Detailed sections from auger holes and outcrops in the Clubhouse Crossroads, Johns Island, Osborn, and Ravenel quadrangles, South Carolina

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature

U. S. Geological Survey Open-File Report Number 87-661

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Introduction

In the course of preparing a detailed map for the Clubhouse Crossroads, Johns Island, Osborn, and Ravenel quadrangles, sediments from numerous auger holes and outcrops were studied and recorded to determine their lithologic characteristics, spatial distribution, and temporal framework. While the major geologic boundaries will be summarized on the forthcoming maps (Weems and Lemon, in preparation), much of the more detailed information could not be shown in such a visual manner and therefore is included in this open-file report. Information is included for 181 localities within these four quadrangles.

A few of the localities (so indicated) were natural outcrops or ditch banks, but since exposures are rare, the majority of the data was gathered by augering. These auger holes were drilled with a truck-mounted, Mobile Drill B-40 power auger, using 5-foot stem sections. One stem was augered into the ground and then pulled to describe the soil profile. After this, a second run was made in which additional stems were added until either a chattering sound followed by a sudden tightening of the drill string occurred (penetration of the Ashley Formation) or until the vacated 5 feet of the first auger run was filled by rising sediment from the newly penetrated section. In the latter case (usually 4-6 flights, depending on the density of the

material being augered), the stems were pulled and described (allowing for 5 feet of total rise during drilling). In most cases the base of the Pleistocene section was penetrated by the third run; in exceptionally thick sections, the rest of the section was augered in 20 to 30 foot runs. One very deep hole (OS-1) was cored and is in permanent storage at the USGS warehouse in Herndon, Virginia.

Although section thicknesses vary considerably, from 8 feet (JI-43, JI-44) to 480 feet (OS-1), most fall in the range of 35-55 feet. Most of the Quaternary and late Tertiary shallow subsurface units are thin (less than 50 feet total thickness) and poorly consolidated down to the upper Oligocene Ashley Formation of the Cooper Group* (*locally called the "Cooper Marl"). In contrast, the Ashley is often 100 feet or more thick and firmly compacted. It was impractical in most instances to try to drill through the Ashley with the power auger, so most of our drill holes were filled and abandoned as soon as we penetrated this unit. In the few areas where the Ashley is thin to absent, our holes were able to penetrate to the "Drayton Limestone" (lower Oligocene and/or upper Eocene) or the Parkers Ferry Formation (upper Eocene).

No attempt was made to describe sediments in detail. Grain sizes and sediment colors were estimated visually without aid of grain-size or color charts. It is possