8	41.9	1.69
2100	Light brown	3	15.0	19.2	36.4	1.89
2200	Light brown	4	15.0	17.6	34.6	1.92
2300	Red brown	4	17.5	17.5	34.0	1.98

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building brick at 2200°-2300°F); high shrinkage.

MECKLENBURG COUNTY - Continued

SAMPLE: 60M-3

Formation: Granite

Location: Caldwell site in NE Mecklenburg Co. 2 mi E of Caldwell on N side of SR 2433, 200 ft E of intersection with SR 2428.

Description: Roadcut, 12 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.5%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	10.0	31.5	46.7	1.45
1900	Orange tan	2	10.0	31.2	45.5	1.48
2000	Orange tan	2	10.0	30.4	45.3	1.49
2100	Light brown	3	10.0	27.8	43.8	1.58
2200	Light brown	3	10.0	24.8	40.9	1.65
2300	Red brown	3	10.0	23.9	39.7	1.66

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

MONTGOMERY COUNTY

A total of thirteen shale and residual clay samples were collected from nine different selected locations in Montgomery County. Laboratory tests indicate potential uses for ten of these samples and provide comparative information on one sample that has recently been used and two samples that are presently used as follows:

Sample No.	Formation	Potential Use
62M - 1	Upper Triassic	Structural clay products.
62M - 2	Upper Triassic	Structural clay products.
62M - 3	Upper Triassic	Structural clay products.
62M - 4	Carolina Slate Belt	Structural clay products.
62M - 5	Carolina Slate Belt	Structural clay products.
62M - 6	Carolina Slate Belt	Structural clay products.
62M - 7	Carolina Slate Belt	Structural clay products.
62M - 8	Carolina Slate Belt	Structural clay products.
62M - 9	Carolina Slate Belt	Structural clay products.
62M - 10	Carolina Slate Belt	Structural clay products.
62M - 11	Carolina Slate Belt	Recent: Face brick.
62M - 12	Carolina Slate Belt	Present: Face brick component.
62M - 13	Carolina Slate Belt	Present: Face brick component.

MONTGOMERY COUNTY

SAMPLE: 62M-1

Formation: Upper Triassic, Newark Group

Location: Harrisville site on N side of N.C. Highway 731, 5.2 mi E of Pekin, 0.7 mi E of Harrisville lookout tower, and 0.5 mi E of SR 1536 junction.

Description: Red-brown shale in 3-ft roadcut just W of small stream; shale is exposed along road E and W for 0.2 mi; attitude of bedding-NE, 15°SE (general area).

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 50-ft section along base of 100-ft long cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	2	5.0	25.4	42.4	1.56
1900	Light brown	3	5.0	24.1	40.6	1.69
2000	Brown	4	7.5	22.1	38.6	1.74
2100	Brown	5	7.5	20.9	36.9	1.77
2200	Dark brown	5	7.5	20.0	35.5	1.77
2300	Very dk. brown	6	7.5	17.8	32.7	1.84

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 62M-2

Formation: Upper Triassic, Newark Group

Location: Pekin site on S side of N.C. Highway 731, 0.5 mi W of Pekin.

Description: Red-brown shale in 10-ft high, 200-ft long roadcut; crops out intermittently for 1 mi along N.C. Highway 731 from Pekin to the W; attitude of bedding-NE, 10-15°SE.

Type Material: Shale

Color: Brown

Sampled Interval: Channel from bottom to top of 10-ft high roadcut below highest point near W end.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	22.4	37.4	1.67
1900	Tan	3	5.0	20.6	35.0	1.70
2000	Tan	3	5.0	19.6	33.8	1.73
2100	Light brown	4	10.0	15.6	28.8	1.84
2200	Chocolate	5	10.0	12.3	23.9	1.94
2300	Very dk. brown	6	15.0	5.8	12.4	2.15

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); high shrinkage at 2300°F.

MONTGOMERY COUNTY - Continued

SAMPLE: 62M-3

Formation: Upper Triassic, Newark Group

Location: Mt. Gilead site on N side of N.C. Highway 73, 2.8 mi E of the town of Mt. Gilead and 0.2 mi E of SR 1118 junction.

Description: Red-brown shale in roadcut, approximately 4-10 ft high and 200 ft long; attitude of bedding-NE, 20-30° SE.

Type Material: Shale

Color: Red brown

Sampled Interval: Every 10 ft over 200-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	7.5	29.1	44.6	1.55
1900	Tan	4	10.0	25.9	41.4	1.60
2000	Tan	5	12.5	22.1	37.4	1.69
2100	Light brown	6	15.0	13.9	27.1	1.95
2200	Chocolate	6	17.5	8.7	18.6	2.13
2300	Very dk. brown	6	20.0	3.5	8.1	2.31

Potential Use: Marginal for structural clay products (e.g., building brick at 2100°-2300°F); high shrinkage.

SAMPLE: 62M-4

Formation: Carolina Slate Belt, lower volcanic rocks, felsic tuff

Location: Tomlinson farm site A 3 mi S of Candor and 0.5 mi W of N.C. Highway 731 (same location as 62M-13).

Description: About 10 ft of weathered felsic tuff exposed in bank of creek in vertical section; attitude of cleavage- E-W, 15° S.

Type Material: Residual clay

Color: Cream

Sampled Interval: Grab sample from clay piled at foot of bank.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale flesh	2	5.0	28.5	42.8	1.50
1900	Off white	2	5.0	26.5	40.6	1.53
2000	Off white	3	7.5	24.5	38.8	1.58
2100	Off white	4	10.0	21.2	35.7	1.68
2200	Off white	5	12.5	16.2	30.0	1.85
2300	Pale buff	6	12.5	10.8	21.4	1.98

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

MONTGOMERY COUNTY - Continued

SAMPLE: 62M-5

Formation: Carolina Slate Belt, lower volcanic rocks, felsic tuff

Location: Tomlinson farm site B 3.2 mi S of Candor and 0.5 mi W of N.C. Highway 731; about 1000 ft SW of site A (same location as 62M-12).

Description: Light gray to bluish-gray, fine-grained, medium-bedded, weathered felsic tuff; quarry has been opened into nose of small ridge; face of quarry is about 7 ft high and 25 ft wide; attitude of bedding-E-W, 15° S.

Type Material: Residual clay

Color: Off white

Sampled Interval: Composite sample from face of quarry.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(Crumbled)				
1900	Off white	2	5.0	24.6	38.5	1.57
2000	Off white	3	5.0	20.7	34.5	1.66
2100	Off white	4	10.0	13.0	24.6	1.89
2200	Gray white	5	14.0	5.6	12.0	2.14
2300	Gray white	6	15.0	1.0	2.3	2.33

Potential Use: Structural clay products (e.g., building brick, structural tile at 2100°F); high shrinkage at 2200°-2300°F.

SAMPLE: 62M-6

Formation: Carolina Slate Belt, felsic tuff

Location: Wadeville W site on SE side of SR 1130, 0.2 mi NE of intersection with SR 1132 and 2.4 mi N of N.C. Highway 73 ; 2.5 mi W of Wadeville.

Description: Roadcut exposure of deeply weathered felsic lithic tuff composed of alternating layers of variegated clay saprolite; colors range from light pink; iron stain prominent along joint planes; outlines of lithic fragments preserved in saprolite; attitude of cleavage-trends N 45°E.

Type Material: Residual clay

Color: Off white

Sampled Interval: Approximately 15 ft across strike.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.5%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Cream	2	5.0	25.6	40.1	1.57
1900	Cream	2	5.0	24.2	38.6	1.60
2000	Cream	3	5.0	20.7	34.5	1.67
2100	Cream-spotted	4	7.5	12.6	24.2	1.92
2200	Flesh-spotted	4	7.5	8.8	18.1	2.06
2300	Gray-spotted	5	12.5	5.7	12.5	2.19

Potential Use: Structural clay products (e.g., building brick, structural tile at 2100°-2300°F).

MONTGOMERY COUNTY - Continued

SAMPLE: 62M-7

Formation: Carolina Slate Belt, felsic tuff

Location: Candor SW site (same locality as 62M-8 & 9) on the W side of SR 1563, 0.2 mi S of intersection with SR 1516; 2.7 mi SW of Candor; sample taken near crest of hill directly in front of farm house.

Description: Roadcut exposure of light gray, tan, and pink residual clay that contains relict structure of tuff; overlain by Pinehurst Fm (?). A large diabase dike cuts across the road 100 ft S of the clay outcrop; attitude of cleavage-N 45°W, 30°SW (?).

Type Material: Residual clay

Color: Off white

Sampled Interval: Approximately 2 ft of uppermost clay exposed in road bank.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Off white	(Crumbled)				
1900	White	2	5.0	25.4	39.6	1.56
2000	White	2	5.0	23.6	37.8	1.60
2100	White	2	5.0	20.4	34.3	1.68
2200	Off white	3	7.5	17.1	30.4	1.78
2300	Off white	4	10.0	12.1	23.4	1.94

Potential Use: Structural clay products (e.g., building brick, structural tile at 2300°F).

SAMPLE: 62M-8

Formation: Carolina Slate Belt, felsic tuff

Location: Candor SW site (same locality as 62M-7 & 9 except taken approximately 200 ft E of Sample 7) on W side of SR 1563, 0.2 mi S of intersection with SR 1516, 2.5 mi SW of Candor.

Description: Roadcut exposure of light gray, tan, and pink residual clay that contains relict structure of tuff; overlain by Pinehurst Fm (?); large diabase dike cuts across road 100 ft S of clay outcrop; attitude of cleavage-N 45°W, 30°SW (?).

Type Material: Residual clay

Color: Cream

Sampled Interval: Approximately 2 ft of white to light gray silty tuffaceous saprolite.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Ivory	2	5.0	18.9	31.9	1.69
1900	Off white	2	5.0	18.3	31.1	1.70
2000	Off white	2	5.0	16.9	29.5	1.75
2100	Off white	3	5.0	15.4	27.6	1.79
2200	Off white	4	5.0	12.7	23.9	1.88
2300	Off white	5	7.5	9.2	18.5	2.01

Potential Use: Structural clay products (e.g., building brick, structural tile at 2200°-2300°F).

MONTGOMERY COUNTY - Continued

SAMPLE: 62M-9

Formation: Carolina Slate Belt, felsic tuff

Location: Candor SW site (same locality as 62M-7 & 8 except taken approximately 200 ft E of Sample 7) on W side of SR 1563, 0.2 mi S of intersection with SR 1516, 2.5 mi SW of Candor.

Description: Roadcut exposure of light gray, tan, and pink residual clay that contains relict structure of tuff; overlain by Pinehurst Fm. (?); large diabase dike cuts across road 100 ft S of clay outcrop; attitude of cleavage-N 45°W, 30°SW (?).

Type Material: Residual clay

Color: Light tan

Sampled Interval: Approximately 2 ft of light pink blocky clay that underlies No. 8; less silty than No. 8.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.0%; drying shrinkage-5.0%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pink	2	5.0	27.5	40.3	1.46
1900	Pinkish white	2	5.0	26.9	40.0	1.49
2000	Off white	2	5.0	25.3	38.6	1.53
2100	White	3	7.5	23.6	37.1	1.57
2200	Light gray	4	7.5	17.9	30.9	1.73
2300	Light gray	6	10.0	11.8	22.7	1.92

Potential Use: Structural clay products (e.g., building brick, structural tile at 2200°-2300°F).

SAMPLE: 62M-10

Formation: Carolina Slate Belt, felsic tuff

Location: Candor SE site on a tributary of Drowning Creek upstream from the new Candor city reservoir 0.5 mi W of Drowning Creek and 0.5 mi S of SR 1514, 2 mi SE of center of Candor.

Description: Exposures of cream-colored clay present in gullies washed out in area stripped for nearby dam; overlain by sand and gravel of Pinehurst Fm.; good exposure, shows relations between overlying sediments and clay; attitude of cleavage-N 50°W, 40°NE.

Type Material: Residual clay

Color: Pale yellow

Sampled Interval: Approximately 4-ft long channel cut in face of gully.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	2.5	29.7	42.9	1.44
1900	Pink buff	2	2.5	28.3	42.0	1.44
2000	Pink buff	2	2.5	29.1	41.6	1.45
2100	Buff	2	2.5	28.5	41.2	1.47
2200	Buff	3	2.5	22.2	35.3	1.59
2300	Buff	4	7.5	14.0	25.7	1.84

Potential Use: Structural clay products (e.g., building brick at 2300°F).

MONTGOMERY COUNTY - Continued

SAMPLE: 62M-11

Formation: Carolina Slate Belt, argillite

Location: Montgomery Shale Products Co., Mt. Gilead mine, subsidiary of Mid-State Tile Co.; plant on N side of SR 1103, 0.35 mi NW of intersection with N.C. Highway 731 on W side of Mt. Gilead.

Description: 2 stockpiles, 4 ft high by 10 ft long on W side of plant; 50% from each stockpile.

Type Material: Clay & shale blend

Color: Tan

Sampled Interval: Every 3 ft over two intervals of 10 ft each.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.1%; working properties-short; drying shrinkage-0.0%; dry strength-low; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	2.5	27.0	41.6	1.54
1900	Dark tan	2	2.5	25.7	40.3	1.57
2000	Light brown	3	5.0	20.2	34.7	1.72
2100	Medium brown	4	10.0	11.5	22.8	1.98
2200	Dark brown	5	15.0	0.4	0.9	2.38
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Recent Use: Face brick.

SAMPLE: 62M-12

Formation: Carolina Slate Belt, felsic volcanic tuff

Location: Taylor Clay Products Co. plant in central Rowan Co. 5 mi SW of intersection of U.S. Highways 29 and 52 in Salisbury on E side of U.S. Highway 29, 0.2 mi SW of SR 2538; sample is from Candor Mine pit #1 (Tomlinson site B) in SE Montgomery Co. 3.2 mi S of center of Candor and 0.5 mi W of N.C. Highway 731.

Description: Representative laboratory sample.

Type Material: Residual clay

Color: White

Sampled Interval: Representative laboratory sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.5%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pink	1	0.0	29.9	43.4	1.45
1900	Pink	1	0.0	26.6	40.2	1.51
2000	Pink	2	0.0	25.6	39.3	1.53
2100	Cream	3	0.0	16.7	29.1	1.75
2200	Cream	3	2.5	16.1	28.6	1.78
2300	Gray	5	5.0	7.1	14.5	2.03

Other Tests: Not effervescent with HCl.

Present Use: Face brick component.

MONTGOMERY COUNTY - Continued

SAMPLE: 62M-13

Formation: Carolina Slate Belt, felsic volcanic tuff

Location: Taylor Clay Products Co. plant in central Rowan Co. 5 mi SW of intersection of U.S. Highways 29 and 52 in Salisbury on E side of U.S. Highway 29, 0.2 mi SW from SR 2538; sample is from Candor Mine pit #2 (Tomlinson site A) in SE Montgomery Co. 3 mi S of center of Candor and 0.5 mi W of N.C. Highway 731.

Description: Representative laboratory sample.

Type Material: Residual clay

Color: Light yellow

Sampled Interval: Representative laboratory sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Peach	1	0.0	23.8	37.4	1.57
1900	Pink	1	0.0	23.5	37.2	1.59
2000	Pink	1	0.0	22.5	36.6	1.62
2100	Cream	3	5.0	16.6	29.3	1.77
2200	Cream	4	5.0	10.4	20.3	1.94
2300	Gray	5	7.5	7.6	14.6	1.95

Other Tests: Not effervescent with HCl.

Present Use: Face brick component.

MOORE COUNTY

A total of thirty-six samples of shale, clay, silt-clay, and saprolite were collected from twenty-one different selected locations in Moore County. Laboratory tests provide comparative information and potential uses for eight samples of raw materials presently or recently used and indicate the potential uses of twenty-eight additional materials as follows:

Sample No.	Formation	Potential Use
63M - 1	Upper Triassic	Not suitable for structural clay products.
63M - 2	Upper Triassic	Structural clay products.
63M - 3	Upper Triassic	Structural clay products.
63M - 4	Upper Triassic	Structural clay products.
63M - 5	Upper Triassic	Structural clay products.
63M - 6	Upper Triassic	Structural clay products.
63M - 7	Upper Triassic	Structural clay products.
63M - 8	Upper Triassic	Structural clay products.
63M - 9	upper Triassic	Structural clay products.
63M - 10	Upper Triassic	Structural clay products.
63M - 11	Upper Triassic	Not suitable for structural clay products.
63M - 12	Upper Triassic	Not suitable for structural clay products.
63M - 13	Upper Triassic	Structural clay products.
63M - 14	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
63M - 15	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
63M - 16	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
63M - 17	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
63M - 18	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
63M - 19	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
63M - 20	Carolina Slate Belt	Structural clay products.
63M - 21	Carolina Slate Belt	Present: Additive to lighten color of red-burning clay.
63M - 22	Carolina Slate Belt	Present: Additive to lighten color of red-burning clay.
63M - 23	Carolina Slate Belt	Structural clay products.
63M - 24	Carolina Slate Belt	Structural clay products.
63M - 25	Upper Triassic (?)	Structural clay products.
63M - 26	Upper Triassic (?)	Marginal for structural clay products.
63M - 27	Tuscaloosa Formation	Structural clay products.

MOORE COUNTY - Continued

Sample No.	Formation	Potential Use
63M - 28	Tuscaloosa Formation	Structural clay products.
63M - 29	Tuscaloosa Formation	Structural clay products.
63M - 30	Tuscaloosa Formation	Structural clay products.
63M - 31	Tuscaloosa Formation	Not suitable for structural clay products.
63M - 32	Tuscaloosa Formation	Structural clay products.
63M - 33	Tuscaloosa Formation	Structural clay products.
63M - 34	Tuscaloosa Formation	Structural clay products.
63M - 35	Tuscaloosa Formation	Structural clay products.
63M - 36	Tuscaloosa Formation	Marginal for structural clay products.

MOORE COUNTY

SAMPLE: 63M-1

Formation: Upper Triassic, Newark Group, Cumnock Formation

Location: Haw Branch site 0.8 mi SEof Haw Branch on SR 1621, 0.4 mi N of intersection with SR 1620 in NE corner of Moore Co.

Description: Red-brown shale in 4- to 6-ft high roadcut; exposed intermittently for approximately 1 mi radius; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.8%; working properties-plastic; drying shrinkage-10.0%; dry strength-fair; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red tan	3	12.5	29.6	48.0	1.62
1900	Red tan	3	15.0	28.9	47.3	1.64
2000	Red tan	4	15.0	22.2	40.9	1.84
2100	Red brown	5	20.0	11.5	26.2	2.28
2200	Chocolate	5	25.0	9.2	22.1	2.40
2300	Very dk. brown	6	25.0	4.3	11.3	2.62

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 63M-2

Formation: Upper Triassic, Newark Group, Cumnock Formation

Location: Carthage site 5 mi N of Carthage city limit on SR 1006, 0.2 mi S of SR 1644 junction.

Description: Red-brown shale in 3- to 6-ft high roadcut on E side of SR 1006; exposed intermittently from Carthage city limit for 5 mi N to site; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Tan

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-3.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	22.4	38.0	1.70
1900	Tan	3	5.0	19.4	34.4	1.77
2000	Dark tan	4	10.0	14.2	27.1	1.91
2100	Light brown	5	10.0	11.7	23.1	1.98
2200	Brown	5	10.0	9.7	19.7	2.03
2300	Steel gray	6	12.5	3.8	8.7	2.28

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F).

MOORE COUNTY - Continued

SAMPLE: 63M-3

Formation: Upper Triassic, Newark Group, Sanford Formation

Location: West Carthage site 0.5 mi W of SR 1261 junction on N.C. Highway 27.

Description: Red-brown shale in 2- to 15-ft high roadcut; similar shale crops out intermittently for 6 mi to W; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.3%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	3	5.0	21.9	37.1	1.69
1900	Reddish tan	3	5.0	20.9	35.9	1.72
2000	Light brown	3	7.5	16.2	29.7	1.83
2100	Red brown	4	7.5	13.4	25.6	1.91
2200	Dark brown	5	10.0	8.7	18.0	2.10
2300	Steel black	6	10.0	3.3	7.40	2.24

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 63M-4

Formation: Upper Triassic, Newark Group

Location: Mount Carmel Church site about 8 mi W of Carthage on S side of SR 1261, 0.3 mi E of SR 1210 junction and 0.5 mi E of Mount Carmel Church.

Description: Red-brown shale in 4-ft high by 150-ft long roadcut on S side of SR 1261; attitude of bedding-NE, 10-20° SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	25.1	43.9	1.58
1900	Tan	2	5.0	24.1	39.6	1.60
2000	Tan	3	5.0	21.7	38.5	1.66
2100	Lt. brown	4	5.0	18.0	36.0	1.82
2200	Gray brown	5	5.0	16.2	32.8	2.09
2300	Dark gray	6	10.0	7.8	16.3	2.44

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

MOORE COUNTY - Continued

SAMPLE: 63M-5

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: SR 1210 site approximately 500 ft N of E-flowing tributary to McLendon's Creek and 0.9 mi S of intersection with SR 1261; 5.2 mi SE of Garner's Store.

Description: Roadcut exposure of alternating beds of brownish red, gray, and buff colored shale; attitude of bedding-N 45°E, 20°SE.

Type Material: Shale

Color: Gray brown

Sampled Interval: Approximately 4 stratigraphic ft over a distance of about 75 ft along W side of road.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	18.7	31.2	1.69
1900	Tan	4	5.0	16.5	29.0	1.75
2000	Light brown	4	5.0	15.2	27.4	1.80
2100	Brown	5	10.0	10.6	20.1	1.89
2200	Lt. chocolate	5	10.0	8.1	16.0	1.98
2300	Dark brown	6	12.5	1.3	3.0	2.29

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 63M-6

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Samarcand site, same locality as 63M-7 & 8 except on N side of SR 1141; 0.2 mi W of intersection of SR 1141 and 1140; 3.5 mi SE of Samarcand.

Description: Upper red clay; roadcut exposure of mottled red clay overlaying tan clay and shale; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Clay

Color: Red

Sampled Interval: Sample represents about 1 stratigraphic ft.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red brown	2	7.5	19.1	39.2	1.71
1900	Red brown	3	7.5	19.0	32.6	1.83
2000	Red brown	3	7.5	15.8	29.0	1.90
2100	Brown	4	10.0	13.3	25.3	1.99
2200	Chocolate	4	10.0	9.5	18.9	2.07
2300	Very dk. brown	6	15.0	3.7	8.3	2.25

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F); high shrinkage at 2300°F.

MOORE COUNTY - Continued

SAMPLE: 63M-7

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Samarcand site, same locality as 63M-6 & 8 except on N side of SR 1141, 0.2 mi W of intersection with SR 1140; 3.5 mi SE of Samarcand.

Description: Middle light tan clay; roadcut exposure of light tan, sandy, micaceous clay that underlies red clay of sample 6; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Clay

Color: Light tan

Sampled Interval: Sample represents about 1 stratigraphic ft.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	5.0	21.1	34.4	1.63
1900	Flesh	2	5.0	20.8	34.2	1.65
2000	Buff	3	5.0	20.1	33.4	1.66
2100	Buff	3	5.0	19.7	33.1	1.68
2200	Gray buff	4	10.0	18.3	31.5	1.72
2300	Gray buff	4	10.0	17.9	31.4	1.76

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 63M-8

Formation: Upper Triassic, Newark Group, Pekin Formation

Location: Samarcand site, same locality as 63M-6 & 7 except on S side of SR 1141; 0.2 mi W of intersection of SR 1141 and 1140; 3.5 mi SE of Samarcand.

Description: Lower tan shale; roadcut exposure of tan shale that underlies samples 63M-6 & 7; shale contains numerous plant fossils in places; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Shale

Color: Tan

Sampled Interval: Sample represents about 1 stratigraphic ft.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	2	7.5	31.8	59.3	1.40
1900	Light brown	2	7.5	31.6	44.5	1.41
2000	Medium brown	3	10.0	26.4	44.4	1.52
2100	Brown	3	10.0	25.0	40.2	1.62
2200	Chocolate	4	10.0	22.5	36.5	1.72
2300	Dark brown	5	10.0	17.9	30.8	2.37

Remarks: Absorption too high; slightly uneven color; rough surface.
Potential Use: Structural clay products (e.g., building brick at 2300°F).

SAMPLE: 63M-9

Formation: Upper Triassic, Newark Group, Pekin Formation (?)

Location: Eagle Springs site, same locality as 63M-10, 11, 12 & 13; on W side of SR 1140, 165 ft S of intersection with SR 1139; 1.3 mi SW of Eagle Springs.

Description: Roadcut exposure of about 7 ft of cream to white clay overlain by terrace gravel and sand; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Clay

Color: Cream

Sampled Interval: Channel to 0-1 ft below base of terrace sand (samples 63M-9 through 12 cover successive clay layers from base of terrace sand to bottom of roadcut).

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh-spotty	2	7.5	27.3	65.1	1.51
1900	Tan-spotty	3	7.5	27.0	41.2	1.65
2000	Light gray	4	10.0	21.7	35.9	1.79
2100	Buff	4	12.5	17.3	31.0	2.00
2200	Buff	5	15.0	11.3	22.6	2.11
2300	Yellow gray	5	15.0	8.9	18.8	2.41

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); high shrinkage at 2200°-2300°F.

SAMPLE: 63M-10

Formation: Upper Triassic, Newark Group, Pekin Formation (?)

Location: Eagle Springs site, same locality as 63M-9, 11, 12 & 13; on W side of SR 1140, 165 ft S of intersection with SR 1139; 1.3 mi SW of Eagle Springs.

Description: Roadcut exposure of about 7 ft of cream to white clay overlain by terrace gravel and sand; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Clay

Color: Off white

Sampled Interval: Channel from 1-3 ft below base of terrace sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-3.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light flesh	2	7.5	28.9	42.3	1.45
1900	Light flesh	3	7.5	28.9	42.0	1.46
2000	Buff	3	10.0	24.8	39.2	1.58
2100	Buff	4	12.5	19.1	36.0	1.65
2200	Buff	4	12.5	18.6	32.9	1.72
2300	Buff	4	12.5	21.8	32.3	1.74

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 63M-11

Formation: Upper Triassic, Newark Group, Pekin Formation (?)

Location: Eagle Springs site, same locality as 63M-9, 10, 12 & 13; on W side of SR 1140, 165 ft S of intersection with SR 1139; 1.3 mi SW of Eagle Springs.

Description: Roadcut exposure of about 7 ft of cream to white clay overlain by terrace gravel and sand; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Clay

Color: Off white

Sampled Interval: Channel from 3-5 ft below base of terrace sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-44.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Buff	2	5.0	34.3	65.1	1.35
1900	Buff	2	5.0	34.1	46.4	1.36
2000	Buff	3	10.0	30.6	46.2	1.42
2100	Buff	3	10.0	28.6	43.5	1.47
2200	Buff	4	10.0	26.5	42.1	1.53
2300	Buff	4	10.0	27.0	40.4	2.41

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 63M-12

Formation: Upper Triassic, Newark Group, Pekin Formation (?)

Location: Eagle Springs site, same locality as 63M-9, 10, 11 & 13; on W side of SR 1140, 165 ft S of intersection with SR 1139; 1.3 mi SW of Eagle Springs.

Description: Roadcut exposure of about 7 ft of cream to white clay overlain by terrace gravel and sand; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Clay

Color: White

Sampled Interval: Channel from 5-7 ft below base of terrace sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-45.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Buff	2	5.0	37.2	48.4	1.30
1900	Buff	2	5.0	36.9	48.1	1.30
2000	Buff	3	10.0	35.5	47.0	1.32
2100	Buff	4	10.0	32.5	45.3	1.39
2200	Buff	4	10.0	29.1	42.7	1.47
2300	Buff	4	10.0	29.4	43.2	1.47

Potential Use: Not suitable for structural clay products; high absorption.

MOORE COUNTY - Continued

SAMPLE: 63M-13

Formation: Upper Triassic, Newark Group, Pekin Formation (?)

Location: Eagle Springs site, same locality as 63M-9, 10, 11 & 12 except collected 200 ft S on same side of road, on W side of SR 1140, 365 ft S of intersection with SR 1139; 1.3 mi SW of Eagle Springs.

Description: Roadcut exposure of about 7 ft of very light gray clay overlain by terrace gravel and sand; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Clay

Color: Very light gray

Sampled Interval: Sample represents about 1 stratigraphic ft.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light flesh	2	5.0	26.0	63.1	1.58
1900	Light flesh	2	5.0	25.0	59.7	1.96
2000	Buff	3	10.0	24.1	46.6	1.98
2100	Buff	4	10.0	19.0	38.0	2.39
2200	Buff	5	15.0	12.1	23.7	2.43
2300	Buff	5	15.0	11.6	23.0	2.45

Potential Use: Structural clay products (e.g., building brick at 2100°F); high shrinkage above 2100°F.

SAMPLE: 63M-14

Formation: Carolina Slate Belt, felsic tuff

Location: Hancock clay pit, located on the W side of SR 1413, 0.5 mi N of intersection with SR 1412, in NW corner of Moore Co.

Description: Pit is developed in weathered felsic tuff which crumbles easily and has a silty feel; E face of pit is about 15 ft high and 100 ft long; material is fairly uniform; attitude of cleavage-N 45°E, 65°NW.

Type Material: Residual silt-clay

Color: Off white

Sampled Interval: Grab sample collected from E face of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.0%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800*	---	(Crumbled)				
1900	Gray	1	5.0	32.5	44.0	1.35
2000	Gray	2	5.0	28.2	40.9	1.45
2100	Gray	2	5.0	25.5	38.5	1.51
2200	Gray	3	10.0	21.6	35.2	1.63
2300	Gray	4	10.0	18.7	32.2	1.72

*1800° specimen disintegrated during handling.

Recent Use: Additive to lighten color of red-burning clay.

MOORE COUNTY - Continued

SAMPLE: 63M-15

Formation: Carolina Slate Belt, laminated felsic volcanics

Location: McDuffy clay pit located on SW side of SR 1278, 0.8 mi NW of intersection with SR 1275; 2.7 mi NE of Samarcand.

Description: Deeply weathered interbedded sequence of laminated felsic volcanics; attitude of bedding-N 20°E, 42°NW.

Type Material: Residual silt-clay

Color: Buff

Sampled Interval: Composite sample from stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.0%; working properties-short; drying shrinkage-4.5%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	1	2.5	28.5	41.2	1.45
1900	Off white	2	5.0	26.2	39.1	1.49
2000	Off white	2	5.0	24.6	37.6	1.53
2100	Off white	2	5.0	22.1	35.1	1.59
2200	Off white	3	5.0	18.2	30.8	1.69
2300	Off white	4	10.0	13.7	25.3	1.85

Recent Use: Additive to lighten color of red-burning clay.

SAMPLE: 63M-16

Formation: Carolina Slate Belt, felsic volcanics

Location: Williams clay pit, same locality as 63M-17; 0.6 mi N of SR 1269; mine road turns N off SR 1269, 0.8 mi NW of N.C. Highway 705 intersection; 4.8 mi NE of Elberta.

Description: Interbedded sequence of weathered laminated felsic volcanics that vary from white to cream and light pink in color; attitude of bedding-anticlinal structure, strike N 45°E, dips 35°NW and 35°SE.

Type Material: Residual silt-clay

Color: White

Sampled Interval: Composite sample from stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.0%; working properties-short; drying shrinkage-2.5%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(Crumbled)				
1900	Buff	1	2.5	27.1	40.0	1.48
2000	Buff	2	2.5	24.9	39.0	1.57
2100	Buff	3	5.0	19.3	32.2	1.67
2200	Gray	4	10.0	12.4	23.3	1.88
2300	Gray	5	12.5	5.8	12.4	2.13

Recent Use: Additive to lighten color of red-burning clay.

MOORE COUNTY - Continued

SAMPLE: 63M-17

Formation: Carolina Slate Belt, felsic volcanics

Location: Williams clay pit, same locality as 63M-16; 0.6 mi N of SR 1269; mine road turns N of SR 1269, 0.8 mi NW of N.C. Highway 705 intersection; 4.8 mi NE of Elberta.

Description: Interbedded sequence of laminated felsic volcanics that vary from white to cream and light pink in color; attitude of bedding-anticlinal structure, strike-N 45°E, dips 35°NW and 35°SE.

Type Material: Residual silt-clay

Color: Cream

Sampled Interval: Approximately 50 ft across strike in floor of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(Crumbled)				
1900	Buff	2	5.0	29.9	41.8	1.40
2000	Buff	2	5.0	27.2	39.6	1.46
2100	Gray buff	3	10.0	21.1	33.8	1.60
2200	Light gray	4	10.0	13.9	26.3	1.89
2300	Gray	6	15.0	5.8	12.1	2.09

Recent Use: Additive to lighten color of red-burning clay.

SAMPLE: 63M-18

Formation: Carolina Slate Belt, laminated felsic volcanics

Location: McKinnis clay pit, same source as 63M-19, located on SE side of SR 1265, 0.8 mi NE of intersection with SR 1261; 3.2 mi SSE of Garner's Store.

Description: Steeply dipping, laminated felsic volcanics; deeply weathered to a rather uniform cream-white color; attitude of bedding-N 50°E, 30°SE.

Type Material: Residual silt-clay

Color: Cream

Sampled Interval: Approximately 75 ft across strike in floor of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(Crumbled)				
1900	Pale pink	1	5.0	37.7	76.6	1.27
2000	Off white	2	5.0	34.0	47.7	1.41
2100	Off white	2	5.0	30.6	43.1	1.69
2200	Off white	3	10.0	18.1	30.6	1.85
2300	Yellow white	4	15.0	13.2	24.4	2.25

Recent Use: Additive to lighten color of red-burning clay.

MOORE COUNTY - Continued

SAMPLE: 63M-19

Formation: Carolina Slate Belt, felsic volcanics

Location: McKinnis clay pit, same source as 63M-18, located on SE side of SR 1265, 0.8 mi NE of intersection with SR 1261; 3.2 mi SSE of Garner's Store.

Description: Steeply dipping, laminated felsic volcanics; deeply weathered to a rather uniform cream-white color; attitude of bedding-N 50°E, 30°SE.

Type Material: Residual silt-clay

Color: Pale cream

Sampled Interval: Composite sample from stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(Crumbled)				
1900	Pale pink	2	5.0	33.9	45.0	1.33
2000	Pale pink	2	5.0	31.4	43.4	1.38
2100	Pale pink	3	5.0	26.8	39.5	1.48
2200	Pale pink	3	10.0	15.5	27.3	1.76
2300	Gray pink	3	15.0	13.4	24.3	1.81

Recent Use: Additive to lighten color of red-burning clay.

SAMPLE: 63M-20

Formation: Carolina Slate Belt, felsic volcanics

Location: Garner's Store S site on SW side of SR 1261, 1.3 mi NW of intersection with SR 1264, 3.9 mi SSE of Garner's Store.

Description: Roadcut exposure of weathered laminated felsic volcanics which is overlain by terrace material; about 1 stratigraphic ft of cream colored felsic volcanics slightly mottled by iron stain is exposed in ditch.

Type Material: Residual clay

Color: Cream

Sampled Interval: Approximately 1 stratigraphic ft.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	26.6	39.4	1.48
1900	Pink white	2	5.0	26.5	39.4	1.49
2000	Pink white	2	5.0	26.3	39.3	1.49
2100	Pink white	2	5.0	25.1	38.2	1.52
2200	Pink white	3	5.0	22.1	35.3	1.60
2300	Light gray	4	7.5	19.4	32.4	1.67

Potential Use: Structural clay product (e.g., building brick at 2300°F).

MOORE COUNTY - Continued

SAMPLE: 63M-21

Formation: Carolina Slate Belt, felsic tuff

Location: Glendon clay pit of Borden Brick Co.; white-clay pit (also source of 63M-22) located 200 ft SE of the intersection of SR 1006 and 1618; 2.2 mi N of Glendon.

Description: Located in zone of deeply weathered felsic tuff; has well developed cleavage and splits in thin sheets on weathering; tuff in S face pit is chalk white; attitude of cleavage-N 70°E, 50°NW.

Type Material: Residual clay

Color: Chalk-white

Sampled Interval: Grab sample from chalk-white material in S face of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-7.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Cream	2	2.5	22.0	53.5	1.91
1900	Cream	3	5.0	12.8	24.4	2.15
2000	Pale brown	4	10.0	6.1	13.1	2.19
2100	Gray	6	12.5	0.3	.71	2.36
2200	Gray	6	15.0	0.3	.66	2.43
2300	---	---	(Expanded)			

Present Use: Additive to lighten the color of red-burning clay.

SAMPLE: 63M-22

Formation: Carolina Slate Belt, felsic tuff

Location: Glendon clay pit of Borden Brick Co., white-clay pit (also source of 63M-21) located 200 ft SE of intersection of SR 1006 and 1618; 2.2 mi N of Glendon.

Description: Located in zone of deeply weathered felsic tuff; has well-developed cleavage and splits in thin sheets on weathering; tuff in S face of pit is chalk white; attitude of cleavage-N 70°E, 50°NW.

Type Material: Residual clay

Color: Cream

Sampled Interval: Grab sample from stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Cream	3	5.0	21.7	35.9	1.65
1900	Cream	3	5.0	21.2	35.5	1.68
2000	Cream	4	5.0	18.2	32.0	1.76
2100	Cream	5	7.5	11.8	23.2	1.95
2200	Tan	5	7.5	11.8	23.1	1.97
2300	Gray	6	10.0	6.8	14.3	2.11

Present Use: Additive to lighten color of red-burning clay.

MOORE COUNTY - Continued

SAMPLE: 63M-23

Formation: Carolina Slate Belt, sheared felsic volcanic tuff

Location: Putnam site (same as 63M-24) 0.85 mi SE of Putnam community and intersection of SR 1629 and 1638, then 200 yd NE of end of farm road beyond log smokehouse.

Description: Residual white to light tan clay mantle overlying highly weathered felsic volcanic tuff exposed in 6 shallow pits; largest pit measures about 20 by 40 ft and is 4 ft deep; attitude of cleavage-trends NE, and dip is nearly vertical.

Type Material: Residual clay

Color: White

Sampled Interval: Sample taken from 3 points at 10-ft intervals along top of 4-ft by 30-ft stockpile; pine trees up to 10 inches in diameter growing on this long-abandoned stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.1%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	0.0	24.7	37.5	1.52
1900	Light tan	2	0.0	24.5	37.2	1.52
2000	Light tan	2	2.5	22.8	35.6	1.56
2100	Beige	2	2.5	18.6	30.5	1.64
2200	Gray	3	5.0	16.0	27.5	1.72
2300	Gray	4	5.0	12.4	22.1	1.78

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g. building brick at 2300°F).

SAMPLE: 63M-24

Formation: Carolina Slate Belt, sheared felsic volcanic tuff

Location: Same as 63M-23 above.

Description: Same as 63M-23 above.

Type Material: Residual clay

Color: White

Sampled Interval: From 3 points at 10-ft intervals on upper edge of largest pit measuring 20 by 40 ft and 4 ft deep.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.4%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-8.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	2.5	21.1	33.5	1.59
1900	Light tan	2	5.0	20.1	32.5	1.62
2000	Medium tan	3	5.0	16.4	28.2	1.72
2100	Beige	4	7.5	14.1	25.0	1.77
2200	Gray	5	10.0	6.3	12.6	2.00
2300	Gray	6	12.5	1.9	4.0	2.11

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

MOORE COUNTY - Continued

SAMPLE: 63M-25

Formation: Upper Triassic (?), basalt dike

Location: Baxter McKenzie site A, 5 mi N of center of Carthage on E side of SR 1644, 0.2 mi S of intersection with SR 1006.

Description: Olive brown saprolite contains residual spheroidal boulders of basalt and is adjacent to baked sandstone in 20-ft high by 300-ft long roadcut; attitude of bedding-N 45°E, 19°SE.

Type Material: Saprolite

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along N portion and 2 ft above base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.1%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-7.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	2	2.5	22.8	38.8	1.70
1900	Medium brown	3	5.0	21.5	37.4	1.74
2000	Medium brown	4	5.0	21.3	37.3	1.75
2100	Dark brown	5	10.0	13.3	26.6	2.00
2200	---	---	(Melted)			

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); abrupt vitrification (2100°-2200°F).

SAMPLE: 63M-26

Formation: Upper Triassic (?), basalt dike

Location: Baxter McKenzie site B, 5 mi N of center of Carthage on E side of SR 1664, 0.2 mi S of intersection with SR 1006.

Description: Sampled from ditch on E side of road at N end of 20-ft high by 300-ft long roadcut; attitude of bedding-N 45°E, 19°SE.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 5 ft over 15-ft section in ditch.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.6%; working properties-plastic; drying shrinkage-12.5%; dry strength-good; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	12.5	14.2	28.0	1.97
1900	Light brown	4	15.0	8.3	17.9	2.16
2000	Medium brown	5	17.5	5.9	13.3	2.26
2100	Medium brown	6	17.5	4.4	10.0	2.27
2200	Dark brown	6	17.5	1.9	4.3	2.29
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Potential Use: Marginal for structural clay products (e.g., building brick at 1900°F); high shrinkage after 1900°F.

MOORE COUNTY - Continued

SAMPLE: 63M-27

Formation: Tuscaloosa Formation, upper member

Location: Southern Pines site, same locality as 63M-28 through 30; W bank of railroad cut on N side of bridge where SR 2053 crosses Seaboard Coastline Railroad 0.3 mi SE of SR 2053 junction with U.S. Highway 1 in Southern Pines.

Description: Approximately 13 ft of gray and buff-colored clay exposed in bank of railroad cut; upper few ft stained purple by iron, also several ft of section near middle and base badly stained; clay section overlain by + 2 ft of Pinehurst Fm.; clay becomes more sandy in lower part of section; horizontal bedding.

Type Material: Sedimentary clay

Color: Purple gray

Sampled Interval: Continuous channel sample, 0.8-3.8 ft in vertical depth from bottom of Pinehurst Fm. sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.0%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale flesh	2	7.5	21.4	40.7	1.70
1900	Pale flesh	3	7.5	20.7	36.3	1.72
2000	Gray flesh	4	10.0	17.9	35.5	1.80
2100	Buff-yellow	5	10.0	16.0	32.2	1.92
2200	Buff-yellow	5	10.0	14.8	28.5	2.01
2300	Yellow gray	6	10.0	12.9	25.9	2.54

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F); good firing range.

SAMPLE: 63M-28

Formation: Tuscaloosa Formation, upper member

Location: Southern Pines site, same locality as 63M-27 through 30; W bank of railroad cut on N side of bridge where SR 2053 crosses Seaboard Coastline Railway, 0.3 mi SE of SR 2053 junction with U.S. Highway 1 in Southern Pines.

Description: Approximately 13 ft of gray and buff-colored clay exposed in bank of railroad cut: upper few ft stained purple by iron, also several ft of section near middle and base badly stained; clay section overlain by + 2 ft of Pinehurst Fm.; clay becomes more sandy in lower part of section; horizontal bedding.

Type Material: Sedimentary clay

Color: Purple gray

Sampled Interval: Continuous channel sample, 3.8-6.8 ft in vertical depth from bottom of Pinehurst Fm. sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	7.5	20.2	34.6	1.71
1900	Pale flesh	3	7.5	19.1	33.3	1.74
2000	Pale flesh	4	10.0	18.2	32.2	1.77
2100	Buff	4	10.0	15.8	29.4	1.86
2200	Buff	5	10.0	15.1	28.3	1.87
2300	Buff	5	10.0	15.1	28.2	1.88

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F); good firing range.

MOORE COUNTY - Continued

SAMPLE: 63M-29

Formation: Tuscaloosa Formation, upper member

Location: Same as 63M-28 above.

Description: Same as 63M-28 above.

Type Material: Sedimentary clay

Color: Purple gray

Sampled Interval: Continuous channel sample, 6.8-9.8 ft in vertical depth from bottom of Pinehurst Fm. sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.0%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale flesh	2	5.0	23.5	37.8	1.67
1900	Pink buff	3	5.0	21.3	35.6	1.67
2000	Pink buff	4	10.0	18.8	32.7	1.74
2100	Buff	5	10.0	15.4	28.7	1.87
2200	Buff	5	10.0	13.3	26.6	1.93
2300	Buff	6	12.5	13.8	25.6	1.93

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F); good firing range.

SAMPLE: 63M-30

Formation: Tuscaloosa Formation, upper member

Location: Same as 63M-28 above.

Description: Same as 63M-28 above.

Type Material: Sedimentary clay

Color: Purple gray

Sampled Interval: Continuous channel sample, 9.8-13.5 ft in verticle depth from bottom of Pinehurst Fm. sand.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.0%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light flesh	2	7.5	22.4	51.8	1.65
1900	Light flesh	3	7.5	21.0	37.0	1.81
2000	Light buff	4	10.0	16.8	30.5	1.89
2100	Buff	4	10.0	14.5	27.4	1.93
2200	Buff	4	12.5	13.4	25.9	1.99
2300	Buff	5	12.5	12.2	24.3	2.47

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

MOORE COUNTY - Continued

SAMPLE: 63M-31

Formation: Tuscaloosa Formation, upper member

Location: Pinehurst site, in roadcut on N side of N.C. Highway 211, 500 ft W of intersection with SR 1209 on N side of Pinehurst near town limits.

Description: Upper 2 ft of formation exposed in roadcut and drainage ditch; clay is gray and quite hard; contains numerous grains of coarse sand scattered throughout clay matrix; overlain by Pinehurst Fm.

Type Material: Sedimentary clay

Color: Cream

Sampled Interval: Upper 2 ft of formation.

Bloating Test: Negative

Unfired Properties: Water of plasticity-19.0%; working characteristics-short; drying shrinkage-5.0%; dry strength-poor; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	1	5.0	16.2	30.0	1.84
1900	Flesh	2	5.0	16.2	29.9	1.85
2000	Light tan	2	5.0	15.3	28.4	1.85
2100	Light tan	2	5.0	12.4	25.8	1.95
2200	Light tan	3	5.0	10.0	24.2	2.58

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 63M-32

Formation: Tuscaloosa Formation, lower member

Location: Nick's Creek site, same locality as 63M-33; roadcut exposure on W side of SR 1209 at Nick's Creek; 0.6 mi NW of intersection with SR 1216; 3.0 mi NW of Pinehurst.

Description: Roadcut exposure of clay overlain by sand and gravel of upper member of Tuscaloosa Fm.; clay varies from light brown or buff at top to dark gray at base; approximately 4 ft of gray clay exposed at base of section; horizontal bedding.

Type Material: Sedimentary clay

Color: Light gray

Sampled Interval: From upper 2 ft of brownish gray carbonaceous clay from lower 4 ft of section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.0%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	5.0	28.4	43.6	1.53
1900	Light tan	3	7.5	27.2	42.6	1.57
2000	Red tan	3	10.0	22.0	37.5	1.71
2100	Light brown	4	12.5	17.0	31.5	1.85
2200	Light brown	5	15.0	12.2	24.2	1.99
2300	Dirty brown	6	17.5	8.1	17.3	2.14

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

MOORE COUNTY - Continued

SAMPLE: 63M-33

Formation: Tuscaloosa Formation, lower member

Location: Same as 63M-32 above.

Description: Same as 63M-32 above.

Type Material: Sedimentary clay

Color: Gray

Sampled Interval: 1 ft of steel gray, micaceous, carbonaceous clay from base of exposed section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working characteristics-short; drying shrinkage-5.0%; dry strength-fair; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Cream	1	5.0	35.7	48.0	1.35
1900	Cream	2	5.0	33.3	46.6	1.40
2000	Cream	2	7.5	30.5	44.4	1.45
2100	Gray	3	10.0	28.1	42.4	1.51
2200	Gray	4	10.0	23.1	37.5	1.62
2300	Gray	5	10.0	20.3	34.2	1.68

Potential Use: Structural clay products (e.g., building brick at 2300°F).

SAMPLE: 63M-34

Formation: Tuscaloosa Formation, lower member

Location: Cameron site, same locality as 63M-35, roadcut exposure on E side of U.S. Highway 1 on S side of bridge at intersection with N.C. Highway 27, at W limits of Cameron.

Description: Roadcut exposure of dark gray, red, and yellow mottled clay; clay overlain by 8-10 ft of tan sand and gravel of the upper member; this Tuscaloosa clay is reported to contain montmorillonite; horizontal bedding.

Type Material: Sedimentary clay

Color: Gray brown

Sampled Interval: Continuous channel sample, 3 ft in vertical depth from base of overlying sand section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.0%; working characteristics-plastic; drying shrinkage-10.0%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale red brown	3	10.0	18.5	33.8	1.81
1900	Pale red brown	4	10.0	18.4	33.5	1.83
2000	Deep flesh	4	10.0	17.7	32.9	1.86
2100	Pale brown	5	15.0	14.4	28.1	1.95
2200	Brown	6	15.0	12.3	25.1	2.04
2300	Gray brown	6	15.0	11.0	22.8	2.08

Potential Use: Structural clay products (e.g., building brick at 1900°-2000°F); high shrinkage above 2000°F.

MOORE COUNTY - Continued

SAMPLE: 63M-35

Formation: Tuscaloosa Formation, lower member

Location: Same as 63M-34 above.

Description: Same as 63M-34 above.

Type Material: Sedimentary clay

Color: Gray brown

Sampled Interval: Continuous channel sample, 3-6.3 ft in vertical depth from base of overlying sand section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working characteristics-plastic; drying shrinkage-10.0%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Deep flesh	3	10.0	19.9	34.4	1.73
1900	Pale flesh	4	10.0	17.0	30.9	1.82
2000	Buff	5	15.0	12.9	25.0	1.94
2100	Pale brown	5	15.0	10.2	20.8	2.04
2200	Gray	6	15.0	8.7	18.2	2.09
2300	Gray	6	15.0	7.7	16.5	2.14

Potential Use: Structural clay products (e.g., building brick at 1900°F); high shrinkage above 1900°F.

SAMPLE: 63M-36

Formation: Tuscaloosa Formation, lower member

Location: Lakeview site, roadcut exposure on SW side of SR 1853, 0.6 mi SE of intersection with SR 1864; approximately 2 mi SE of Lakeview.

Description: Approximately 3 ft of greenish clay overlain by about 8 ft of sand and gravel; horizontal bedding.

Type Material: Sedimentary clay

Color: Cream

Sampled Interval: Composite sample from clay section of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working characteristics-plastic; drying shrinkage-10.0%; dry strength-fair; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	10.0	22.0	36.9	1.67
1900	Tan	2	10.0	21.8	36.4	1.68
2000	Tan	2	12.5	19.6	34.2	1.74
2100	Light brown	3	15.0	18.2	32.8	1.80
2200	Red brown	4	15.0	16.6	30.7	1.85
2300	Chocolate	4	15.0	14.2	27.3	1.93

Potential Use: Marginal for structural clay products (e.g., building brick at 2200°-2300°F); high shrinkage.

NASH COUNTY

A total of five residual silty clay and residual clay samples were collected from different selected sites in Nash County. Laboratory tests indicate potential uses for the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
64N - 1	Carolina Slate Belt	Structural clay products.
64N - 2	Carolina Slate Belt	Not suitable for structural clay products.
64N - 3	Carolina Slate Belt	Not suitable for structural clay products.
64N - 4	Carolina Slate Belt	Structural clay products.
64N - 5	Granite	Structural clay products.

NASH COUNTY

SAMPLE: 64N-1

Formation: Carolina Slate Belt, felsic tuff

Location: Spring Hope site on E side of N.C. Highway 581, 0.1 mi S of bridge over Tar River and 1.2 mi N of intersection with N.C. Highway 97; 4.5 mi S of Spring Hope.

Description: Roadcut exposure--deeply weathered felsic tuff; fresh material is light gray, crumbles easily, and has silty feel--apparently contains high percentage of sericite; attitude of cleavage-N 45°E, vertical.

Type Material: Residual silty clay

Color: Light gray

Sampled Interval: Approximately 5 ft across strike from top of roadcut to drainage ditch.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-poor; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(Crumbled)				
1900	Buff	2	2.5	30.5	41.1	1.35
2000	Buff tan	2	2.5	27.5	38.8	1.41
2100	Tan	3	5.0	22.6	33.9	1.50
2200	Light gray	4	10.0	16.3	27.1	1.66
2300	Gray	6	12.5	9.1	17.4	1.91

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F); poor bond.

SAMPLE: 64N-2

Formation: Carolina Slate Belt, felsic volcanics

Location: Hickory site on E side of N.C. Highway 48, 0.25 mi S of Fishing Creek and 1.2 mi N of intersection with N.C. Highway 44 in Hickory in NE Nash County.

Description: 400-ft long roadcut up to 10 ft high.

Type Material: Residual silty clay

Color: Red

Sampled Interval: Every 10 ft over 60-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.9%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-6.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products.

NASH COUNTY - Continued

SAMPLE: 64N-3

Formation: Carolina Slate Belt, felsic volcanics

Location: Aventon site, roadcut on S side of SR 1501, 0.15 mi W of Crooked Swamp and 0.5 mi E of intersection with SR 1502; approximately 4 mi SE of Aventon.

Description: 400-ft long, 7-ft high roadcut.

Type Material: Residual silty clay

Color: Red

Sampled Interval: Every 15 ft over 45-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.7%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products.

SAMPLE: 64N-4

Formation: Carolina Slate Belt, felsic volcanics

Location: Bumns Chapel Site on S side of SR 1302, 0.55 mi E of its intersection with SR 1301 and about 1 mi SE of Bumns Chapel, 3 mi W of center of Nashville.

Description: 300 ft long by 5 ft high roadcut.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-45.1%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	2	5.0	38.0	51.7	1.36
1900	Light brown	2	5.0	35.9	50.9	1.42
2000	Light brown	3	7.5	30.5	46.7	1.53
2100	Brown	4	10.0	25.0	42.3	1.69
2200	Brown	5	10.0	22.2	39.3	1.77
2300	Dark brown	6	12.5	19.3	35.9	1.86

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

NASH COUNTY - Continued

SAMPLE: 64N-5

Formation: Granite

Location: Castalia site in NW Nash Co. 1 mi SW of N.C. Highway 58 intersection in Castalia on E side of SR 1321 and 300 ft SW of SR 1330 intersection.

Description: Roadcut, 3 ft high, 300 ft long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 5 ft over 20-ft section at SW end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.7%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	29.7	42.2	1.42
1900	Tan	2	5.0	27.7	40.7	1.47
2000	Tan	3	5.0	24.2	37.7	1.56
2100	Tan	3	5.0	21.8	35.6	1.63
2200	Light brown	4	7.5	19.3	32.4	1.68
2300	Light brown	6	10.0	14.8	26.6	1.80

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

NORTHAMPTON COUNTY

One sedimentary clay sample and two residual clay samples were collected from selected sites in northwestern Northampton County. Laboratory tests indicate potential uses for the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
66N - 1	Terrace clay overlaying granite	Structural clay products.
66N - 2	Granite	Structural clay products.
66N - 3	Carolina Slate Belt	Not suitable for structural clay products.

NORTHAMPTON COUNTY

SAMPLE: 66N-1

Formation: Terrace clay overlaying granite.

Location: Gaston site, roadcuts on both sides of N.C. Highway 46, approximately 2.9 mi W of N.C. Highway 48 intersection in Gaston.

Description: 4- to 5-ft high roadcuts on N and S sides of highway.

Type Material: Sedimentary clay

Color: Gray

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.0%; working properties-short; drying shrinkage-0.0%; dry strength-low; pH-6.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	2.5	20.2	34.3	1.70
1900	Dark tan	2	5.0	18.6	32.7	1.76
2000	Light brown	3	5.0	13.9	26.4	1.90
2100	Medium brown	4	7.5	6.4	13.7	2.14
2200	Dark brown	5	10.0	1.9	3.8	2.00
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

SAMPLE: 66N-2

Formation: Granite

Location: Gaston SW site on N edge of Roanoke Rapids Lake in NW Northampton Co. 2.7 mi (straight line) SW of center of Gaston and 0.7 mi S of S end of SR 1218.

Description: Wave-cut bank, 2 ft high, 30 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 3 ft over 30-ft section along middle of bank.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.2%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	24.0	38.5	1.60
1900	Orange tan	4	2.5	21.8	36.5	1.68
2000	Tan	4	5.0	15.0	27.9	1.87
2100	Light brown	4	10.0	13.4	25.4	1.90
2200	Medium brown	6	10.0	11.2	22.2	1.98
2300	Red brown	6	10.0	10.4	20.6	1.98

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 1900°-2300°F); good firing range.

NORTHAMPTON COUNTY - Continued

SAMPLE: 66N-3

Formation: Carolina Slate Belt, felsic volcanics

Location: Henrico site in NW corner of Northampton Co. on N side of SR 1214, 2.9 mi W of SR 1217 intersection at Henrico.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Orange

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	2.5	23.5	38.6	1.64
1900	Orange tan	2	2.5	22.6	37.3	1.65
2000	Tan	2	5.0	22.3	37.2	1.67
2100	Tan	2	5.0	19.3	33.3	1.73
2200	Light brown	2	5.0	18.4	32.5	1.77
2300	Salmon	2	5.0	17.6	31.2	1.77

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

ORANGE COUNTY

A total of six samples of shale and residual clay were collected from different selected sites in Orange County. Laboratory tests indicate potential uses for the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
680 - 1	Upper Triassic	Structural clay products.
680 - 2	Upper Triassic	Structural clay products.
680 - 3	Carolina Slate Belt	Not suitable for structural clay products.
680 - 4	Carolina Slate Belt	Not suitable for structural clay products.
680 - 5	Carolina Slate Belt	Not suitable for structural clay products.
680 - 6	Granite	Structural clay products.

ORANGE COUNTY

SAMPLE: 68 O-1

Formation: Upper Triassic, Newark Group

Location: Sunoco site on E side of Chapel Hill on S side of U.S. Highway 15-501, 0.25 mi E of junction of U.S. Highway 15-501 bypass and U.S. Highway 15-501 business.

Description: Red-brown shale in 10-ft high roadcut; attitude of bedding-strikes NE, low-angle dip to SE.

Type Material: Shale

Color: Brown

Sampled Interval: 5-ft long channel section 5 ft down from top and parallel to length of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.0%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-6.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	10.0	22.0	36.7	1.67
1900	Tan	4	10.0	18.8	32.9	1.75
2000	Light brown	5	12.5	15.9	28.9	1.82
2100	Dark brown	6	15.0	4.8	9.7	2.03
2200	Very dk. brown	6	15.0	2.8	6.2	2.21
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 1900°-2000°F); high shrinkage above 2000°F.

SAMPLE: 68 O-2

Formation: Upper Triassic, Newark Group

Location: Andrew L. Mooney, Jr. site NE of Chapel Hill on E side of SR 1734, 0.2 mi NE of SR 1733 junction.

Description: Red-brown shale in roadcut on E side of SR 1734; shale crops out to N along road for 0.3 mi then becomes interbedded with predominant sandstone; attitude of bedding-N 20°E, 10°SE.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 100-ft section at base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	22.2	36.2	1.63
1900	Tan	3	7.5	21.3	35.1	1.65
2000	Light brown	4	7.5	18.9	32.1	1.70
2100	Very dk. brown	5	12.5	7.7	15.6	2.03
2200	Brownish black	6	12.5	3.1	6.7	2.15
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

ORANGE COUNTY - Continued

SAMPLE: 68 O-3

Formation: Carolina Slate Belt, mafic volcanics

Location: Hillsborough site on S side of Hillsborough on NW side of SR 1009 and I-85 intersection.

Description: Excavation extends 0.2 mi N from I-85 on W side of SR 1009; exposure ranges from 25-ft high benched cut near S end down to 4-ft high cut at N end; attitude of cleavage- NE-trending, dipping steeply NW.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 10 ft over 100-ft section in N portion of excavation.

Unfired Properties: Water of plasticity-43%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium tan	2	12.5	27.8	42.8	1.54
1900	Medium tan	2	15.0	25.5	39.3	1.54
2000	Dark brown	3	15.0	21.0	33.8	1.61
2100	Medium tan	5	17.5	17.3	29.1	1.68
2200	Medium tan	5	17.5	15.0	28.2	1.88

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 68 O-4

Formation: Carolina Slate Belt, mafic volcanics

Location: Oaks site in SW Orange Co. on S side of N.C. Highway 54, 0.6 mi SE of N.C. Highway 54 and SR 1007 intersection at Oaks.

Description: Roadcut, 0.2 mi long, 4-6 ft high; attitude of cleavage- NE-trending, dipping steeply NW.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 5 ft over 25-ft section along middle of roadcut.

Unfired Properties: Water of plasticity-41%; drying shrinkage-7.5%; dry strength-fair; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium tan	2	10.0	27.9	43.8	1.57
1900	Medium tan	3	10.0	26.4	42.0	1.59
2000	Orange brown	4	12.5	23.6	41.5	1.76
2100	Orange brown	6	15.0	19.2	37.1	1.93
2200	Medium brown	7	15.0	16.9	35.8	2.12

Potential Use: Not suitable for structural clay products; high shrinkage.

ORANGE COUNTY - Continued

SAMPLE: 68 O-5

Formation: Carolina Slate Belt, intermediate volcanics

Location: Cedar Grove site in N-central Orange Co. 7 mi N of Hillsborough on E side of N.C. Highway 86, 0.1 mi S of SR 1352 intersection and 1.9 mi E of Cedar Grove.

Description: Roadcut, 4 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 5 ft over 30-ft section near center of cut.

Unfired Properties: Water of plasticity-41%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium tan	2	10.0	28.4	42.0	1.48
1900	Medium tan	2	10.0	26.5	41.9	1.58
2000	Orange brown	3	10.0	25.5	41.4	1.59
2100	Orange brown	4	15.0	23.2	40.5	1.77
2200	Medium tan	6	17.5	18.6	33.3	1.79

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 68 O-6

Formation: Granite

Location: Carr site in NW Orange Co. 2 mi ENE of Carr on S side of SR 1371, 0.3 mi W of N.C. Highway 86.

Description: Roadcut, 10 ft high, 400 ft long.

Type Material: Residual clay

Color: Orange

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.9%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	0.0	32.0	47.1	1.47
1900	Orange tan	3	2.5	31.4	46.4	1.48
2000	Orange tan	3	2.5	29.1	44.1	1.51
2100	Dark tan	5	5.0	20.0	35.0	1.75
2200	Light brown	5	10.0	16.8	31.0	1.84
2300	Light red	5	10.0	16.0	30.2	1.89

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

PERSON COUNTY

Nine residual clay samples were collected from different selected sites in Person County. Laboratory tests indicate potential uses for the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
73P - 1	Carolina Slate Belt	Not suitable for structural clay products.
73P - 2	Carolina Slate Belt	Not suitable for structural clay products.
73P - 3	Carolina Slate Belt	Not suitable for structural clay products.
73P - 4	Carolina Slate Belt	Structural clay products.
73P - 5	Diorite	Structural clay products.
73P - 6	Carolina Slate Belt	Structural clay products.
73P - 7	Roxboro granite	Structural clay products.
73P - 8	Metagabbro	Not suitable for structural clay products.
73P - 9	Mica gneiss	Structural clay products.

PERSON COUNTY

SAMPLE: 73P-1

Formation: Carolina Slate Belt, mafic volcanics

Location: McGehees Mill site in NW Person Co. on E side of SR 1323, 1 mi N of McGehees Mill and junction with SR 1322.

Description: Road ditch; attitude of cleavage- NE trending, dipping SE.

Type Material: Residual clay

Color: Light orange brown

Sampled Interval: Every 5 ft over 25-ft section along ditch.

Unfired Properties: Water of plasticity-39%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	3	10.0	33.0	49.8	1.51
1900	Gray red	4	10.0	26.4	42.2	1.60
2000	Yellow brown	6	12.5	25.7	42.1	1.64
2100	Yellow brown	7	17.5	16.5	33.7	2.04
2200	Medium brown	7	17.5	14.4	29.7	2.06

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 73P-2

Formation: Carolina Slate Belt, mafic volcanics

Location: Woodsdale site in N-central Person Co. on S side of SR 1322, 2.75 mi W of SR 1326 junction in Woodsdale and 0.75 mi W of SR 1333 intersection.

Description: Roadcut, 2-6 ft high and 200 ft long; attitude of cleavage- NE-trending, dipping SE.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 10 ft over 100-ft section along middle of cut.

Unfired Properties: Water of plasticity-45%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium tan	2	15.0	25.5	40.5	1.59
1900	Gray red	3	15.0	23.4	38.4	1.64
2000	Gray red	4	15.0	22.7	38.1	1.68
2100	Dark brown	5	17.5	18.1	35.8	1.90
2200	Gray red	6	20.0	17.9	34.4	2.00

Potential Use: Not suitable for structural clay products; high shrinkage.

PERSON COUNTY - Continued

SAMPLE: 73P-3

Formation: Carolina Slate Belt, felsic volcanics

Location: Dixons Store site in NE Person Co. on W side of SR 1582, 0.3 mi N of SR 1512 and 2 mi W of Dixons Store.

Description: Roadcut, 4 ft high, 300 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Red orange

Sampled Interval: Every 10 ft over 50-ft section along middle of cut.

Unfired Properties: Water of plasticity-43%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange brown	2	12.5	29.3	46.0	1.57
1900	Orange brown	3	12.5	26.0	41.3	1.59
2000	Medium tan	5	15.0	20.8	36.2	1.74
2100	Gray red	7	17.5	11.0	22.0	2.0
2200	Lt. gray red	7	17.5	11.0	22.0	2.00

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 73P-4

Formation: Carolina Slate Belt, felsic volcanics

Location: Timberlake site in S-central Person Co. on SW side of U.S. Highway 501-SR 1202 intersection just S of Timberlake.

Description: Roadcut, 4 ft high, 0.1 mi long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Unfired Properties: Water of plasticity-32%; working properties-plastic; drying shrinkage-3.0%; dry strength-fair; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange brown	2	5.0	24.8	38.9	1.57
1900	Brown orange	3	7.5	20.8	34.1	1.60
2000	Orange brown	4	7.5	19.5	33.3	1.75
2100	Medium brown	6	10.0	13.6	26.5	1.95
2200	Medium brown	7	10.0	12.0	24.1	2.01

Potential Use: Structural clay products (e.g., building brick at 2000°-2200°F).

PERSON COUNTY - Continued

SAMPLE: 73P-5

Formation: Diorite

Location: Hurdle Mills site in SW Person Co. on W side of N.C. Highway 157, 0.2 mi S of its intersection with SR 1107 on SE side of Hurdle Mills.

Description: Roadcut, 200 ft long, 2-4 ft high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.1%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	2	2.5	34.6	50.7	1.46
1900	Light brown	3	5.0	29.5	47.8	1.62
2000	Light brown	3	5.0	21.2	38.1	1.79
2100	Brown	3	7.5	15.5	31.0	2.00
2200	Brown	5	10.0	14.0	29.1	2.07
2300	Dark brown	6	12.5	12.3	25.9	2.11

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 73P-6

Formation: Carolina Slate Belt, felsic volcanics

Location: Paynes Tavern site in Central Person Co., 1.1 mi N of Paynes Tavern on S side of SR 1150, 0.15 mi E of its intersection with SR 1149.

Description: Roadcut, 200 ft long, slopes down on each end from maximum height of 4 ft at middle of roadcut.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-41.7%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	33.3	48.0	1.44
1900	Tan	3	2.5	32.4	47.4	1.46
2000	Tan	4	7.5	17.6	32.8	1.86
2100	Brown	5	12.5	11.7	24.1	2.06
2200	Brown	5	12.5	11.4	23.6	2.07
2300	Dark brown	5	12.5	10.1	21.6	2.14

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F).

PERSON COUNTY - Continued

SAMPLE: 73P-7

Formation: Roxboro granite

Location: Olive Hill site in W-central Person Co. 0.65 mi SE of Olive Hill on SW side of N.C. Highway 57, 0.35 mi NW of intersection with SR 1343.

Description: Roadcut, 400 ft long, slopes down on each end from 6-7 ft high in central portion of roadcut.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.4%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-4.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	27.0	41.5	1.54
1900	Tan	3	0.0	28.2	42.7	1.51
2000	Tan	3	2.5	23.6	38.2	1.62
2100	Light brown	3	5.0	18.1	31.9	1.76
2200	Light brown	4	5.0	16.4	29.6	1.80
2300	Gray	4	7.5	14.0	26.2	1.86

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 73P-8

Formation: Metagabbro

Location: Hyco site in NW Person Co., on SE side of SR 1313, 1 mi SW of its intersection with N.C. Highway 57 by the SW area of Hyco Reservoir.

Description: Roadcut, 300 ft long, slopes to road level on each end from 5 ft high near center of roadcut.

Type Material: Residual clay

Color: Greenish-brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-18.8%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	0.0	21.0	37.5	1.78
1900	Brown	3	0.0	20.0	36.0	1.80
2000	Brown	3	0.0	18.8	34.9	1.86
2100	---	---	(Melted)			
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; abrupt vitrification (2000°-2100°F).

PERSON COUNTY - Continued

SAMPLE: 73P-9

Formation: Mica gneiss

Location: Semora site in NW corner of Person Co. 0.65 mi SE of N.C. Highway 57 and 119 intersection in Semora on NE side of N.C. Highway 57, 0.1 mi SE of Caswell-Person county line.

Description: Roadcut, 300 ft long, slopes to road level on each end from 5 ft high near center of roadcut.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft from 100-ft section at NW end of roadcut, SE portion of cut is stream terrace.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.9%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light brown	3	2.5	30.0	45.8	1.53
1900	Light brown	3	5.0	28.1	43.8	1.56
2000	Light brown	3	7.5	19.5	34.9	1.79
2100	Brown	4	10.0	15.0	28.8	1.92
2200	Dark brown	5	10.0	13.9	27.6	1.98
2300	Dark brown	5	10.0	11.8	24.1	2.04

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

POLK COUNTY

Four residual clay samples and seventeen sedimentary clay samples were collected from selected sites in Polk County. Laboratory tests indicate potential uses of the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
75P - 1	Granite	Not suitable for structural clay products.
75P - 2	Terrace alluvium	Not suitable for structural clay products.
75P - 3	Terrace alluvium	Structural clay products.
75P - 4	Terrace alluvium	Structural clay products.
75P - 5	Terrace alluvium	Structural clay products.
75P - 6	Terrace alluvium	Structural clay products.
75P - 7	Terrace alluvium	Structural clay products.
75P - 8	Terrace alluvium	Structural clay products.
75P - 9	Terrace alluvium	Structural clay products.
75P - 10	Terrace alluvium	Structural clay products.
75P - 11	White terrace alluvium	Not suitable for structural clay products.
75P - 12	Red terrace alluvium	Not suitable for structural clay products.
75P - 13	Terrace alluvium	Not suitable for structural clay products.
75P - 14	Terrace alluvium	Not suitable for structural clay products.
75P - 15	Terrace alluvium	Not suitable for structural clay products.
75P - 16	Terrace alluvium	High-duty refractory.
75P - 17	Terrace alluvium	Structural clay products.
75P - 18	Terrace alluvium	Not suitable for structural clay products.
75P - 19	Granite gneiss complex	Not suitable for structural clay products.
75P - 20	Mica gneiss	Structural clay products.
75P - 21	Whiteside granite	Not suitable for structural clay products.

POLK COUNTY

SAMPLE: 75P-1

Formation: Granite

Location: Sunny View West, site A, 1.5 mi W of center of Sunny View on SR 1138, 0.2 mi S of its junction with SR 1164, in N Polk Co.

Description: Massive non-foliated granite weathered to saprolite in roadcut.

Type Material: Residual sand-clay

Color: Buff

Type of Sample: Composite sample

Bloating Test: Negative

Unfired Properties: Water of plasticity-42.4%; working characteristics-short; drying shrinkage-0.0%; dry strength-poor; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 75P-2

Formation: Terrace alluvium

Location: Sunny View West, site B, 2 mi WSW of center of Sunny View on W side of SR 1138, 0.6 mi S of Cooper's Gap Road (SR 1161) on W side of road opposite T.D. Lawter's mailbox.

Description: Terrace alluvium developed along tributary of Rotten Creek; horizontal bedding; small deposit--18 ft by 80 ft by 150+ ft.

Type Material: Sedimentary clay

Color: Buff

Type of Sample: Channel sample

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working characteristics-short; drying shrinkage-0.0%; dry strength-good; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	1	2.5	39.4	48.9	1.23
1900	Light tan	2	2.5	39.1	48.3	1.25
2000	Light tan	2	2.5	38.3	48.3	1.26
2100	Buff spotted	3	5.0	36.9	47.4	1.28
2200	Buff spotted	4	5.0	28.1	40.9	1.45
2300	Gray spotted	5	7.5	24.3	37.7	1.55

Potential Use: Not suitable for structural clay products; high absorption.

POLK COUNTY - Continued

SAMPLE: 75P-3

Formation: Terrace alluvium

Location: Sunny View Southwest site 0.7 mi SW of center of Sunny View in Polk Co. along tributary of Britten Creek.

Description: Alluvial terrace material; horizontal bedding; medium-sized, gray-colored deposit along tributary of Britten Creek.

Type Material: Sedimentary clay

Color: Pale gray

Type of Sample: Grab sample

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.8%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	5.0	20.4	32.5	1.59
1900	Flesh	2	5.0	19.6	32.4	1.63
2000	Flesh	3	5.0	19.6	32.0	1.65
2100	Gray flesh	3	5.0	17.9	30.1	1.68
2200	Gray flesh	4	5.0	14.6	25.9	1.78
2300	Gray spotted	5	7.5	12.7	23.5	1.85

Potential Use: Structural clay products (e.g., building brick, structural tile at 2200°-2300°F).

SAMPLE: 75P-4

Formation: Terrace Alluvium

Location: Sunny View East site, E of center of Sunny View on SR 1310, 0.5 mi SW of Walnut Creek and 0.8 mi N of SR 1161 in N Polk Co.

Description: Terrace alluvium along S bank of Walnut Creek; horizontal bedding; alluvium covers approximately 0.5 acre 10 ft deep.

Type Material: Sedimentary clay

Color: Bright yellow

Type of Sample: Composite sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Deep flesh	2	5.0	21.3	34.5	1.62
1900	Deep flesh	2	5.0	20.6	34.3	1.66
2000	Flesh	2	5.0	20.4	34.3	1.69
2100	Pale flesh	3	5.0	20.0	33.7	1.69
2200	Buff pink	4	7.5	16.7	29.7	1.78
2300	Buff	4	7.5	15.6	28.5	1.83

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 75P-5

Formation: Terrace alluvium

Location: Pea Ridge North site 1.8 mi NNW of center of Pea Ridge on SR 1315, 0.4 mi SW of Walnut Creek bridge on NW bank of Walnut Creek in NE Polk Co.

Description: Terrace alluvium, horizontal bedding; deposit covers 75+ acres to undetermined depth.

Type Material: Sedimentary clay

Color: Buff

Type of Sample: Channel sample

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	5.0	17.9	30.5	1.70
1900	Flesh	2	5.0	17.7	30.5	1.73
2000	Flesh	3	5.0	17.2	30.1	1.75
2100	Buff	3	7.5	15.0	27.0	1.80
2200	Buff	4	7.5	12.7	23.7	1.86
2300	Buff spotted	4	7.5	10.8	20.7	1.92

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 75P-6

Formation: Terrace alluvium

Location: Pea Ridge Northwest site 3.4 mi NW of center of Pea Ridge on SR 1365, 50 yd S of its junction with Mountain Range Road (SR 1313) in N-central Polk Co.

Description: Terrace alluvium; horizontal bedding; small deposit about 1 acre of undetermined depth, probably over 5 ft.

Type Material: Sedimentary clay

Color: Light yellow

Type of Sample: Grab sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.5%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	27.0	41.1	1.50
1900	Tan	2	2.5	27.0	40.4	1.52
2000	Flesh	2	5.0	26.3	40.4	1.54
2100	Pale pink	2	5.0	25.6	40.0	1.56
2200	Buff	3	5.0	20.8	34.7	1.67
2300	Buff	4	5.0	18.7	32.4	1.73

Potential Use: Structural clay products (e.g., building brick at 2300°F).

POLK COUNTY - Continued

SAMPLE: 75P-7

Formation: Terrace alluvium

Location: Lynn site in SW Polk Co. 1.2 mi ESE of center of Lynn on SR 1515, 0.7 mi of its junction with SR 1506, 1.6 mi NE of center of Tryon.

Description: Terrace alluvium; horizontal bedding; clay crops out along 200 ft of terrace at depth of 5 ft; bottom not observed.

Type Material: Sedimentary clay

Color: Buff

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.3%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	5.0	25.3	38.8	1.45
1900	Flesh	2	5.0	25.1	38.2	1.51
2000	Flesh	3	5.0	25.1	37.9	1.55
2100	Pale flesh	3	5.0	23.8	36.4	1.59
2200	Buff	4	10.0	17.9	31.2	1.74
2300	Buff	5	10.0	16.1	29.1	1.81

Potential Use: Structural clay products (e.g., building brick, structural tile at 2200°-2300°F).

SAMPLE: 75P-8

Formation: Terrace alluvium

Location: Tryon East site in SW Polk Co. 150 yd S of Pacolet River bridge on SR 1517 and 3.5 mi E of Tryon.

Description: Terrace alluvium, horizontal bedding; sample collected from "B" soil horizon; deposit could be extensive.

Type Material: Sedimentary clay

Color: Red brown

Type of Sample: Grab sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.2%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red brown	2	5.0	37.7	53.2	1.41
1900	Brown	2	5.0	32.3	48.2	1.49
2000	Brown	2	5.0	32.3	48.1	1.49
2100	Brown	3	10.0	25.6	42.3	1.65
2200	Dark brown	4	10.0	18.3	34.2	1.87
2300	Dk. chocolate	5	12.5	17.5	33.0	1.89

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 75P-9

Formation: Terrace alluvium

Location: Tryon Northeast site in SW Polk Co. on SR 1516, 200 yd E of Pacolet River bridge and 2.3 mi ENE of Tryon.

Description: Terrace alluvium; horizontal bedding; deposit may be extensive, underlies wide flood plain.

Type Material: Sedimentary clay

Color: Gray

Type of Sample: Grab sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.7%; working characteristics-plastic; drying shrinkage-2.5%; dry strength-good; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red brown	2	2.5	32.3	46.9	1.43
1900	Red brown	2	2.5	32.3	46.3	1.45
2000	Red brown	2	5.0	31.3	46.2	1.48
2100	Red brown	3	5.0	26.0	40.8	1.57
2200	Brown	4	5.0	23.5	38.9	1.66
2300	Dk. chocolate	5	10.0	16.4	31.5	1.92

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 75P-10

Formation: Terrace alluvium

Location: Sandy Plains Southeast site in SE corner of Polk Co. 6.4 mi SE of center of Sandy Plains on SR 1353, 300 yd E of its junction with SR 1004 and 1.6 mi S of McGinnis Crossroads.

Description: Terrace alluvium; horizontal bedding; roadcut 300 ft long, minimum of 5 ft clay, overlain by red weathered sandy zone 4 ft in depth.

Type Material: Sedimentary clay

Color: Pale gray

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.7%; working characteristics-short; drying shrinkage-2.5%; dry strength-fair; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	2.5	25.6	39.7	1.54
1900	Flesh	2	5.0	25.3	39.5	1.57
2000	Pale flesh	2	5.0	25.0	39.3	1.58
2100	Pale flesh	3	5.0	24.1	38.5	1.60
2200	Yellow-buff	4	5.0	21.5	36.0	1.68
2300	Buff	4	5.0	19.4	33.0	1.70

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

POLK COUNTY - Continued

SAMPLE: 75P-11

Formation: White terrace alluvium

Location: Sandy Plains East site in SE Polk Co. 5.7 mi E of center of Sandy Plains on SR 1302 (County Line Road) 0.5 mi N of its junction with SR 1004 in center of community of Green River (location same as 75P-12).

Description: White terrace alluvium; horizontal bedding; lower terrace alluvium overlain by 8 ft of red stratified silty clay alluvium.

Type Material: Sedimentary clay

Color: Pale yellow

Type of Sample: Composite sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.7%; working characteristics-short; drying shrinkage-2.5%; dry strength-fair; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	2.5	30.8	44.7	1.43
1900	Flesh	2	2.5	30.3	44.0	1.44
2000	Flesh	2	2.5	29.9	43.8	1.49
2100	Pink	2	5.0	29.0	43.1	1.49
2200	Pink-gray	2	5.0	26.3	40.7	1.55
2300	Buff-gray	3	5.0	24.1	38.3	1.59

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 75P-12

Formation: Red terrace alluvium

Location: Sandy Plains East site in SE Polk Co. 5.7 mi E of center of Sandy Plains on SR 1302 (County Line Road) 0.5 mi N of junction with SR 1004 in center of community of Green River (location same as 75P-11).

Description: Red terrace alluvium; horizontal bedding; roadcut 50 ft long, 8+ ft deep of red stratified silty clay, upper terrace level overlying "white" clay.

Type Material: Sedimentary clay

Color: Red brown

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.5%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red brown	2	5.0	38.5	49.5	1.28
1900	Red brown	2	5.0	37.7	49.4	1.31
2000	Red brown	2	5.0	36.4	48.7	1.34
2100	Light brown	2	5.0	33.9	47.3	1.40
2200	Brown	3	7.5	32.3	46.5	1.44
2300	Dark brown	4	10.0	30.3	44.6	1.47

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 75P-13

Formation: Terrace alluvium

Location: Sandy Plains Northeast site in SE Polk Co. on SR 1005, 100 yd NE of its junction, with N.C. Highway 9 in Sandy Plains.

Description: Terrace alluvium; horizontal bedding; deposit crops out for 70 yd along SR 1005, 2-6 ft deep.

Type Material: Sedimentary clay

Color: Buff

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working characteristics-short; drying shrinkage-2.5%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale tan	2	2.5	28.6	42.8	1.48
1900	Pale tan	2	2.5	28.6	42.6	1.49
2000	Pale tan	2	2.5	28.6	42.4	1.50
2100	Pale flesh	3	2.5	27.8	41.7	1.50
2200	Pale flesh	3	2.5	26.7	41.1	1.54
2300	Buff-gray	3	2.5	25.3	39.8	1.57

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 75P-14

Formation: Terrace alluvium

Location: Sandy Plains Southwest site A in SE Polk Co. 2.6 mi SW of Sandy Plains on SR 1521, 0.3 mi SW of its junction with SR 1522.

Description: Terrace alluvium; horizontal bedding; roadcut 50 yds long, minimum of 8 ft red clay.

Type Material: Sedimentary clay

Color: Red brown

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.6%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red brown	2	5.0	37.0	51.5	1.36
1900	Red brown	2	5.0	37.0	50.4	1.39
2000	Brown	3	7.5	35.7	49.7	1.39
2100	Brown	5	10.0	31.3	47.4	1.51
2200	Chocolate	6	12.5	23.3	40.2	1.73
2300	Dk. chocolate	6	12.5	21.3	37.5	1.76

Potential Use: Not suitable for structural clay products; high absorption.

POLK COUNTY - Continued

SAMPLE: 75P-15

Formation: Terrace alluvium

Location: Sandy Plains Southwest site B in SE Polk Co. 2.6 mi SW of center of Sandy Plains on SR 1520, 0.2 mi SW of its junction with SR 1522,

Description: Terrace alluvium; horizontal bedding; roadcut about 30 yds long and about 6 ft deep.

Type Material: Sedimentary clay

Color: Pale yellow

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.1%; working characteristics-short; drying shrinkage-2.5%; dry strength-fair; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	2.5	27.0	41.2	1.50
1900	Light tan	2	2.5	27.0	41.1	1.53
2000	Pale flesh	2	2.5	26.7	40.9	1.54
2100	Pale pink	2	2.5	26.3	40.8	1.55
2200	Pale pink	2	2.5	26.3	40.4	1.55
2300	Buff gray	3	5.0	25.6	39.9	1.56

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 75P-16

Formation: Terrace alluvium

Location: Mill Spring site in W-central Polk Co. 3.5 mi W of center of Mill Spring on SR 1138, 0.1 mi E of SR 1142 (Holbert Cove Road) on W bank of Ostin Creek.

Description: Terrace alluvium; horizontal bedding; 300 yds long, 5 ft deep; base not exposed; unweathered feldspar present.

Type Material: Sedimentary clay

Color: Buff

Type of Sample: Grab sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.6%; working characteristics-short; drying shrinkage-0.0%; dry strength-poor; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pink spotted	2	2.5	29.9	46.5	1.53
1900	Pink spotted	2	2.5	20.0	39.1	1.56
2000	Pink spotted	2	2.5	24.4	37.4	1.64
2100	Pale pink spotted	2	5.0	23.8	34.9	1.74
2200	Pale pink spotted	2	5.0	18.7	33.2	1.78
2300	---	---	(Expanded)			

Other Tests: Pyrometric cone equivalent 31-32.

Potential Use: High-duty refractory.

POLK COUNTY - Continued

SAMPLE: 75P-17

Formation: Terrace alluvium

Location: Sunny View Northwest site in NW Polk Co. on SR 1165, 0.5 mi NW of its junction with SR 1164 (Owl Hollow Road) and 0.4 mi SE of Rutherford county line.

Description: Terrace alluvium, horizontal bedding; one of a series of shallow exposures of a terrace developed along an ancient stream valley.

Type Material: Sedimentary clay

Color: Light gray

Type of Sample: Grab sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.7%; working characteristics-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	5.0	32.3	46.2	1.43
1900	Flesh	3	5.0	31.7	45.7	1.44
2000	Flesh	3	5.0	29.9	44.7	1.49
2100	Pale flesh	4	7.5	26.3	41.3	1.57
2200	Tan-flesh	5	10.0	21.3	36.3	1.70
2300	Gray spotted	6	10.0	18.5	32.5	1.76

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 75P-18

Formation: Terrace alluvium

Location: Sandy Plains East-Southeast site in SE Polk Co. 5.8 mi ESE of center of Sandy Plains on SR 1359, 0.5 mi E of SR 1004.

Description: Terrace alluvium, horizontal bedding; outcrop 70 ft long, 4 ft deep; white clay along roadcut.

Type Material: Sedimentary clay

Color: Yellow

Type of Sample: Channel sample.

Bloating Test: Negative

Unfired Properties: Water of plasticity-41.4%; working characteristics-short; drying shrinkage-2.5%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Red tan	2	2.5	40.8	51.6	1.26
1900	Red tan	2	2.5	40.0	51.4	1.28
2000	Flesh	2	5.0	40.0	51.3	1.28
2100	Pale tan	2	5.0	35.7	48.4	1.36
2200	Tan	3	7.5	35.7	48.4	1.36
2300	Tan gray	4	10.0	26.3	40.7	1.55

Potential Use: Not suitable for structural clay products; high absorption.

POLK COUNTY - Continued

SAMPLE: 75P-19

Formation: Granite gneiss complex

Location: Columbus site in central Polk Co. 2.5 mi NNE of center of Columbus on W side of SR 1137, 0.3 mi SW of its N intersection with N.C. Highway 108.

Description: Roadcut, 4 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.5%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	34.7	48.7	1.47
1900	Orange tan	2	5.0	33.0	48.6	1.47
2000	Orange tan	2	7.5	32.7	48.1	1.47
2100	Light brown	3	10.0	31.9	47.4	1.49
2200	Light brown	3	10.0	26.1	42.3	1.62
2300	Red brown	3	10.0	26.9	42.6	1.59

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 75P-20

Formation: Mica gneiss

Location: Valhalla site in SW Polk Co. 1.2 mi WSW of center of Valhalla on S side of SR 1107, 1.8 mi W of intersection with U.S. Highway 176 and 0.1 mi S of Southern Railway.

Description: Roadcut, 12 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.5%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	28.1	43.4	1.54
1900	Tan	3	5.0	25.8	40.7	1.58
2000	Orange tan	3	5.0	21.7	36.4	1.68
2100	Orange tan	4	7.5	21.1	36.1	1.71
2200	Light red	4	10.0	17.8	31.9	1.79
2300	Dark red	4	10.0	16.1	29.2	1.82

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

POLK COUNTY - Continued

SAMPLE: 75P-21

Formation: Whiteside granite

Location: Saluda site in SW corner of Polk Co. 1.1 mi S of center of Saluda on E side of SR 1102, 1.1 mi S of U.S. Highway 176 in Saluda and on N side of Southern Railway underpass, on small service road parallel to railway.

Description: Roadcut, 6 ft high, 200 ft long.

Type Material: Residual clay

Color: Beige

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.5%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

RANDOLPH COUNTY

Seven residual clay samples were collected from different selected sites in Randolph County. Laboratory tests indicate potential uses for the raw materials represented by these samples, as well as a blend of two materials, as follows:

Sample No.	Formation	Potential Use
76R - 1	Carolina Slate Belt	Structural clay products.
76R - 2	Carolina Slate Belt	Structural clay products.
76R - 3	Carolina Slate Belt	Not suitable for structural clay products.
76R - 4	Carolina Slate Belt	Not suitable for structural clay products.
76R - 5	Carolina Slate Belt	Structural clay products.
76R - 6	Carolina Slate Belt	Structural clay products.
76R - 7	Granite	Structural clay products.

RANDOLPH COUNTY

SAMPLE: 76R-1

Formation: Carolina Slate Belt, felsic volcanics

Location: Jay Williams site A approximately 4.5 mi SW of Ulah in SW Randolph Co. on SW side of Jay Williams brick residence on SE side of SR 1143 and 2.65 mi SW of intersection with SR 1142.

Description: 100-yd long strip of abandoned road bed parallel to new road; two 7-ft deep test pits 100 ft apart along middle of road bed; white and buff sandy clay outcrops along SR 1143 for 0.2 mi; attitude of cleavage-NE strike, near vertical.

Type Material: Residual clay blend

Color: White

Sampled Interval: Composite from 2 test pits.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.4%; working properties-moderate plasticity; drying shrinkage-0.0%; dry strength-poor; pH-7.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	0.0	22.6	35.7	1.58
1900	Tan	2	2.5	21.8	34.8	1.60
2000	Tan	2	2.5	17.9	30.4	1.70
2100	Brown	3	7.5	9.1	17.9	1.97
2200	Gray brown	4	10.0	1.6	3.5	2.19
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°F).

SAMPLE: 76R-2

Formation: Carolina Slate Belt, felsic volcanics

Location: Jay Williams site B approximately 4.5 mi SW of Ulah on NW side of SR 1143, 2.65 mi SW of its intersection with SR 1142 and 0.1 mi NE of Jay Williams brick residence.

Description: Shallow depression, cleared area about 100 ft in diameter; clay has been utilized in part for chinking log cabins and lining chimneys; attitude of layering-NE strike, steeply dipping to vertical.

Type Material: Residual clay

Color: Gray

Sampled Interval: Test pit, 1.5 ft deep.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.5%; working properties-low plasticity; drying shrinkage-2.5%; dry strength-poor; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	18.4	32.2	1.74
1900	Tan	2	2.5	18.3	31.8	1.75
2000	Tan	2	2.5	17.8	31.1	1.75
2100	Tan	3	2.5	16.6	29.2	1.76
2200	Buff	4	2.5	15.9	26.6	1.80
2300	Buff	5	2.5	13.3	25.4	1.91

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

RANDOLPH COUNTY - Continued

SAMPLE: 76R-3

Formation: Carolina Slate Belt, felsic volcanics

Location: Seagrove site on W side of U.S. Highway 220, 0.1 mi N of intersection with SR 2910 and about 2 mi N of U.S. Highway 220-N.C. Highway 705 junction in Seagrove.

Description: 7-ft high roadcut on W side of U.S. Highway 220; about 100 ft off highway; roadcut 0.2 mi long.

Type Material: Residual clay

Color: Light orange brown

Sampled Interval: Every 10 ft over 100-ft section along middle of elevation of roadcut near center.

Unfired Properties: Water of plasticity-38%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange brown	2	7.5	36.3	51.1	1.41
1900	Brown orange	3	7.5	30.0	43.8	1.46
2000	Dark tan	4	7.5	27.4	43.7	1.55
2100	Orange brown	5	10.0	25.4	42.5	1.72
2200	Dark tan	5	12.5	22.3	39.0	1.75

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 76R-4

Formation: Carolina Slate Belt, felsic volcanics

Location: Ramseur site in E-central Randolph Co. approximately 1 mi E of Ramseur on W side of SR 2626, 0.3 mi S of junction with U.S. Highway 64.

Description: Roadcut, 4-6 ft high, 0.2 mi long.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 10 ft over 100-ft section along base and at center of cut.

Unfired Properties: Water of plasticity-39%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	1	5.0	35.8	49.0	1.37
1900	Dark tan	2	5.0	35.2	48.6	1.38
2000	Orange brown	3	7.5	28.7	43.6	1.50
2100	Dk. orange brown	4	10.0	26.8	43.1	1.63
2200	Medium brown	5	10.0	25.0	41.0	1.64

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 76R-5

Formation: Carolina Slate Belt, argillite

Location: Asheboro site in W-central Randolph Co. approximately 3.5 mi W of junction of U.S. Highway 64 and N.C. Highway 49 on W side of Asheboro; on NE corner of intersection of U.S. Highway 64 and SR 1420.

Description: Roadcut, 5-10 ft high; attitude of bedding- NE-trending.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 5 ft over 25-ft section along middle of elevation of roadcut.

Unfired Properties: Water of plasticity-38%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange brown	1	5.0	31.1	46.2	1.43
1900	Orange brown	1	5.0	32.8	44.5	1.41
2000	Orange brown	2	5.0	28.7	43.3	1.51
2100	Medium brown	3	10.0	22.6	40.0	1.77
2200	Orange brown	4	10.0	21.5	36.1	1.68

Potential Use: Structural clay products (e.g., building brick at 2200°F).

SAMPLE: 76R-6

Formation: Carolina Slate Belt, felsic volcanics

Location: Randleman site in N-central Randolph Co. 2 mi E of center of Randleman on S side of SR 2119 and 0.9 mi W of intersection with SR 2111.

Description: Roadcut, 2-4 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Light orange

Sampled Interval: Every 20 ft over 100-ft section along base of roadcut, W end.

Unfired Properties: Water of plasticity-44%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	7.5	33.3	48.3	1.45
1900	Yellow orange	3	12.5	27.1	44.9	1.58
2000	Brown orange	5	12.5	27.4	42.8	1.64
2100	Dark tan	5	15.0	16.8	29.9	1.78
2200	Dark tan	5	17.5	16.0	29.4	1.84

Potential Use: Structural clay products (e.g., building brick at 2000°-2100°F); shrinkage increases above 2100°F.

RANDOLPH COUNTY - Continued

SAMPLE. 76R-7

Formation: Granite

Location: Trinity site in NW Randolph Co. 2 mi SE of the center of Trinity on W side of SR 1566, 0.3 mi S of intersection with SR 1565.

Description: Roadcut, 7 ft high, 300 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.1%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	3	0.0	20.7	35.9	1.73
1900	Light tan	3	0.0	18.2	32.5	1.76
2000	Orange tan	3	2.5	18.2	32.1	1.78
2100	Light brown	5	2.5	14.3	26.3	1.84
2200	Red brown	5	2.5	13.2	24.7	1.86
2300	Brown	6	5.0	8.7	18.1	2.09

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

RICHMOND COUNTY

A total of five samples of shale and residual clay were collected from different selected locations in Richmond County. Laboratory tests provide comparative information on two samples of raw materials recently used and indicate potential uses for materials represented by three additional samples as follows:

Sample No.	Formation	Potential Use
77R - 1	Upper Triassic	Structural clay products.
77R - 2	Carolina Slate Belt	Structural clay products.
77R - 3	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
77R - 4	Carolina Slate Belt	Recent: Additive to lighten color of red-burning clay.
77R - 5	Granite	Structural clay products.

RICHMOND COUNTY

SAMPLE: 77R-1

Formation: Upper Triassic, Newark Group

Location: Exway site on SR 1005 2.4 mi SE of Exway 0.1 mi NW of SR 1152 junction.

Description: Reddish-brown shale in 2- to 5-ft high gently sloping roadcut, S side of road; attitude of bedding-NE, 20-25°SE.

Type Material: Shale

Color: Yellow

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-18.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	15.6	29.2	1.87
1900	Tan	3	7.5	11.5	22.9	2.00
2000	Light brown	4	7.5	9.4	19.5	2.07
2100	Brown	5	10.0	4.2	9.8	2.32
2200	Dark brown	6	12.5	2.7	6.3	2.34
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 2000°-2200°F).

SAMPLE: 77R-2

Formation: Carolina Slate Belt, laminated argillite

Location: Carriker property on E side of SR 1317, 0.3 mi S of intersection with SR 1318, 3.5 mi NW of Ellerbe.

Description: Roadcut exposure of yellowish tan plastic clay that retains bedding and cleavage; cut by several large, white massive quartz veins; clay exposed for approximately 300 ft along road that slopes to small stream; clay becomes harder and less plastic near foot of hill; overlain by several ft of Pinehurst Fm. (?); attitude of bedding-N 70°E, 45°NW.

Type Material: Residual silty clay

Color: Buff

Sampled Interval: Approximately 25 ft across strike at N end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.0%; working properties-plastic; drying shrinkage-0.0%; dry strength-fair; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Flesh	2	0.0	33.5	45.8	1.36
1900	Flesh	2	5.0	27.2	40.5	1.49
2000	Flesh	3	5.0	23.2	36.7	1.58
2100	Flesh	4	10.0	17.8	30.7	1.73
2200	Flesh gray	6	15.0	6.9	14.2	2.06
2300	Gray	6	15.0	3.5	7.5	2.15

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F); high shrinkage above 2100°F.

RICHMOND COUNTY - Continued

SAMPLE: 77R-3

Formation: Carolina Slate Belt, felsic tuff

Location: Robert & Billie Webb clay pit (same locality as 77R-4) located 0.5 mi S of SR 1310; turn S off SR 1310, 0.1 mi E of intersection with SR 1318.

Description: Small clay pit developed into E face of hill at approximately 450 ft elevation; clay in pit varies from chalk white to light gray, is pink mottled, and contains conspicuous secondary hematite concretions which weather to a purple color that locally stains clay; clay overlain by cobbles and coarse sand of Pinehurts Fm. (?); attitude of cleavage-N 45°E, steep dip to NW.

Type Material: Residual clay
Color: Off white

Sampled Interval: Approximately 20 ft across strike in E face of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale buff	2	0.0	31.0	47.8	1.48
1900	Pale buff	2	5.0	31.6	47.3	1.51
2000	Pale buff	2	5.0	31.7	47.0	1.52
2100	Off white	2	5.0	26.7	41.9	1.57
2200	Pale buff	2	5.0	23.7	38.9	1.64
2300	Pale buff	3	5.0	20.4	35.6	1.75

Recent Use: Additive to lighten color of red-burning clay.

SAMPLE: 77R-4

Formation: Carolina Slate Belt, felsic tuff

Location: Robert & Billie Webb clay pit (same locality as 77R-3) located 0.5 mi S of SR 1310; turn S off SR 1310; 0.1 mi E of intersection with SR 1318.

Description: Small clay pit developed into E face of hill at approximately 450 ft elevation; clay in pit varies from chalk white to light gray, is pink mottled, and contains conspicuous secondary hematite concretions which weather to a purple color that locally stains clay; clay overlain by cobbles and coarse sand of Pinehurst Fm. (?); attitude of cleavage-N 45°E, steep dip to NW.

Type Material: Residual clay
Color: Cream

Sampled Interval: Composite sample from floor of pit; clay has washed into pit and is one foot thick.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-fair; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pale flesh	2	5.0	29.5	42.5	1.44
1900	Off white	2	5.0	28.9	41.4	1.43
2000	Off white	2	5.0	28.5	41.2	1.45
2100	Off white	2	5.0	26.5	39.4	1.49
2200	Buff	3	10.0	20.9	33.8	1.62
2300	Buff	4	10.0	16.6	28.8	1.74

Recent Use: Additive to lighten color of red-burning clay.

SAMPLE: 77R-5

Formation: Granite

Location: Cordova site in SW Richmond Co. on E side of SR 1117, 0.3 mi N of Seaboard Coast Line Railway underpass in Cordova and intersection with SR 1109.

Description: Roadcut, 5-10 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	2.5	32.2	46.4	1.44
1900	Orange tan	2	2.5	28.8	43.0	1.49
2000	Orange tan	3	5.0	27.6	41.5	1.50
2100	Orange tan	3	5.0	27.2	42.0	1.54
2200	Light red	3	5.0	25.6	40.5	1.58
2300	Dark red	4	5.0	20.0	33.8	1.69

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

ROCKINGHAM COUNTY

A total of seven shale and residual clay samples were collected from different selected locations in Rockingham County. Laboratory tests provide comparative information and potential uses for three raw materials presently used and indicate potential uses for materials represented by four additional samples as follows:

Sample No.	Formation	Potential Use
79R - 1	Upper Triassic	Present: Brick.
79R - 2	Upper Triassic	Present: Lightweight aggregate.
79R - 3	Upper Triassic	Present: Brick
79R - 4	Upper Triassic	Structural clay products.
79R - 5	Upper Triassic	Structural clay products.
79R - 6	Mica schist	Structural clay products.
79R - 7	Mica gneiss	Not suitable for structural clay products.

ROCKINGHAM COUNTY

SAMPLE: 79R-1

Formation: Upper Triassic, Newark Group

Location: Webster Brick Co., Plant #5, 1.4 mi NE of Eden city limit on N.C. Highway 770, 0.35 mi E of Southern Railroad and 1.7 mi SW of Virginia state line.

Description: Mine is benched into hillside and is approximately 1000 ft by 500 ft and averages 15 ft deep; reddish-brown shale exposed with no interbedded sandstone visible; attitude of bedding N 25°E, 30°NW in general (faulting is apparent).

Type Material: Shale
Color: Light tan

Sampled Interval: Every 10 ft from 100-ft section along base of plant's sheltered stockpile of ground material.

Bloating Test: Negative

Unfired Properties: Water of plasticity-44.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.6.

Fired Properties: T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	10.0	32.2	45.9	1.42
1900	Tan	3	10.0	28.3	42.6	1.50
2000	Light brown	4	10.0	23.9	38.6	1.61
2100	Brown	5	17.5	14.1	26.5	1.88
2200	Dark brown	6	17.5	9.6	19.2	2.00
2300	Blue black	6	17.5	2.7	6.1	2.25

Present Use: Brick.

SAMPLE: 79R-2

Formation: Upper Triassic, Newark Group

Location: Virginia Solite Corp., Leaksville mine, 1.6 mi NE of Eden city limit just below Virginia state line; 0.7 mi N of N.C. Highway 770 and SR 1743 junction.

Description: Pit is roughly 600 ft square and approximately 30 ft deep; cropping out in pit is interbedded medium- to dark-gray shales ranging from 6 inches to 5 ft thick; several other pits are not currently active; attitude of bedding-N 35°E, 32°NW.

Type Material: Shale
Color: Black

Sampled Interval: Every 10 ft over 50-ft section along base of outside stockpile of crushed material.

Bloating Test: Positive

Unfired Properties: Water of plasticity-22.2%; working properties-short; drying shrinkage-0.0%; dry strength-fair; pH-7.9.

Fired Properties: T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Specific Gravity	Apparent Porosity %	Bulk Density gm/cc
1800	Pale tan	2	0.0	25.8	2.64	40.5	1.56
1900	Pale tan	3	0.0	25.3	2.57	39.4	1.57
2000	Spec. brown	3	0.0	17.2	2.27	28.1	1.63
2100	---	---	(Melted)				
2200	---						
2300	---						

Preliminary Bloating Test: Crushing characteristics-good; particle size-1/2 to 3/4 inch; drying characteristics-good; retention time-15 minutes.

T °F	Absorption %	Bulk Density gm/cc	Bulk Density Lb/ft^3	Remarks
1900	---			No expansion
2000	7.7	1.44	90	Slight expansion
2100	6.8	1.01	63	Very good expansion, good skin, voids
2200	7.9	0.78	49	Fine expansion, good skin, voids

Present Use: Lightweight aggregate.

ROCKINGHAM COUNTY - Continued

SAMPLE: 79R-3

Formation: Upper Triassic, Newark Group

Location: Pine Hall Brick Co., Madison Plant #3, 1.7 mi SW of center of Madison plant on W side of SR 1138 0.7 mi S of U.S. Highway 311, just N of Dan River Bridge and Norfolk & Western Railway; pits 1 and 2 are just NE of plant across SR 1138.

Description: Pit 1--0.15 mi E of plant, roughly 1000 ft square and 20-30 ft deep; yellowish-brown and gray shale exposed. Pit 2--on N side of Pit 1, roughly rectangular 300 ft by 500 ft and 20 ft deep; length trends N-S; most of material exposed is light- to medium-gray shale. Attitude of bedding in both pits-generally N 60°E, 40°NW, many local variations in dip.

Type Material: Shale

Color: Tan

Sampled Interval: Samples from moving conveyor belt to plant's pug mill; blend from 4 pits--2 Madison pits, 1 Pine Hall pit, and 1 Walnut Cove pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-20.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	7.5	28.1	42.8	1.52
1900	Red tan	3	10.0	24.6	39.2	1.59
2000	Lt. red brown	4	10.0	16.5	30.1	1.82
2100	Brown	5	12.5	10.3	20.8	2.02
2200	Dark brown	6	17.5	7.6	16.0	2.10
2300	Steel black	6	17.5	2.8	6.3	2.25

Present Use: Brick.

SAMPLE: 79R-4

Formation: Upper Triassic, Newark Group

Location: Stoneville site on NW side of junction of U.S. Highway 220 bypass and U.S. Highway 220 business; about 2 mi SW of Stoneville.

Description: Red-brown shale in 2- to 15-ft high roadcut, approximately 450 ft long; attitude of bedding-NE strike, low-angle dip to NW.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft over 200-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	7.5	29.1	44.7	1.54
1900	Tan	3	7.5	23.2	38.7	1.67
2000	Tan	4	10.0	20.3	35.5	1.75
2100	Lt. brown	5	10.0	16.2	30.2	1.86
2200	Lt. brown	5	10.0	15.4	29.0	1.88
2300	Steel gray	6	12.5	8.3	17.2	2.08

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F).

SAMPLE: 79R-5

Formation: Upper Triassic, Newark Group

Location: Eden site on N.C. Highway 135 (formerly SR 2138) 0.2 mi SW of N.C. Highway 770 junction; about 0.3 mi SW of Eden city limit.

Description: Red-brown shale in 4- to 6-ft high roadcut, 250-300 ft long; attitude of bedding-NE trend, gentle NW dip.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.2%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-5.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	2.5	22.1	37.5	1.70
1900	Tan	4	5.0	15.8	29.7	1.87
2000	Lt. brown	4	5.0	12.5	24.8	1.88
2100	Chocolate	5	10.0	7.7	14.4	1.98
2200	Dark brown	6	10.0	6.0	13.0	2.17
2300	Gray black	6	10.0	2.2	5.0	2.25

Potential Use: Structural clay products (e.g., building brick at 1900°-2300°F).

SAMPLE: 79R-6

Formation: Mica schist

Location: Williamsburg S site in SE corner of Rockingham Co. on W side of N.C. Highway 150, 2.6 mi S of intersection with N.C. Highway 87 in Williamsburg and 0.3 mi S of intersection with SR 2626.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.0%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	31.1	48.5	1.56
1900	Orange tan	3	2.5	30.1	47.0	1.56
2000	Orange tan	3	7.5	24.5	41.3	1.68
2100	Light brown	5	12.5	16.3	31.5	1.93
2200	Light brown	5	12.5	13.8	27.8	2.02
2300	Red brown	5	15.0	13.2	27.5	2.08

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F); high shrinkage above 2200°F.

ROCKINGHAM COUNTY - Continued

SAMPLE: 79R-7

Formation: Mica gneiss

Location: Benaja site in SE Rockingham County 2.7 mi NE of Benaja on W side of SR 2598, 0.3 mi NE of U.S. Highway 29 intersection.

Description: Roadcut, 5 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.1%; working properties-short; drying defects-none; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for use in structural clay products.

ROWAN COUNTY

A total of five residual clay and shale samples were collected from different selected locations in Rowan County. Laboratory tests provide comparative information on two samples of raw materials presently and recently used and indicate potential uses for materials represented by three additional samples as follows:

Sample No.	Formation	Potential Use
80R - 1	Carolina Slate Belt	Present: Nonplastic component in face-brick mixtures.
80R - 2	Carolina Slate Belt	Recent: Nonplastic component in face-brick mixtures.
80R - 3	Carolina Slate Belt	Structural clay products.
80R - 4	Granite	Not suitable for structural clay products.
80R - 5	Diorite-gabbro	Structural clay products.

ROWAN COUNTY

SAMPLE: 80R-1

Formation: Carolina Slate Belt, argillite

Location: Statesville Brick Co., Gold Hill shale mine; pit is behind Perlite plant on W side of U.S. Highway 52, 0.5 mi S of intersection with SR 2351 in town of Gold Hill.

Description: Shallow-stripped field excavated to about 20-ft depth in central area; field is kidney shaped with a 1000-ft N-S length and a 300- to 400-ft width.

Type Material: Residual clay and shale

Color: Red

Sampled Interval: Every 20 ft over 100-ft section of central part of 300-ft long by 7-ft high by 8-ft wide stockpile.

Bloating Test: Negative

Unfired Properties: Water of plasticity-22.9%; working properties-low plasticity; drying shrinkage-2.5%; dry strength-poor; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Present Use: Nonplastic component in face-brick mixtures.

SAMPLE: 80R-2

Formation: Carolina Slate Belt, argillite

Location: Isenhour Brick & Tile Co., Clearwater clay mine, on S side of SR 2140, 1.9 mi NE of SR 1004 intersection in community of Liberty and on E side of Reedy Creek arm of High Rock Lake.

Description: Irregular bench-type pit up to 35 ft deep, extends SW roughly parallel to lake shore for about 3000 ft and varies from 300 to 400 ft in width; attitude of bedding-N 15°E, vertical.

Type Material: Residual clay and shale

Color: Tan

Sampled Interval: Every 5 ft up 25-ft high face at NE end of pit.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.7%; working properties-low plasticity; drying shrinkage-0.0%; dry strength-poor; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	2.5	30.7	46.4	1.51
1900	Dark tan	2	5.0	29.5	45.4	1.54
2000	Light brown	2	5.0	27.9	43.8	1.57
2100	Dark brown	3	7.5	20.6	35.8	1.74
2200	Dark brown	5	15.0	2.2	4.7	2.14
2300	---	---	(Melted)			

Other Tests: Not effervescent with HCl.

Recent Use: Nonplastic component in face-brick mixtures.

ROWAN COUNTY - Continued

SAMPLE: 80R-3

Formation: Carolina Slate Belt, mafic volcanics

Location: High Rock site in SE Rowan Co. about 3 mi S of High Rock Dam just W of Yadkin River on E side of intersection of SR 2152 and 2153.

Description: Roadcut, 1.5 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Dark yellow

Sampled Interval: Every 5 ft for 100-ft N of intersection along SR 5152.

Unfired Properties: Water of plas icity-28.1%; plasticity-good; drying shrinkage-2.5%; dry strength-fair; pH-6.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Lt. orange brown	1	2.5	27.3	42.9	1.57
2000	Orange brown	2	5.0	22.9	39.2	1.71
2100	Orange brown	3	5.0	21.3	37.1	1.74
2200	Orange brown	7	10.0	12.1	24.1	1.99
2300	Red brown	7	12.5	7.1	15.3	2.15

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 80R-4

Formation: Granite

Location: Woodleaf site in NW Rowan Co. on SW side of Woodleaf on E side of SR 1959, 0.2 mi N of SR 1964.

Description: Roadcut, 5 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.0%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	2	0.0	24.6	40.0	1.60
1900	Light tan	3	0.0	24.2	38.8	1.63
2000	Light tan	3	0.0	23.3	37.9	1.63
2100	Dark tan	3	2.5	19.7	33.3	1.69
2200	Dark tan	3	2.5	18.8	32.4	1.73
2300	Gray pink	3	2.5	16.9	30.0	1.77

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

ROWAN COUNTY - Continued

SAMPLE: 80R-5

Formation: Diorite-gabbro

Location: Barber site in NW Rowan Co. on S side of SR 1957, 0.1 mi E of intersection with SR 1958 on E side of Barber.

Description: Roadcut, 3 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-34.0%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	4	5.0	26.9	45.3	1.69
1900	Orange tan	4	5.0	24.5	42.9	1.75
2000	Orange tan	6	7.5	20.9	37.7	1.80
2100	Light brown	7	15.0	9.2	20.8	2.27
2200	Light brown	7.5	15.0	7.2	17.0	2.36
2300	Red brown	7.5	17.5	7.2	17.4	2.41

Other Tests & Remarks: Not effervescent with HCl; high shrinkage; marginal color.

Potential Use: Structural clay products (e.g., building brick at 2000°-2200°F); high shrinkage above 2000°F.

RUTHERFORD COUNTY

Five residual clay samples were collected from different selected locations in Rutherford County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
81R - 1	Mica gneiss	Not suitable for structural clay products.
81R - 2	Henderson granite gneiss	Not suitable for structural clay products.
81R - 3	Granite	Not suitable for structural clay products.
81R - 4	Granite gneiss complex	Not suitable for structural clay products.
81R - 5	Mica gneiss	Not suitable for structural clay products.

RUTHERFORD COUNTY

SAMPLE: 81R-1

Formation: Mica gneiss

Location: Golden Valley site in NE Rutherford Co. 1.5 mi NNE of Golden Valley Church on W side of SR 1728, 1 mi N of N.C. Highway 226 intersection; 6.5 mi NNE of Sunshine.

Description: Roadcut, 0.2 mi long, 8-10 ft high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.4%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for use in structural clay products; no bond.

SAMPLE: 81R-2

Formation: Henderson granite gneiss

Location: Whitehouse site in NW corner of Rutherford Co. 3.3 mi SW of Whitehouse on SW side of SR 1312, 0.15 mi E of intersection with SR 1316 on Cedar Creek.

Description: Roadcut, 0.1 mi long, 3-4 ft high.

Type Material: Residual clay

Color: Orange

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.6%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for use in structural clay products; no bond.

RUTHERFORD COUNTY - Continued

SAMPLE: 81R-3

Formation: Granite

Location: Rutherfordton site in SW Rutherford Co. 8.2 mi WNW of U.S. Highway 64-74 and 221 intersection in Rutherfordton on W side of SR 1340, 0.3 mi NW of intersection with U.S. Highway 64-74.

Description: Roadcut, 200 ft long, slopes to road level at each end from 5 ft high at center.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along face of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.1%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 81R-4

Formation: Granite gneiss complex

Location: Gilkey site in central Rutherford Co. 1 mi S of the center of Gilkey on NW corner of intersection of U.S. Highway 221 and SR 1376.

Description: Roadcut, extends 130 ft along N side of SR 1376, 4 ft high.

Type Material: Residual clay

Color: Lilac

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.1%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for use in structural clay products; no bond.

RUTHERFORD COUNTY - Continued

SAMPLE: 81R-5

Formation: Mica gneiss

Location: Caroleen site in SE Rutherford Co. 1.8 mi E of the center of Caroleen on S side of SR 1931, just W of Hills Creek bridge, 1.2 mi W of N.C. Highway 120 intersection.

Description: Roadcut, 200 ft long, 7 ft high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.1%; working properties-short; drying defects-poor bond; drying shrinkage-0.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

STANLY COUNTY

A total of five samples of shale and residual clay and shale were collected from different selected locations in Stanly County. Laboratory tests provide comparative information on three samples of raw materials that are presently being used and indicate potential uses for materials represented by two additional samples as follows:

Sample No.	Formation	Potential Use
84S - 1	Carolina Slate Belt	Present: Lightweight aggregate.
84S - 2	Carolina Slate Belt	Present: Face brick.
84S - 3	Carolina Slate Belt	Present: Face brick.
84S - 4	Carolina Slate Belt	Structural clay products.
84S - 5	Carolina Slate Belt	Structural clay products.

STANLY COUNTY

SAMPLE: 84S-1

Formation: Carolina Slate Belt, argillite

Location: Carolina Solite Corp., Aquadale mine, on W side of Aquadale 0.5 mi S of SR 2001 from a point 0.2 mi SE of its intersection with SR 1917.

Description: Stockpile, 100 ft long, 40 ft wide and 30 ft high.

Type Material: Shale (fresh)
Color: Gray

Sampled Interval: Every 5 ft over 20-ft section along W side of stockpile.

Bloating Test: Positive

Unfired Properties: Water of plasticity-15.0%; working properties-short; drying shrinkage-0.0%; dry strength-low; pH-9.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---		(Expanded)			

Preliminary Bloating Test: Crushing characteristics-angular; particle size-3/4 inch; retention time-15 minutes.

T °F	Absorption %	Bulk Density gm/cc	Bulk Density Lb/ft^3	Remarks
1800	2.8	2.45	153	No expansion
1900	3.2	2.32	145	No expansion
2000	3.1	1.29	80	Slight expansion
2100	2.9	1.10	69	Fair pore structure
2200	5.2	0.96	60	Fair pore structure

Present Use: Lightweight aggregate.

SAMPLE: 84S-2

Formation: Carolina Slate Belt, argillite

Location: Stanly Shale Products, Inc., Norwood mine, at W edge of Norwood on E side of SR 1927, 0.2 mi SE of its intersection with SR 1923.

Description: From belt to pug mill.

Type Material: Residual clay and shale
Color: Tan

Sampled Interval: Every 2 ft over 10-ft section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.9%; working properties-short; drying shrinkage-2.5%; dry strength-low; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	2.5	27.3	42.9	1.57
1900	Dark tan	2	5.0	24.4	40.0	1.64
2000	Light brown	3	7.5	21.2	36.7	1.73
2100	Medium brown	4	10.0	14.7	28.2	1.92
2200	Dark brown	5	15.0	1.1	2.6	2.39
2300	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Present Use: Face brick.

STANLY COUNTY - Continued

SAMPLE: 84S-3

Formation: Carolina Slate Belt, argillite

Location: Yadkin Brick Yards, Inc., Yadkin mine, located at intersection of SR 1511 and 1571 in Isenhour, approximately 4 mi E of New London.

Description: Storage bin

Type Material: Residual clay and shale

Color: Tan

Sampled Interval: Random sample from storage bin just preceding pug mill.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.4%; working properties-short; drying shrinkage-2.5%; dry strength-low; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	2.5	23.3	37.0	1.59
1900	Dark tan	2	2.5	22.8	36.5	1.60
2000	Light brown	3	5.0	19.1	32.8	1.72
2100	Medium brown	4	7.5	14.0	26.2	1.87
2200	Red brown	5	10.0	9.4	18.9	2.01
2300	Dark brown	5	15.0	1.3	3.0	2.34

Other Tests: Not effervescent with HCl.

Present Use: Face brick.

SAMPLE: 84S-4

Formation: Carolina Slate Belt, graywacke.

Location: New London site, in NW Stanly Co. on S side of SR 1440, 1.3 mi W of junction with U.S. Highway 52, in center of New London and 0.1 mi E of SR 1400 junction.

Description: Roadcut, 3 ft high, 200 ft long, attitude of bedding-NE.

Type Material: Residual clay

Color: Buff

Sampled Interval: Every 10 ft over 100-ft section at E end of roadcut.

Unfired Properties: Water of plasticity-32.8%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	1	5.0	27.8	42.3	1.52
2000	Lt. orange brown	3	7.5	24.0	39.4	1.64
2100	Orange brown	3	10.0	20.3	35.5	1.75
2200	Lt. red brown	6	10.0	12.4	24.2	1.95
2300	Red brown	7	12.5	11.2	22.2	1.98

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

STANLY COUNTY - Continued

SAMPLE: 84S-5

Formation: Carolina Slate Belt, argillite

Location: Red Cross site, in SW Stanly Co. on E side of N.C. Highway 205, 1.2 mi N of N.C. Highway 27 intersection in Red Cross.

Description: Roadcut, 4 ft high, 200 ft long; attitude of bedding- NE-trending.

Type Material: Residual clay

Color: Orange

Sampled Interval: Every 20 ft over 100-ft section along N half of roadcut.

Unfired Properties: Water of plasticity-27.3%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-7.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	1	5.0	25.2	40.1	1.59
2000	Buff	3	7.5	21.2	36.3	1.71
2100	Orange brown	4	10.0	19.4	33.8	1.74
2200	Orange brown	6.5	12.5	10.8	21.9	2.03
2300	Red brown	7	15.0	7.6	16.4	2.16

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); high shrinkage at 2300°F.

STOKES COUNTY

A total of eight shale and residual clay samples were collected from different selected locations in Stokes County. Laboratory tests provide comparative information of a blended raw material from two locations presently being used and indicate potential uses for six additional materials as follows:

Sample No.	Formation	Potential Use
85S - 1 & 2 (blend)	Upper Triassic	Present: Brick
85S - 3	Upper Triassic	Structural clay products.
85S - 4	Upper Triassic	Structural clay products.
85S - 5	Upper Triassic	Structural clay products.
85S - 6	Mica gneiss	Not suitable for structural clay products.
85S - 7	Kings Mountain Group	Structural clay products.
85S - 8	Granite	Not suitable for structural clay products.

STOKES COUNTY

SAMPLE: 85S-1 & 2 (Blend)

Formation: Upper Triassic, Newark Group

Location: Pine Hall Brick Co., Plant 1, 0.8 mi W of Pine Hall train station on SR 1911; uses blend from 2 pits. Pine Hall pit--0.8 mi SW of plant on E side of SR 1915 and 1.3 mi SW of SR 1911 junction; Walnut Cove pit--0.15 mi N of SR 1921, 0.3 mi W of SR 1920 junction, and 0.7 mi E of Walnut Cove city limit.

Description: Pine Hall Pit--roughly rectangular, 400 ft by 125 ft, approximately 35 ft deep; length-NE-SW; reddish brown to brown shale exposed. Walnut Cove pit--roughly circular, 300 ft in diameter, about 30 ft deep; 3- to 10-ft thick beds of reddish brown to brown shale exposed. Attitude of bedding--both pits--N 60°E, 45°NW.

Type Material: Shale

Color: Light tan

Sampled Interval: From small pile of blended and ground material behind plant office.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	22.4	37.2	1.66
1900	Tan	3	5.0	21.0	35.7	1.70
2000	Tan	4	7.5	15.3	28.8	1.89
2100	Brown	5	10.0	10.4	21.2	2.03
2200	Purple brown	6	12.5	3.6	8.3	2.29
2300	Very dk. brown	6	12.5	2.5	5.8	2.34

Present Use: Brick

SAMPLE: 85S-3

Formation: Upper Triassic, Newark Group

Location: Walnut Cove site, S side of U.S. Highway 311, 2.2 mi NE of Walnut Cove at SR1717.

Description: Reddish-brown shale in 6- to 12-ft high roadcut approximately 300 ft long; attitude of bedding- NE, gentle NW dip.

Type Material: Shale

Color: Reddish brown

Sampled Interval: Every 20 ft over 200-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.0%; working characteristics-plastic; drying shrinkage-7.5%; dry strength-good; pH-7.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	3	10.0	24.0	39.4	1.64
1900	Reddish tan	3	10.0	20.7	35.5	1.72
2000	Reddish tan	4	10.0	19.9	34.5	1.74
2100	Brown	4	10.0	19.3	33.6	1.74
2200	Brown	5	10.0	19.2	33.5	1.74
2300	Very dk. brown	5	10.0	17.9	31.8	1.77

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F).

STOKES COUNTY - Continued

SAMPLE: 85S-4

Formation: Upper Triassic, Newark Group

Location: Morning Star Church site on N.C. Highway 772, 0.15 mi SE of Morning Star Church; 2.9 mi NW of Pine Hall.

Description: Red-brown shale in 4- to 6-ft high roadcut, 600-800 ft long. Crops out intermittently 2.2 mi; attitude of bedding-strikes NE, low-angle dip to NW.

Type Material: Shale

Color: Brown

Sampled Interval: Every 20 ft over 200-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-42.0%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-6.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	7.5	30.9	47.3	1.49
1900	Tan	3	7.5	29.1	43.4	1.53
2000	Tan	4	10.0	21.2	35.6	1.68
2100	Brown	5	10.0	18.1	31.9	1.76
2200	Brown	6	15.0	16.0	29.0	1.81
2300	Very dk. brown	6	15.0	8.5	17.1	2.01

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F); high shrinkage above 2200°F.

SAMPLE: 85S-5

Formation: Upper Triassic, Newark Group

Location: Germanton site on N.C. Highway 65, 0.4 mi NE of N.C. Highway 8 junction, approximately 1.4 mi NE of Germanton; crops out intermittently over 4.5 mi from Germanton to Walnut Cove.

Description: Reddish-brown shale in 6-ft high gently sloping roadcut, approximately 300 ft long; attitude of bedding-NE, 30°W.

Type Material: Shale

Color: Red brown

Sampled Interval: Every 20 ft over 200-ft section along bottom of 500-ft cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.0%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	7.5	22.6	37.1	1.64
1900	Tan	3	10.0	15.8	28.9	1.83
2000	Light brown	4	10.0	12.5	24.0	1.92
2100	Dark brown	6	15.0	7.0	15.0	2.14
2200	Dark brown	6	15.0	5.6	12.3	2.20
2300	Near black	6	15.0	2.2	5.0	2.28

Potential Use: Structural clay products (e.g., building brick at 2000°-2300°F); high shrinkage above 2000°F.

STOKES COUNTY - Continued

SAMPLE: 85S-6

Formation: Mica gneiss

Location: King site in SW Stokes Co. 1.5 mi E of center of King, on S side of SR 1236, 0.5 mi E of intersection with SR 1122, adjacent to Southern Railway crossing.

Description: Roadcut, 5-6 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	1	0.0	28.9	43.9	1.49
1900	Light tan	1	0.0	28.6	43.2	1.53
2000	Light tan	1	0.0	27.3	41.8	1.54
2100	Dark tan	1	0.0	22.1	36.0	1.63
2200	Light brown	1	0.0	19.2	32.4	1.69
2300	Red brown	3	2.5	17.6	30.6	1.74

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 85S-7

Formation: Kings Mountain Group

Location: Pinnacle site in SW corner of Stokes Co. on W side of SR 1236, 0.3 mi NW of SR 1152 intersection in Pinnacle.

Description: Roadcut, ranges from road level on ends to 15 ft high at middle, 0.1 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.8%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	0.0	36.5	52.1	1.42
1900	Orange tan	3	0.0	36.0	51.4	1.43
2000	Orange tan	3	2.5	30.8	46.4	1.51
2100	Light brown	3	5.0	25.0	40.6	1.63
2200	Light brown	4	5.0	23.3	39.3	1.69
2300	Red brown	4	7.5	21.6	38.6	1.79

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

STOKES COUNTY - Continued

SAMPLE: 85S-8

Formation: Granite

Location: Francisco site in the NW corner of Stokes Co. on S side of N.C. Highway 89, 4.7 mi W of Francisco and 0.9 mi W of intersection with N.C. Highway 66.

Description: Roadcut, 4 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.2%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	0.0	34.2	48.8	1.43
1900	Tan	3	0.0	33.6	48.1	1.43
2000	Tan	3	0.0	31.3	45.6	1.46
2100	Tan	3	0.0	27.4	41.9	1.53
2200	Tan	3	0.0	26.6	40.8	1.54
2300	Gray pink	3	2.5	25.7	41.8	1.63

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SURRY COUNTY

Eight residual clay samples were collected from selected sites in Surry County. Laboratory tests indicate potential uses of the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
86S - 1	Mica schist	Not suitable for structural clay products.
86S - 2	Mica schist	Not suitable for structural clay products.
86S - 3	Mica schist	Not suitable for structural clay products.
86S - 4	Mica schist	Structural clay products.
86S - 5	Gneiss or pegmatite	Refractory products.
86S - 6	Granite (?)	Structural clay products.
86S - 7	Kings Mountain Group	Structural clay products.
86S - 8	Mica gneiss	Structural clay products.

SURRY COUNTY

SAMPLE: 86S-1

Formation: Mica schist

Location: Mount Airy site A on S side of Mount Airy on SW corner of intersection of U.S. Highway 52 Bypass and SR 1772 (same locality as 86S-2).

Description: SE end of roadcut 3-35 ft high, 0.3 mi long on SW side of U.S. Highway 52 Bypass; schistosity trends NE, dips at high angle to vertical.

Type Material: Residual clay

Color: Red brown

Sampled Interval: 10-ft channel section up face of upper residual clay mantle (5-20 ft thick)

Unfired Properties: Water of plasticity-41.5%; working properties-plastic; drying shrinkage-7.5%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Lt. reddish brown	3	10.0	25.8	42.1	1.63
2100	Lt. reddish brown	5	12.5	21.2	36.4	1.73
2200	Lt. reddish brown	6	15.0	17.7	32.3	1.82
2300	Moderate reddish brown	6	17.5	14.0	26.9	1.92

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 86S-2

Formation: Mica schist

Location: Mount Airy site B on S side of Mount Airy on SW corner of U.S. Highway 52 Bypass and SR 1772 intersection (same locality as 86S-1).

Description: Center of roadcut 3-35 ft high 0.3 mi long on SW side of U.S. Highway 52 Bypass; schistosity trends NE, dips at high angle to vertical.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 5 ft up 35-ft face of cut.

Unfired Properties: Water of plasticity-43.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-poor.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Lt. reddish brown	1	2.5	43.7	---	---
2100	Lt reddish brown	2	2.5	27.6	39.2	1.42
2200	Lt. grayish reddish brown	2	5.0	22.4	35.1	1.57
2300	Grayish red	3	5.0	18.4	31.2	1.69

Potential Use: Not suitable for structural clay products; too soft.

SURRY COUNTY - Continued

SAMPLE: 86S-3

Formation: Mica schist

Location: White Plains site on N side of new U.S. Highway 601, 0.1 mi SWof SR 1356 and 1.2 mi N of its junction with SR 1354; 2 mi SW of center of White Plains.

Description: Roadcut 5-15 ft deep; schistosity trends NE, steeply dipping to vertical.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 10 ft over 100-ft section along floor of roadcut.

Unfired Properties: Water of plasticity-47.2%; working properties-plastic; drying shrinkage-10.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Lt. reddish brown	3	10.0	30.8	43.9	1.43
2100	Lt. reddish brown	5	10.0	27.3	40.3	1.48
2200	Lt. reddish brown	5	12.5	23.8	36.4	1.53
2300	Dark red	6	15.0	19.8	32.1	1.62

Potential Use: Not suitable for structural clay products; high absorption and shrinkage.

SAMPLE: 86S-4

Formation: Mica schist

Location: Dobson site 2 mi SE of Dobson on E side of U.S. Highway 601 across from SR 1104 exit and at S end of new U.S. Highway 601 Bypass.

Description: 5-ft high road bank 0.25 mi long; lineations- NE-trending.

Type Material: Residual clay

Color: Orange brown

Sampled Interval: Trench up 4-ft high bank.

Unfired Properties: Water of plasticity-39.1%; working properties-plastic; drying shrinkage-7.5%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	3	7.5	30.0	44.2	1.47
2100	Grayish reddish orange	5	10.0	22.9	36.6	1.60
2200	Moderate reddish brown	5	12.5	18.4	31.3	1.70
2300	Dark red	7	12.5	15.9	28.3	1.78

Potential Use: Structural clay products (building brick at 2200°-2300°F).

SURRY COUNTY - Continued

SAMPLE: 86S-5

Formation: Gneiss or pegmatite

Location: Virgil Doby site on S side of N.C. Highway 89, 0.9 mi W of its junction with SR 1607 and 12.5 mi (straight line) W from center of Mount Airy.

Description: Cut bank in side of hill about 30 ft above stream; 4-ft diameter tunnel penetrates 4 ft into hill; about 200 ft S of N.C. Highway 89 on W side of fence; lineations trend NE, steeply dipping to vertical.

Type Material: White residual clay

Color: White

Sampled Interval: Grab sample from west wall of tunnel.

Unfired Properties: Water of plasticity-61.8%; working properties-plastic; drying shrinkage-7.5%; dry strength-fair.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Pink-white	2	7.5	62.0	56.9	0.86
2100	Cream-white	2	7.5	65.6	56.5	0.88
2200	Cream-white	2	7.5	65.0	54.7	0.88
2300	Cream-white	2	7.5	57.0	54.5	0.96

Potential Use: Refractory products.

SAMPLE: 86S-6

Formation: Granite

Location: Elkin site in SW corner of Surry Co. 2.5 mi NNE of center of Elkin on S side of SR 1138, 0.3 mi E of U.S. Highway 21 Bypass.

Description: Roadcut, 15 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.5%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-3.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	0.0	35.5	51.4	1.45
1900	Orange tan	3	0.0	32.1	47.9	1.49
2000	Orange tan	3	2.5	27.8	44.1	1.59
2100	Light brown	3	5.0	22.6	38.1	1.68
2200	Light brown	4	7.5	20.0	35.6	1.78
2300	Red brown	5	10.0	19.0	35.1	1.84

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SURRY COUNTY - Continued

SAMPLE: 86S-7

Formation: Kings Mountain Group

Location: Shoals site in SE edge of Surry Co. 2 mi WNW of center of Shoals, at west end of SR 2075.

Description: Ten-acre field behind abandoned white 2-story house.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along edge of field behind house.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.5%; working properties-plastic; drying shrinkage-0.0%; dry strength-good; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	0.0	29.1	45.3	1.56
1900	Orange tan	5	2.5	20.7	36.4	1.76
2000	Orange tan	5	5.0	17.1	31.3	1.83
2100	Light brown	5	7.5	14.5	27.4	1.89
2200	Light brown	5	7.5	12.9	25.4	1.97
2300	Red brown	6	7.5	11.3	22.4	1.98

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick, roofing tile at 1900°-2300°F); very good firing range.

SAMPLE: 86S-8

Formation: Mica gneiss

Location: Pilot Mountain site in E-central Surry Co. on W side of SR 2017, 1.7 mi S of intersection with SR 2018 and 5 mi WNW of center of Pilot Mountain.

Description: Roadcut, 6 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.4%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.3.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	0.0	30.6	46.8	1.53
1900	Orange tan	2	0.0	28.1	44.2	1.57
2000	Orange tan	3	2.5	25.0	40.0	1.60
2100	Light brown	3	5.0	20.2	35.3	1.75
2200	Light brown	5	5.0	18.0	31.9	1.77
2300	Red brown	5	5.0	16.7	30.8	1.85

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

UNION COUNTY

A total of six samples of residual clay and shale were collected from different locations in Union County. Laboratory tests provide comparative information on one raw material presently used and indicate potential uses for materials represented by five additional samples as follows:

Sample No.	Formation	Potential Use
90U - 1	Carolina Slate Belt	Present: Face brick.
90U - 2	Carolina Slate Belt	Structural clay products.
90U - 3	Carolina Slate Belt	Structural clay products.
90U - 4	Carolina Slate Belt	Structural clay products.
90U - 5	Mica schist	Structural clay products.
90U - 6	Granite	Not suitable for structural clay products.

UNION COUNTY

SAMPLE: 90U-1

Formation: Carolina Slate Belt, argillite

Location: Kendrick Brick & Tile Co., Monroe mine, on S side of U.S. Highway 74, 1.05 mi W of its intersection with SR 1007 in Bakers in W-central Union County.

Description: From belt to bulk dry storage for ground and blended material.

Type Material: Residual clay and shale

Color: Tan

Sampled Interval: Grab sample every 5 sec for 60-sec period from belt.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.7%; working properties-low plasticity; drying shrinkage-2.5%; dry strength-low; pH-6.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	2	2.5	21.5	35.3	1.64
1900	Dark tan	3	5.0	21.1	35.2	1.67
2000	Light brown	4	5.0	13.8	24.2	1.75
2100	Red brown	5	10.0	2.9	6.5	2.25
2200	---	---	(Expanded)			

Other Tests: Not effervescent with HCl.

Present Use: Face brick.

SAMPLE: 90U-2

Formation: Carolina Slate Belt, argillite

Location: New Salem site in NE Union Co. on S side of N.C. Highway 218, 0.6 mi W of N.C. Highway 205 junction in New Salem.

Description: Roadcut, 7 ft high, 200 ft long; attitude of bedding- NE-trending.

Type Material: Residual clay

Color: Buff

Sampled Interval: Random sample over face of roadcut.

Unfired Properties: Water of plasticity-30.1%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	1	2.5	28.0	42.6	1.52
2000	Buff	2	5.0	20.4	33.7	1.65
2100	Orange brown	3	7.5	19.5	34.5	1.77
2200	Red brown	7	12.5	9.5	19.1	2.01
2300	Medium red brown	7+	15.0	4.5	10.0	2.23

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F); high shrinkage at 2300°F.

UNION COUNTY - Continued

SAMPLE: 90U-3

Formation: Carolina Slate Belt, intermediate volcanics

Location: Waxhaw site in SW Union Co. 3.8 mi NW of Waxhaw on SE side of SR 1307, 0.6 mi SW of intersection with N.C. Highway 16.

Description: Roadcut, 4 ft high, 200 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Orange

Sampled Interval: 20 ft over N half of roadcut.

Unfired Properties: Water of plasticity-30.1%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	2	5.0	25.0	40.5	1.61
2000	Brown orange	2	5.0	24.4	40.3	1.66
2100	Orange brown	3	5.0	22.9	38.0	1.66
2200	Orange brown	5	7.5	19.1	33.4	1.75
2300	Dark orange	6	10.0	18.9	33.3	1.76

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

SAMPLE: 90U-4

Formation: Carolina Slate Belt, argillite

Location: Sturdivants site in SE Union Co. on S side of SR 1003, 2.7 mi W of Sturdivants and 0.3 mi W of junction with SR 1929.

Description: Roadcut, 3 ft high, 300 ft long; attitude of bedding- NE-trending.

Type Material: Residual clay

Color: Dark yellow

Sampled Interval: Random sample from E half of roadcut.

Unfired Properties: Water of plasticity-31.8%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-8.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Buff	1	5.0	27.7	41.8	1.51
2000	Buff	2	5.0	23.4	38.4	1.64
2100	Orange brown	3	7.5	21.4	36.8	1.72
2200	Red brown	7	12.5	9.9	20.0	2.02
2300	Medium red brown	7+	15.0	5.1	11.0	2.15

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F); high shrinkage at 2300°F.

UNION COUNTY - Continued

SAMPLE: 90U-5

Formation: Mica schist

Location: Waxhaw West site in SW Union Co. 2 mi W of center of Waxhaw on E side of SR 1175, 200 ft S of N.C. Highway 75.

Description: Roadcut, 3 ft high, 250 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-41.5%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	10.0	32.4	49.3	1.52
1900	Orange tan	3	10.0	30.0	46.2	1.54
2000	Orange tan	3	10.0	27.7	43.8	1.58
2100	Orange tan	4	10.0	23.0	40.4	1.75
2200	Orange tan	4	15.0	16.5	32.7	1.98
2300	Light red	4	15.0	13.0	27.1	2.08

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F); high shrinkage above 2100°F.

SAMPLE: 90U-6

Formation: Granite

Location: Waxhaw SW site in SW corner of Union Co. 3.3 mi SW of center of Waxhaw on E side of SR 1106, 100 yd S of intersection with SR 1107.

Description: Roadcut, 4 ft high, 150 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-32.0%; working properties-short; drying shrinkage-5.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	25.0	41.0	1.64
1900	Orange tan	3	7.5	21.5	36.7	1.71
2000	Orange tan	3	7.5	21.4	36.6	1.71
2100	Light brown	3	7.5	20.7	35.8	1.73
2200	Light brown	3	7.5	20.4	35.9	1.73
2300	Dark red	3	7.5	20.4	35.4	1.76

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

VANCE COUNTY

Four residual clay samples were collected from different selected sites in Vance County. Laboratory tests indicate potential uses of the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
91V - 1	Carolina Slate Belt	Not suitable for structural clay products.
91V - 2	Carolina Slate Belt	Structural clay products.
91V - 3	Mica gneiss	Not suitable for structural clay products.
91V - 4	Granite	Not suitable for structural clay products.

VANCE COUNTY

SAMPLE: 91V-1

Formation: Carolina Slate Belt, mafic volcanics

Location: Tungsten site in extreme NW corner of Vance Co., on N side of SR 1342, 0.3 mi E of Granville Co. line and approximately 2 mi SW of Tungsten.

Description: Roadcut, 4 ft high, 200 ft long; attitude of layering- NE-trending.

Type Material: Residual clay

Color: Red brown

Sampled Interval: Every 10 ft, over 50-ft section at E end of roadcut.

Unfired Properties: Water of plasticity-39%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-6.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Medium tan	2	12.5	24.2	38.6	1.59
1900	Medium tan	3	15.0	24.2	38.5	1.59
2000	Orange brown	5	15.0	22.2	38.5	1.74
2100	Medium tan	6	17.5	15.2	30.1	1.98
2200	Medium tan	7	20.0	11.1	22.2	2.00

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 91V-2

Formation: Carolina Slate Belt, felsic volcanics

Location: Floytan Crossroads site in SW Vance Co. on S side of SR 1107, approximately 0.75 mi W of Floytan Crossroads.

Description: Roadcut, 8 ft high, 150 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Light brown

Sampled Interval: Every 5 ft over 20-ft section along middle of cut, near center.

Unfired Properties: Water of plasticity-23%; working properties-short; drying shrinkage-2.5%; dry strength-good; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Dark tan	1	2.5	24.8	39.2	1.58
1900	Medium tan	2	2.5	22.0	35.9	1.63
2000	Medium brown	3	2.5	20.1	33.6	1.67
2100	Orange brown	4	5.0	14.7	27.0	1.84
2200	Gray red	5	7.5	13.8	25.9	1.88

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F).

VANCE COUNTY - Continued

SAMPLE: 91V-3

Formation: Mica gneiss

Location: Henderson site in E-central Vance Co., 6 mi NE of the center of Henderson, 0.2 mi NW of I-85, on the E side of SR 1371.

Description: Roadcut, 4 ft high, 300 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.6%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	2.5	26.6	41.3	1.55
1900	Tan	3	5.0	26.4	40.7	1.54
2000	Tan	3	5.0	25.8	40.0	1.55
2100	Light brown	3	5.0	21.0	35.1	1.68
2200	Medium brown	3	7.5	18.3	31.5	1.73
2300	Light red	3	7.5	17.2	30.4	1.77

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 91V-4

Formation: Granite

Location: Williamsboro site in N-central Vance Co., 1.6 mi N of Williamsboro on N side of SR 1341, on W side of N.C. Highway 39.

Description: Roadcut, 3 ft high, 100 ft long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft along face of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.1%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	7.5	32.0	47.0	1.47
1900	Dark tan	3	7.5	31.6	47.0	1.48
2000	Dark tan	3	7.5	29.0	44.6	1.54
2100	Light brown	5	15.0	14.9	28.8	1.94
2200	Medium brown	5	17.5	13.0	26.0	2.00
2300	Red brown	5	20.0	12.4	25.5	2.06

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

WAKE COUNTY

A total of seventeen shale and residual clay samples were collected from different selected locations in Wake County. Laboratory tests provide comparative information on one raw material recently used and indicate potential uses for materials represented by sixteen additional samples as follows:

Sample No.	Formation	Potential Use
92W - 1	Upper Triassic	Recent: Brick.
92W - 2	Upper Triassic	Structural clay products.
92W - 3	Upper Triassic	Structural clay products.
92W - 4	Upper Triassic	Structural clay products.
92W - 5	Upper Triassic	Structural clay products.
92W - 6	Upper Triassic	Structural clay products.
92W - 7	Upper Triassic	Structural clay products.
92W - 8	Upper Triassic	Structural clay products.
92W - 9	Upper Triassic	Structural clay products.
92W - 10	Upper Triassic	Structural clay products.
92W - 11	Upper Triassic	Not suitable for structural clay products.
92W - 12	Upper Triassic	Structural clay products.
92W - 13	Carolina Slate Belt	Not suitable for structural clay products.
92W - 14	Carolina Slate Belt	Structural clay products.
92W - 15	Granite	Not suitable for structural clay products.
92W - 16	Hornblende gneiss	Not suitable for structural clay products.
92W - 17	Mica gneiss	Not suitable for structural clay products.

WAKE COUNTY

SAMPLE: 92W-1

Formation: Upper Triassic, Newark Group

Location: Triangle Brick Co., Durham mine, plant straddles Wake-Durham Co. line on E side of N.C. Highway 55, about 7 mi S of Durham city limit; mine is in Wake Co. just S of the plant.

Description: 2- to 3-ft thick overburden of buff to orange loam; 70% 4- to 12-ft thick layers of red-brown shale interbedded with about 30% 1/2- to 4-ft thick layers of buff-gray to brown arkosic sandstone. Both materials mined--sandstone used as a brick filler and facing; pit approximately 450 ft square and about 35 ft deep in S end; attitude of bedding-N 10°E, 10°SE; pit converted to water storage pond.

Type Material: Shale

Color: Brown

Sampled Interval: Ground and blended sample from plant conveyor belt.

Bloating Test: Negative

Unfired Properties: Water of plasticity-21.0%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-7.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	2.5	16.9	31.3	1.80
1900	Reddish tan	4	2.5	17.4	30.9	1.83
2000	Brown	5	5.0	15.0	28.3	1.89
2100	Very dk. brown	6	12.5	3.7	8.6	2.31
2200	---	---	(Melted)			
2300	---					

Recent Use: Brick.

SAMPLE: 92W-2

Formation: Upper Triassic, Newark Group

Location: J. C. King site on SR 1642, 0.5 mi N of SR 1002 junction and 0.7 mi N of Raleigh-Durham Airport.

Description: Red-brown shale in 2-ft high roadcut; crops out intermittently for 1.5 mi radius; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	2	5.0	21.1	34.9	1.65
1900	Tan	3	5.0	20.3	33.5	1.65
2000	Tan	3	5.0	18.8	31.8	1.69
2100	Chocolate	4	10.0	11.5	21.7	1.89
2200	Very dk. brown	5	12.5	3.7	8.0	2.17
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 2100°F); abrupt vitrification (2100°-2200°F).

WAKE COUNTY - Continued

SAMPLE: 92W-3

Formation: Upper Triassic, Newark Group

Location: Mrs. I. D. Marcom site on S side of SR 1002, 0.4 mi NE of N.C. Highway 54 junction and 1 mi N of Morrisville city limit.

Description: Red-brown shale in 4- to 6-ft high roadcut, 200-250 ft long; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Pink

Sampled Interval: Every 10 ft over 60-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	7.5	19.5	32.6	1.67
1900	Tan	3	7.5	17.3	29.9	1.73
2000	Light brown	4	10.0	11.3	21.6	1.91
2100	Dark brown	6	15.0	3.5	7.6	2.18
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°F); high shrinkage at 2100°F.

SAMPLE: 92W-4

Formation: Upper Triassic, Newark Group

Location: Otto Lyons site on SW side of SR 1637, 0.7 mi NW of Morrisville city limit.

Description: Red-brown shale in 4- to 5-ft high roadcut, 200-250 ft long; crops out intermittently over 0.7 mi to SE; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red brown

Sampled Interval: Every 10 ft over 60-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	21.6	34.2	1.58
1900	Tan	3	10.0	17.7	31.0	1.75
2000	Light brown	4	10.0	14.0	26.1	1.86
2100	Dark brown	6	15.0	1.4	3.3	2.35
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°F); abrupt vitrification (2000°-2100°F).

WAKE COUNTY - Continued

SAMPLE: 92W-5

Formation: Upper Triassic, Newark Group

Location: Carpenter site on W side of N.C. Highway 55, 1.35 mi S of Durham Co. line and 2.4 mi N of Carpenter.

Description: Red-brown shale in 15- to 20-ft high roadcut; crops out intermittently from Durham Co. line to Carpenter, about 3 mi; attitude of bedding-N 15°E.

Type Material: Shale

Color: Brown

Sampled Interval: Every 10 ft over 70-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-24.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-7.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	19.6	33.6	1.71
1900	Light brown	4	5.0	17.0	29.9	1.76
2000	Light brown	5	10.0	14.7	26.8	1.82
2100	Dark brown	6	15.0	3.2	7.4	2.31
2200	---	---	(Expanded)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 1900°-2000°F); abrupt vitrification (2000°-2100°F).

SAMPLE: 92W-6

Formation: Upper Triassic, Newark Group

Location: U.S. Highway 70 site on W side of U.S. Highway 70, 0.1 mi S of Durham Co. line; about 9 mi NW of Raleigh city limit.

Description: Red-brown shale in gently sloping roadcut; crops out from Wake-Durham Co. line along U.S. Highway 70 for 1 mi to SE; attitude of bedding-N 10°E.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-23.0%; working properties-short; drying shrinkage-5.0%; dry strength-fair; pH-6.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	3	5.0	20.8	34.2	1.64
1900	Reddish tan	3	5.0	18.9	31.6	1.67
2000	Brown	4	5.0	15.0	26.6	1.78
2100	Very dk. brown	6	15.0	3.3	7.3	2.21
2200	Brownish black	6	15.0	1.7	3.8	2.24
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick at 2000°F); high shrinkage above 2000°F.

SAMPLE: 92W-7

Formation: Upper Triassic, Newark Group

Location: Bonsal site on N side of U.S. Highway 1, 0.4 mi NE of Chatham Co. line; 1.7 mi NE of Merry Oaks; 0.8 mi S of Bonsal; and 0.45 mi SW of Norfolk & Southern Railroad.

Description: Red-brown shale in 15- to 20-ft high roadcut; crops out intermittently along road for 2 mi NE of Chatham Co. line; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 5 ft across 100-ft square area.

Bloating Test: Negative

Unfired Properties: Water of plasticity-25.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-6.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	21.1	35.6	1.69
1900	Tan	4	5.0	14.2	26.4	1.86
2000	Light brown	5	7.5	8.8	18.0	2.04
2100	Chocolate	6	15.0	2.5	5.7	2.30
2200	Chocolate	6	15.0	1.8	4.2	2.33
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick at 1900°-2000°F); high shrinkage at 2100°-2200°F.

SAMPLE: 92W-8

Formation: Upper Triassic, Newark Group

Location: New Hill site on W side of SR 1127, 0.5 mi S of SR 1135 junction; 2.4 mi S of New Hill.

Description: Red-brown shale in 2- to 3-ft high roadcut; crops out approximately 0.4 mi along road; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 5 ft over 50-ft section along middle of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-5.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	?	5.0	20.4	33.3	1.63
1900	Tan	3	5.0	16.0	31.9	1.81
2000	Light brown	3	5.0	13.0	23.6	1.99
2100	Brown	5	12.5	8.1	16.1	1.99
2200	Brown	6	12.5	6.4	12.9	2.02
2300	---	---	(Expanded)			

Potential Use: Structural clay products (e.g., building brick, floor brick at 2100°-2200°F); slightly high shrinkage.

WAKE COUNTY - Continued

SAMPLE: 92W-9

Formation: Upper Triassic, Newark Group

Location: Holly Springs site on N side of SR 1115, 1.5 mi SW of SR 1116 junction; 2.5 mi SW of Holly Springs city limit.

Description: Red-brown shale in 8- to 10-ft high roadcut; exposed along road for approximately 0.1 mi; attitude of bedding-NE, 15°SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good; pH-7.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	22.7	37.0	1.63
1900	Light brown	3	5.0	19.8	33.4	1.69
2000	Light brown	4	5.0	15.2	27.3	1.80
2100	Very dk. brown	5	10.0	3.2	7.2	2.25
2200	---	---	(Melted)			
2300	---					

Potential Use: Structural clay products (e.g., building brick at 2000°F); abrupt vitrification (2000°-2100°F).

SAMPLE: 92W-10

Formation: Upper Triassic, Newark Group

Location: Beaverdam Creek site on NW side of SR 1900 and 1905 junction, 1 mi E of N.C. Highway 50; 4.2 mi S of Creedmoor.

Description: Red-brown shale in 4- to 14-ft high roadcut, 250-300 ft long; attitude of bedding-NE strike, low-angle dip to SE.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 50-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-35.0%; working properties-plastic; drying shrinkage-7.5%; dry strength-good; pH-7.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Reddish tan	2	7.5	21.1	34.4	1.63
1900	Reddish tan	3	7.5	18.1	31.0	1.71
2000	Brown	4	7.5	13.7	25.1	1.83
2100	Very dk. brown	6	15.0	4.9	10.5	2.15
2200	Brownish black	6	15.0	2.6	5.9	2.25
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick at 2000°F); high shrinkage above 2000°F.

SAMPLE: 92W-11

Formation: Upper Triassic, Newark Group

Location: N.C. Highway 55 site on W side of N.C. Highway 55, 0.2 mi N of intersection with U.S. Highway 64.

Description: Roadcut, 5-12 ft high, with nearly vertical banks approximately 175-200 ft in length.

Type Material: Shale

Color: Tan

Sampled Interval: Every 10 ft over 100-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.0%; working properties-plastic; drying shrinkage-10.0%; dry strength-good; pH-3.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	10.0	27.4	40.2	1.47
1900	Tan	3	10.0	26.1	39.0	1.49
2000	Tan	3	10.0	20.0	33.0	1.65
2100	Light brown	4	12.5	13.7	25.1	1.83
2200	Chocolate	5	15.0	8.3	16.7	2.02
2300	---	---	(Melted)			

Potential Use: Not suitable for structural clay products; high shrinkage.

SAMPLE: 92W-12

Formation: Upper Triassic, Newark Group

Location: Morrisville site on E side of N.C. Highway 54, 0.5 mi NW of Morrisville.

Description: 2- to 7-ft high gently inclined roadcut, approximately 250-275 ft long.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 60-ft section along base of cut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-26.4%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	2.5	21.7	35.5	1.64
1900	Tan	3	2.5	18.3	31.2	1.71
2000	Light brown	4	5.0	11.8	22.4	1.89
2100	Chocolate	5	7.5	5.5	11.8	2.14
2200	Dark brown	6	10.0	0.8	1.9	2.32
2300	---	---	(Melted)			

Potential Use: Structural clay products (e.g., building brick, floor brick at 2000°-2200°F).

SAMPLE: 92W-13

Formation: Carolina Slate Belt, felsic tuff

Location: Willow Springs site on NW side of U.S. Highway 401, 10 mi S of junction with U.S. Highway 70; sample collected from bank of roadcut on SW side of Terrible Creek.

Description: Roadcut of white to light gray and tan felsic tuff, locally iron stained; highly sheared and appears to contain considerable sericite; thin quartz stringers abundant along cleavage planes; best clay exposures near crest of hill; overlain by several ft of Tuscaloosa sand and gravel and hardpan, locally; attitude of cleavage- N 10°E, 80°SE.

Type Material: Residual sericite-quartz-clay

Color: White

Sampled Interval: Approximately 5 ft across strike.

Bloating Test: Negative

Unfired Properties: Water of plasticity-28.0%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-6.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 92W-14

Formation: Carolina Slate Belt, felsic volcanics

Location: Zebulon site in E tip of Wake Co. just N of the Wake-Johnston Co. line on W side of N.C. Highway 39, 0.6 mi S of U.S. Highway 264 junction; approximately 2 mi E of Zebulon and 0.3 mi S of railroad.

Description: Roadcut, 6 ft high, 300 ft long; attitude of cleavage- NE-trending.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 200-ft section N from Johnston Co. line.

Unfired Properties: Water of plasticity-29.5%; working properties-plastic; drying shrinkage-2.5%; dry strength-fair; pH-5.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Light tan	1	2.5	31.8	46.1	1.45
2000	Buff	1	2.5	29.5	45.1	1.53
2100	Lt. orange brown	3	2.5	27.9	43.0	1.54
2200	Lt. red brown	4	5.0	21.2	35.4	1.67
2300	Lt. red brown	7	7.5	19.2	33.8	1.76

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

WAKE COUNTY - Continued

SAMPLE: 92W-15

Formation: Granite

Location: Rolesville site in NE Wake Co. 3 mi E of center of Rolesville on S side of SR 2300, 0.3 mi W of intersection with SR 2301.

Description: Roadcut, 2 ft high at W end, increases to 8 ft high at E end.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.2%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-4.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	2.5	24.6	39.7	1.62
1900	Orange tan	2	5.0	23.3	38.5	1.65
2000	Light tan	2	5.0	22.7	37.5	1.65
2100	Light brown	3	7.5	17.1	30.9	1.82
2200	Medium brown	3	10.0	14.6	27.1	1.86
2300	Red brown	3	10.0	14.2	26.9	1.90

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 92W-16

Formation: Hornblende gneiss

Location: Neuse site in N-central Wake Co. on S side of SR 2006, 2.6 mi W of Neuse Crossroads and 0.1 mi E of intersection with SR 2000.

Description: Roadcut, 3-4 ft high, 200 ft long.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along E end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.3%; working properties-short; drying shrinkage-5.0%; dry strength-fair; pH-5.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	34.9	49.3	1.41
1900	Orange tan	3	5.0	34.6	48.7	1.41
2000	Dark tan	3	5.0	34.3	48.6	1.42
2100	Dark tan	3	7.5	27.9	43.3	1.55
2200	Light brown	5	10.0	22.8	38.3	1.68
2300	Red brown	5	12.5	22.2	37.3	1.68

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high absorption.

WAKE COUNTY - Continued

SAMPLE: 92W-17

Formation: Mica gneiss

Location: McCullers site in S-central Wake Co., 1 mi E of U.S. Highway 401 and SR 1010 intersection at McCullers, on S side of SR 1010, 250 ft E of SR 2723.

Description: Roadcut, 300 ft long, 2-4 ft high.

Type Material: Residual clay

Color: Yellow

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-27.3%; working properties-short; drying shrinkage-5.0%; dry strength-fair; pH-4.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	27.3	43.6	1.57
1900	Orange tan	3	5.0	27.2	42.9	1.58
2000	Orange tan	3	5.0	24.8	40.3	1.62
2100	Light brown	3	7.5	21.8	37.5	1.72
2200	Medium brown	3	7.5	20.3	35.2	1.73
2300	Red brown	3	7.5	19.7	34.7	1.76

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

WARREN COUNTY

Seven residual clay samples were collected from selected sites in Warren County. Laboratory tests indicate potential uses of the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
93W - 1	Granite	Structural clay products.
93W - 2	Granite	Structural clay products.
93W - 3	Mica gneiss	Structural clay products.
93W - 4	Granite	Not suitable for structural clay products.
93W - 5	Carolina Slate Belt	Not suitable for structural clay products.
93W - 6	Mica schist	Structural clay products.
93W - 7	Mica gneiss	Structural clay products.

WARREN COUNTY

SAMPLE: 93W-1

Formation: Granite

Location: SR 1324 site on SR 1324, 0.3 mi W of its intersection with SR 1305, on N road bank.

Description: Light to dark brown clay exposed on roadcut 200-250 ft long and approximately 3 ft high.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.8%; working properties-plastic; drying shrinkage-5.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	4	5.0	26.5	41.9	1.58
1900	Tan	4	7.5	22.5	37.6	1.67
2000	Tan	4	7.5	18.6	35.0	1.88
2100	Light brown	5	15.0	11.3	23.5	2.08
2200	Brown	6	17.5	6.7	15.2	2.27
2300	Dark brown	7	17.5	5.0	12.1	2.41

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 1900°-2000°F); high shrinkage above 2000°F.

SAMPLE: 93W-2

Formation: Granite

Location: SR 1364 site on N bank of SR 1364, 200 ft W of its intersection with SR 1305.

Description: Clay exposed along roadcut 150-175 ft long and approximately 3 ft high.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 10 ft over 50-ft section along the approximate middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.3%; working properties-plastic; drying shrinkage-5.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	5.0	28.9	43.9	1.52
1900	Tan	4	7.5	26.4	41.7	1.58
2000	Tan	4	7.5	24.8	40.4	1.63
2100	Orange tan	4	12.5	17.4	31.7	1.82
2200	Light brown	4	15.0	13.2	25.3	1.92
2300	Red brown	5	15.0	13.1	25.3	1.93

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°F); high shrinkage above 2100°F.

SAMPLE: 93W-3

Formation: Weathered mica gneiss

Location: SR 1107 site on N side of SR 1107, 0.5 mi W of its intersection with U.S. Highway 401.

Description: Red clay exposed in excavated cut approximately 375-425 ft long and 2-9 ft high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 10 ft over a 30-ft section.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.0%; working properties-plastic; drying shrinkage-5.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Salmon	3	5.0	28.5	43.6	1.53
1900	Salmon	3	7.5	27.4	42.5	1.55
2000	Beige	3	7.5	25.6	41.2	1.61
2100	Light red	4	7.5	21.7	36.9	1.70
2200	Light red	4	12.5	17.5	31.9	1.82
2300	Dark rose	4	12.5	15.7	30.0	1.91

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2300°F).

SAMPLE: 93W-4

Formation: Granite

Location: Hicks site 0.5 mi W of U.S. Highway 401 and 0.2 mi S of SR 1109; 2 mi NW of center of Warrenton.

Description: Red clay exposed on slight topographic high.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 5 ft along 25-ft section on hillside.

Bloating Test: Negative

Unfired Properties: Water of plasticity-38.2%; working properties-plastic; drying shrinkage-5.0%; dry strength-good.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	31.2	46.8	1.50
1900	Orange tan	3	10.0	29.5	46.0	1.56
2000	Light brown	3	10.0	26.5	43.2	1.63
2100	Light red	4	15.0	15.6	30.9	1.98
2200	Light red	4	17.5	9.6	21.1	2.20
2300	Dark red	5	17.5	6.9	16.0	2.32

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; high shrinkage.

WARREN COUNTY - Continued

SAMPLE: 93W-5

Formation: Carolina Slate Belt, felsic volcanics

Location: Embro site on E side of SR 1510, 0.5 mi N of intersection with SR 1509, approximately 3.3 mi E of Embro in E-central Warren Co.

Description: 7-ft high brownish red clay roadcut approximately 500 ft long on E side of SR 1510.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 10 ft along 100-ft section of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-40.5%; working properties-short; drying shrinkage-0.0%; dry strength-low; pH-5.6.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	---	(No bond)				
1900	---					
2000	---					
2100	---					
2200	---					
2300	---					

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; no bond.

SAMPLE: 93W-6

Formation: Mica schist

Location: Parktown site in S-central Warren Co. on S side of SR 1625, 0.9 mi W of center of Parktown and on SE side of intersection with SR 1622.

Description: Roadcut, 3 ft high, 0.2 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along west end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.6%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	5.0	29.1	45.1	1.55
1900	Light brown	3	5.0	28.7	44.3	1.54
2000	Light brown	3	5.0	27.1	43.9	1.62
2100	Light brown	5	10.0	19.1	35.0	1.83
2200	Medium brown	5	12.5	15.6	30.4	1.95
2300	Red brown	5	15.0	14.8	29.6	2.00

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); high shrinkage at 2300°F.

SAMPLE: 93W-7

Formation: Mica gneiss

Location: Vaughan site in NE Warren Co. on N side of U.S. Highway 158, 0.4 mi W of SR 1506 intersection in Vaughan.

Description: Roadcut, 5 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.4%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-4.7.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	30.7	46.7	1.52
1900	Orange tan	2	5.0	29.2	45.2	1.55
2000	Light brown	3	7.5	24.3	40.3	1.66
2100	Light brown	3	10.0	21.2	37.5	1.77
2200	Medium brown	5	10.0	18.2	33.9	1.86
2300	Red brown	5	10.0	15.5	29.8	1.93

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

WILKES COUNTY

Four residual clay samples were collected from different selected locations in Wilkes County. Laboratory tests indicate potential uses for these samples as follows:

Sample No.	Formation	Potential Use
97W - 1	Granite	Not suitable for structural clay products.
97W - 2	Mica schist	Structural clay products.
97W - 3	Mica gneiss	Not suitable for structural clay products.
97W - 4	Hornblende gneiss	Structural clay products.

WILKES COUNTY

SAMPLE: 97W-1

Formation: Granite

Location: Ronda East site in E-central Wilkes Co. on S side of N.C. Highway 268, 1 mi E of intersection with SR 2303 in Ronda.

Description: Roadcut, 10 ft high, 300 ft long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.2%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Light tan	1	0.0	32.2	46.4	1.44
1900	Light tan	1	0.0	30.9	44.7	1.44
2000	Light tan	1	0.0	30.6	44.0	1.45
2100	Light brown	3	0.0	21.8	34.7	1.59
2200	Light brown	3	0.0	19.8	32.4	1.64
2300	Red brown	3	2.5	18.6	31.9	1.71

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 97W-2

Formation: Mica schist

Location: Ronda West site in E-central Wilkes Co. on N side of N.C. Highway 268, 2.2 mi W of intersection with SR 2303 in Ronda.

Description: Roadcut, 15 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Tan

Sampled Interval: Every 20 ft over 100-ft section along E end of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-30.4%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	3	0.0	26.8	43.4	1.62
1900	Orange tan	3	0.0	24.0	40.5	1.69
2000	Orange tan	3	0.0	22.4	37.8	1.69
2100	Brown	5	2.5	18.3	32.9	1.80
2200	Red brown	6	5.0	12.4	24.2	1.95
2300	Dark brown	7	5.0	7.4	15.5	2.10

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

WILKES COUNTY- Continued

SAMPLE: 97W-3

Formation: Mica gneiss

Location: North Wilkesboro site in central Wilkes Co. on S side of N.C. Highway 268, 0.1 mi E of intersection with SR 2333 and 4 mi NE of center of North Wilkesboro.

Description: Roadcut, 12 ft high, 0.1 mi long.

Type Material: Residual clay

Color: Red

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-29.3%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.4.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Pink	1	0.0	33.9	49.4	1.43
1900	Pink	1	0.0	33.3	48.1	1.44
2000	Pink	1	0.0	32.7	46.8	1.45
2100	Pink	2	2.5	29.2	43.4	1.49
2200	Pink	3	2.5	27.9	43.7	1.56
2300	Pink	3	2.5	26.1	40.8	1.56

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 97W-4

Formation: Hornblende gneiss

Location: Mt. Zion site in W Wilkes Co. 5.5 mi E of Mt. Zion on S side of U.S. Highway 421, 0.2 mi W of SR 1156.

Description: Roadcut, irregular, 5-20 ft high, 0.25 mi long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-31.3%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	26.0	42.5	1.64
1900	Tan	3	0.0	24.6	41.0	1.67
2000	Tan	3	0.0	23.8	39.7	1.67
2100	Light brown	3	2.5	20.0	35.2	1.76
2200	Light brown	4	2.5	19.2	34.2	1.78
2300	Red brown	4	2.5	18.6	33.3	1.79

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2200°-2300°F).

WILSON COUNTY

Two residual clay samples were collected from different selected sites in western Wilson County. Laboratory tests indicate potential uses of the raw material represented by these samples as follows:

Sample No.	Formation	Potential Use
98W - 1	Carolina Slate Belt	Not suitable for structural clay products.
98W - 2	Granite	Not suitable for structural clay products.

WILSON COUNTY

SAMPLE: 98W-1

Formation: Carolina Slate Belt, felsic volcanics

Location: Buckhorn Crossroads site in SW Wilson Co. on E side of N.C. Highway 581, 0.8 mi N of N.C. Highway 42 junction in Buckhorn Crossroads and 0.1 mi S of Moccasin Creek bridge.

Description: Roadcut, 6-8 ft high, 300 ft long.

Type Material: Residual clay

Color: Lt orange

Sampled Interval: Random sampled over N 100 ft of roadcut; S end of cut is mostly river terrace deposit.

Unfired Properties: Water of plasticity-29.9%; working properties-short; drying shrinkage-2.5%; dry strength-fair; pH-7.5.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1900	Lt. red brown	1	2.5	34.6	49.2	1.41
2000	Orange brown	1	2.5	32.8	48.7	1.49
2100	Medium orange	2	2.5	30.3	46.1	1.52
2200	Red brown	4	5.0	25.0	40.8	1.63
2300	Red brown	6	7.5	22.7	38.4	1.69

Potential Use: Not suitable for structural clay products; high absorption.

SAMPLE: 98W-2

Formation: Granite

Location: Sims site in W-central Wilson Co. on N side of SR 1137, 0.9 mi W of intersection with SR 1135, just W of Sims.

Description: Roadcut, 5 ft high, 200 ft long.

Type Material: Residual clay (sandy)

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-18.9%; working properties-short; drying shrinkage-2.5%; dry strength-poor; pH-5.0.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	5.0	23.4	39.3	1.68
1900	Orange tan	2	5.0	21.7	37.8	1.74
2000	Lt. brown	2	5.0	21.8	37.6	1.73
2100	Lt. brown	2	5.0	20.9	37.0	1.77
2200	Medium brown	2	5.0	19.9	35.3	1.78
2300	Red brown	2	5.0	19.4	34.6	1.78

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; poor bond.

YADKIN COUNTY

One shale and four residual clay samples were collected from selected sites in Yadkin County. Laboratory tests indicate potential uses of the raw materials represented by these samples as follows:

Sample No.	Formation	Potential Use
99Y - 1	Upper Triassic	Structural clay products.
99Y - 2	Mica gneiss	Not suitable for structural clay products.
99Y - 3	Granite	Not suitable for structural clay products.
99Y - 4	Kings Mountain Group	Structural clay products.
99Y - 5	Diorite-gabbro	Not suitable for structural clay products.

YADKIN COUNTY

SAMPLE: 99Y-1

Formation: Upper Triassic, Newark Group

Location: Courtney site on E side of U.S. Highway 601, 0.7 mi S of intersection with SR 1001, approximately 1 mi SW of Courtney in S-central Yadkin Co.

Description: Red-brown shale in roadcut 6-9 ft high and approximately 250-300 ft long; crops out intermittently for about 2 mi; attitude of bedding- NE-trending, 25°NW.

Type Material: Shale

Color: Red

Sampled Interval: Every 10 ft over 100-ft section along base of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-36.8%; working properties-plastic; drying shrinkage-2.5%; dry strength-good; pH-3.9.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	2	5.0	28.2	40.6	1.44
1900	Tan	3	5.0	26.3	39.2	1.49
2000	Tan	3	5.0	21.6	34.3	1.59
2100	Light brown	4	10.0	17.3	29.6	1.71
2200	Chocolate	5	10.0	13.1	23.7	1.81
2300	Steel black	6	17.5	1.3	3.0	2.31

Potential Use: Structural clay products (e.g., building brick at 2100°-2200°F); abrupt vitrification between 2200°-2300°F.

SAMPLE: 99Y-2

Formation: Mica gneiss

Location: Marler site 1.3 mi S of Marler on N side of SR 1112, 0.35 mi W of its junction with SR 1103 in SW Yadkin Co.

Description: Roadcut, 100 ft long, 2 ft high; NE-trending lineations.

Type Material: Residual clay

Color: Light red brown

Sampled Interval: Every 5 ft along 30-ft section at base of roadcut.

Unfired Properties: Water of plasticity-40.1%; working properties-plastic; drying shrinkage-7.5%; dry strength-fair.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
2000	Grayish reddish orange	3	10.0	33.0	---	---
2100	Lt. reddish brown	5	10.0	32.4	46.3	1.43
2200	Grayish reddish orange	6	12.5	23.6	38.7	1.62
2300	Moderate reddish brown	6	12.5	23.3	37.8	1.64

Potential Use: Not suitable for structural clay products; high absorption.

YADKIN COUNTY - Continued

SAMPLE: 99Y-3

Formation: Granite

Location: Swancreek site in W-central Yadkin Co. 0.5 mi S of Swancreek on N side of SR 1303, 0.1 mi E of SR 1300.

Description: Roadcut, 3-5 ft high, 300 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-33.6%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.2.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	2	0.0	31.7	46.9	1.48
1900	Orange tan	3	0.0	30.5	45.6	1.49
2000	Orange tan	3	0.0	28.1	42.5	1.51
2100	Light brown	3	2.5	24.8	40.0	1.61
2200	Light brown	3	2.5	21.7	35.6	1.64
2300	Brown	3	5.0	19.3	33.8	1.74

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

SAMPLE: 99Y-4

Formation: Kings Mountain Group

Location: Smithtown site in NE Yadkin Co. on SE side of Smithtown on NE corner of intersection of N.C. Highway 67 and SR 1542.

Description: Roadcut, 15 ft high at intersection, grades down to road level N along SR 1542, 250 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-37.3%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-3.8.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Orange tan	1	0.0	32.5	48.1	1.48
1900	Orange tan	2	0.0	32.4	47.4	1.46
2000	Orange tan	3	0.0	30.1	44.7	1.49
2100	Light brown	3	0.0	21.7	36.2	1.67
2200	Light brown	3	2.5	19.8	34.3	1.73
2300	Red brown	4	2.5	17.9	32.3	1.80

Other Tests: Not effervescent with HCl.

Potential Use: Structural clay products (e.g., building brick at 2300°F).

YADKIN COUNTY - Continued

SAMPLE: 99Y-5

Formation: Diorite-gabbro

Location: Huntsville site in SE corner of Yadkin Co. on W side of SR 1716, 0.15 mi S of junction with SR 1001 in Huntsville.

Description: Roadcut, 4 ft high, 200 ft long.

Type Material: Residual clay

Color: Brown

Sampled Interval: Every 20 ft over 100-ft section along middle of roadcut.

Bloating Test: Negative

Unfired Properties: Water of plasticity-39.1%; working properties-short; drying shrinkage-0.0%; dry strength-poor; pH-4.1.

Fired Properties:

T °F	Color	Moh's Hardness	Shrinkage Total %	Absorption %	Apparent Porosity %	Bulk Density gm/cc
1800	Tan	3	0.0	35.0	51.4	1.47
1900	Tan	3	0.0	32.0	47.9	1.49
2000	Tan	3	0.0	32.7	47.9	1.47
2100	Tan	3	2.5	26.7	43.8	1.64
2200	Tan	3	2.5	22.9	39.3	1.72
2300	Light red	3	5.0	19.6	35.1	1.79

Other Tests: Not effervescent with HCl.

Potential Use: Not suitable for structural clay products; too soft.

APPENDIX I

Beneficiation, Chemical, and Mineral Analysis of Five White Residual Clays

by

Edwin H.Bentzen, III[1]

Introduction

In February 1969, five samples of white residual clay from the Carolina Slate Belt in North Carolina were collected by the N.C. Geological Survey Section, Raleigh. Samples from these locations have previously been submitted to the U.S. Bureau of Mines for testing. The Bureau gave potential uses for each sample; however, no uses were named which could be the basis for a large industry. Subsequently, portions of the resampled material were submitted to the North Carolina State University, Minerals Research Laboratory for preliminary beneficiation studies. The object of this work was to produce, by minimal processing, a product on which a larger-scale industry might be based. The type of products under consideration included ball clay, kaolinite clay, brick clay, sericite, and ceramic products.

Although three of the five materials sampled had been used as additives to brick clay, only one is in use as such today. Also, in each case, they are minor constituents of a red brick and not major constituents of a white brick.

Sample Identification

The five samples submitted were assigned Lab No. 3518, A through E. Cross identification with N.C. Geological Survey Section (N.C.G.S.) sample numbers is shown below:

Lab No.	N.C.G.S. Sample No.	County	Location
3518-A	N.C. 43H-9	Harnett	Angier site
3518-B	N.C. 63M-14	Moore	Hancock clay pit
3518-C	N.C. 63M-16	Moore	Williams clay pit
3518-D	N.C. 63M-21	Moore	Glendon clay pit
3518-E	N.C. 76R-1	Randolph	Jay Williams site

For preliminary data and firing test results, see appropriate county and sample number in main report.

Procedure

The samples were crushed through a roll crusher, set at 1/4 inch, mixed, and sampled for chemical analysis. The complete chemical analyses are shown in Table 1 as follows:

Table 1. Chemical Analysis of Head Feed.

Lab. No. 3518 Sample	Analysis Percent								
	LOI	Na_2O	K_2O	Al_2O_3	SiO_2	Fe_2O_3	CaO	MgO	Total
A	5.9	1.22	1.31	23.8	66.4	1.2	----	0.06	99.89
B	3.1	0.12	2.92	14.2	77.7	1.6	0.06	0.34	97.12
C	5.5	0.11	2.54	19.1	69.1	2.4	0.20	0.51	99.46
D	3.4	0.49	1.95	14.1	74.8	2.4	2.4	0.72	100.26
E	4.1	2.20	1.40	15.8	72.04	2.6	0.80	0.58	99.48

[1]Formerly Mineral Dressing Engineer, North Carolina State University, Minerals Research Laboratory, Asheville, North Carolina, and now with the Colorado School of Mines.

On the basis of the chemical analyses, and equations derived by Koeniz[2] and Coffen[3], the mineralogic compositions in Table 2 were projected as follows:

Table 2. Mineral Composition of Head Feed.

Minerals	Sample No. A	B	C	D	E
Albite	10.3	1.0	0.9	4.1	18.6
Microcline	----	6.6	13.7	11.5	8.3
Anorthite	----	0.3	1.0	11.9	4.0
Muscovite	28.8	15.4	2.0	----	----
Quartz	33.7	57.7	40.3	51.3	41.3
Kaolinite	27.1	17.2	38.7	17.3	23.3
Total	99.9	98.2	96.6	96.1	95.5

Table 3 gives the method used to determine the rational analysis as follows:

Table 3. Calculation of Mineral Composition from Chemical Analysis[4]

A = % LOI C = % Al_2O_3 E = % Na_2O

B = % SiO_2 D = % CaO F = % K_2O

U = % albite, $Na_2O \cdot Al_2O_3 \cdot 6SiO_2$

V = % microcline, $K_2O \cdot Al_2O_3 \cdot 6SiO_2$

W = % anorthite, $CaO \cdot Al_2O_3 \cdot 2SiO_2$

X = % muscovite, $K_2O \cdot 3Al_2O_3 \cdot 6SiO_2 \cdot 2H_2O$

Y = % quartz, SiO_2

Z = % kaolinite, $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$

X = 7.813C - 22.097A - 14.201D - 12.847E - 8.455F
U = 8.458E
V = (F - 0.118X) - 0.169
W = 4.960D
Z = (C - 0.195U - 0.183V - 0.365W - 0.385X) - 0.395
Y = B - 0.687U - 0.648V - 0.430W - 0.452X - 0.465Z

[2]E.W. Koeniz, "Calculation of Mineralogical Composition of Feldspar by Chemical Analysis," Journal of American Ceramic Society, v. 25, n. 14, p. 420.

[3]William W. Coffeen, "Simple Procedure for Correction of Mineral Compositions Calculated from Feldspar Analysis," Ceramic Age, v. 60, n. 6, p. 29.

[4]Procedure described in Industrial Ceramics, Felix Singer and Sonja Singer, Chemical Publishing Co., Inc.; New York, New York, 1963, pp. 301-302.

The test procedure used to determine "grit" is an adaptation of one explained in J.M. Huber Corporation's publication Kaolin Clays and Their Industrial Uses. In place of a Hamilton-Beach mixer No. 18, a Wemco Mineral Master with a small propeller and a 500-gram capacity octagonal pot was used. The speed was adjusted to 2000 RPM.

Tetrasodium pyrophosphate solution was made by dissolving 20 grams of anhydrous tetrasodium pyrophosphate ($Na_4P_2O_7$) in 1000 cubic centimeters of distilled water. One hundred grams of clay, 375 cubic centimeters of water, and 25 cubic centimeters of tetrasodium pyrophosphate solution were placed in the pot and mixed at high speed for ten minutes. The mixture was poured slowly into an eight-inch diameter, 325 mesh screen which had previously been wetted with water. The pot was washed thoroughly, and the washings were poured onto the screen. Generally, the chemical treatment indicated above was sufficient to produce free screening. However, in cases where the screen became clogged because of a high-viscosity clay or excessive residue, the screening was facilitated by directing a stream of water against the screen from a rubber hose. The force of the water was regulated by squeezing the end of the rubber hose. The clay was washed through the screen with a stream of water until the wash water was clear and free from clay particles. The operation can be completed in one minute or less.

The residue on the screen was washed into a small pan and allowed to stand for two to three minutes. The clean water was decanted by using a glass stirring rod pressed against the lip of the pan. The residue was dried in the pan at 105°C, cooled, and weighed.

The minus 325 mesh slurry was collected in a 2.5-gallon bucket which was filled to a depth of ten inches. The slurry was well mixed to place all solids in suspension and was allowed to settle. After a specified amount of time, the suspended material was poured off. The sinks were collected, dried at 105°C, cooled, and weighed. The suspended solids were either further settled for a specified time or flocculated. Assay samples were collected and analyzed. The results of these settling test runs can be seen in Table 4.

Table 4. Results of Trial Production Settling Time.

Sample #	Settling Time (Min.)	Projected Clay Product Weight %	Actual Clay Product Weight %	% Albite	% Microcline	% Muscovite	% Quartz	% Kaolinite
A	20	27.1	26.0	16.1	(None)	51.3	1.9	31.7
B	17	17.2	14.0	2.5	3.4	40.9	6.2	43.9
C	32	38.8	40.0	1.7	13.3	14.9	9.8	56.0
D	27	17.3	18.5	5.1	14.1	17.9	15.5	42.1
E	8	23.3	23.3	13.5	18.3	(None)	15.2	45.2

Results

The clay content of the head feed, as determined by a rational analysis, was rather disappointing when compared to some deposits worked for ball clay or kaolin which contain 85 to 95 percent kaolinite. These deposits lend themselves to simple beneficiation with high yield. With the minimal processing used here, aimed at the best balance between maximum weight recovery and high grade clay, the yield was low. More rigorous processing could probably produce a better yield; however, this would prove costly in production.

The color readings on the products were not as high as those necessary for paper or paint filler markets. The bulk weight, however, was in the right range.

It was agreed upon with S.G. Conrad, State Geologist, that one pound of clay product would be produced. From the test data, it was seen that 2000 grams of head feed would have to be treated in order to produce the necessary weight of product.

Only the three higher-grade samples were treated to produce clay product. Each was treated as before. One hundred-gram samples were mixed with a pyrophosphate solution, screened, and settled to remove grit and silt. The slimes and clay were poured into a cut-off 55-gallon drum to a depth of ten inches. After mixing they were allowed to stand for 24 hours. The slimes were then siphoned off and discarded. The clay product was dried at 105°C, cooled, and weighed. The dried clay was screened on a 200 mesh screen, sampled for assay, and checked for color reflectance and bulk weight. The results can be seen in Table 5 as follows:

Table 5. Production of Clay Product.

Chemical Analy.	Wt. %	LOI	Na_2O	K_2O	Al_2O_3	SiO_2	Fe_2O_2	CaO	MgO	Total
A	22.8	8.1	1.82	1.82	34.7	51.2	1.57	0.26	----	99.9
C	37.6	8.2	0.18	4.18	29.3	53.6	3.60	0.10	0.48	99.5
E	23.1	6.6	1.34	2.73	26.5	58.4	3.83	0.64	0.73	100.7

Rational Analy.	Albite	Micro	Anor	Musco	Quartz	Kaolin	
A	15.39	----	1.29	49.66	3.37	30.66	100.3
C	1.52	15.27	0.50	13.55	5.68	65.89	102.4
E	11.33	7.90	3.17	11.82	18.62	43.39	96.2

Color* & Bulk wt. Filter Color:	Blue	Green	Amber	Blk. wt.
A	75	85	88	11.28
C	63	75	79	10.30
E	58	73	74	21.42

*Percentage of light reflectivity based on magnesium oxide as 100.

GLOSSARY

Absorption -- the relationship of the weight of water absorbed by a ceramic specimen to the weight of the specimen before immersion in water, expressed as a percent.

Apparent porosity -- the ratio of the volume of open pores in a specimen to the bulk volume, usually expressed in percent.

ASTM -- American Society for Testing Materials.

Attitude -- the position of a structural surface relative to the horizontal, expressed quantitatively by both strike and dip measurements. Strike is the trend that a structural unit takes as it intersects the horizontal. Dip is the angle that a structural surface makes with the horizontal measured perpendicular to the strike.

Ball clay -- a secondary clay, commonly characterized by the presence of organic matter, high plasticity, high dry strength, long vitrification range, and light color when fired.

Beneficiate -- to improve a raw material by the removal of undesirable constituents.

Bloating -- swelling naturally or by gas-forming additives upon the application of heat.

Bloating range -- temperature range in which a clay material will bloat.

Bloating test -- a test to determine the ability of a ceramic material or product to expand when heated.

Bonding clay -- a clay of high plasticity and high dry strength used to bond nonplastic materials; it may or may not be refractory.

Bulk density -- the weight of a solid per unit of exterior volume expressed in gm/cc or lb/ft^3.

Casting -- forming ceramic ware by introducing a body slip into a porous mold which absorbs sufficient water from the slip to produce a semi-rigid article.

Die -- a mold used for shaping brick, or a form for shaping an extruded column.

Drying -- removal of uncombined water or other volatile substance from a ceramic raw material or product, usually expedited by low-temperature heating.

Drying characteristics -- characteristics which develop in, or on, a ceramic body upon drying, such as strength, warping, etc.

Drying defects -- features such as cracking, warping, and efflorescence which develop during the drying of a ceramic body.

Drying shrinkage -- the percent of linear change of a ceramic body upon drying, usually at 110°C.

Dry-pressed brick -- brick formed from moistened ground material under pressure in a mechanical or hydraulic press.

Dry strength -- the mechanical strength of a ceramic body after being dried, usually at 110°C.

Dummy (bag- or extruded-type clay product) -- rod-shaped clay, commonly 1 to 1.5 inches in diameter and 12 inches in length, utilized to backfill holes in which explosive charges have been set.

E -- east compass direction.

Efflorescence -- the staining of a masonry surface as a result of the deposition of water-soluble salts.

Expansion -- swelling of a clay material when in the thermoplastic state.

Expansion range -- temperature range in which a clay material will expand.

Extrusion -- the forcing of clay material through an opening or die to form a continuous body of like cross section throughout its length.

Face brick -- brick of various colors, often with imparted surface texture, manufactured especially for use in exposed walls or masonry units. Face bricks are designated "NW", "MW", or "SW" to indicate suitability for use under negligible, mild, or severe weather conditions.

Firing -- the controlled heat treatment of ceramic ware in a kiln or furnace, during the process of manufacture, to develop the desired properties.

Firing range -- the range of firing temperature within which a ceramic composition develops properties which render it commercially useful.

Flocculation -- the technical term for the gathering of suspended particles into aggregations.

Flux -- a substance that promotes fusion in a given ceramic mixture.

Fusion -- the process of melting, usually the result of interaction of two or more materials.

Glaze -- a ceramic coating matured to the glassy state on a formed ceramic article, or the material or mixture from which the coating is made.

Green strength (dry) -- the strength of dry ceramic material before it is fired.

Green strength (wet) -- the strength of moistened ceramic material before it is fired.

Grog -- ground up pieces of burned brick or clay, added to the raw clay mixture for the purpose of decreasing the shrinkage and density of the burned ware.

Hardness -- the resistance to scratching or abrasion expressed verbally, or by Moh's scale of hardness as follows:

Moh's Scale

1	talc	5	apatite
2	gypsum	6	orthoclase feldspar
3	calcite	7	quartz
4	fluorite		

HCl -- hydrochloric acid.

Hot top -- a refractory feedhead for an ingot mold.

Jiggering -- forming ceramic ware from a plastic body by differential rotation of a profile tool and mold, the mold having the contour of one surface of the ware and the profile tool that of the other surface.

Kiln -- a furnace for firing ceramic products such as brick or porcelain.

lb/ft^3 -- pounds per cubic feet.

Lightweight aggregate -- aggregate produced by expanding, or bloating, of such materials as clay, shale, or slate which have been heated.

Linear shrinkage -- the percent of linear contraction of a ceramic body, measured both after drying and after firing.

Loss on ignition (LOI) -- the loss in weight, expressed in percent, which results from heating a sample of material to a high temperature, after preliminary drying at a temperature just above the boiling point of water.

Maturing range -- the time-temperature range within which a ceramic body, glaze, or other composition may be fired to yield specified properties.

Mealy -- a granular feel caused by lumpy, soft particles.

Mineral filler -- an inert mineral substance added to certain manufactured products to impart desirable properties such as weight, wear resistance, and opacity.

N -- north compass direction.

pH -- hydrogen ion concentration; a measurement of acidity or alkalinity.

Plasticity -- the property of a moistened material to be deformed under pressure, with the deformed shape being retained when the deforming force is removed.

Porous clay products -- clay products capable of absorbing moisture, such as flower pots and garden pottery.

psi -- pounds per square inch.

Pyrometric cone -- a trigonal cone, standardized as to shape and softening point, used as a control in firing ceramic products.

Pyrometric cone equivalent (PCE) -- the designation number of a pyrometric cone which softens simultaneously with a cone of the ceramic material under investigation when tested in accordance with a standard method of testing.

Refractories -- materials, usually non-metallic, used to withstand high temperature.

Rotary kiln -- an inclined tubular furnace which revolves on its axis.

S -- south compass direction.

Scumming -- the formation of an undesirable residue on the surface of a ceramic product.

Shrinkage -- the reduction in size of ceramic material upon drying and firing.

Sinter -- a ceramic material or mixture fired to less than complete fusion, resulting in a coherent mass, or the process involved.

Slip -- a suspension of ceramic material in a liquid.

Slow firing test -- a test to determine the firing characteristics of ceramic raw materials in which dried samples are fired in a kiln started at room temperature and raised to a maximum temperature over a period of hours. Samples removed at specific temperatures are evaluated for hardness, color, percent of total linear shrinkage, percent absorption, percent apparent porosity, and bulk density.

Soft mud process -- the formation of ceramic products by throwing or forcing a mixture of soft consistency into a mold.

Soluble salts -- compounds formed by the combining of acids and bases. Common water soluble salts found in clay materials include chloride, sulfates, and carbonates of alkalies, alkaline earths, aluminum, and iron.

SR -- secondary road.

Stoneware -- fine-textured ceramic products, either vitreous or semivitreous, generally made from low-grade plastic fireclay.

Structural clay products -- any of a class of load-bearing, ceramic building units.

T °F -- temperature in degrees Fahrenheit.

Thixotropic clay -- a clay that weakens when disturbed and strengthens when left undisturbed (false body).

Vitrification -- the condition of being vitrified.

Vitrify -- to produce (in a ceramic ware) enough glassy phase or close crystallization by high firing to make nonporous.

W -- west compass direction.

Water of plasticity -- the percent of water required to plasticize a clay material.

Workability -- the consistency and moldability of plastic ceramic materials.

XLA -- expanded lightweight aggregate.

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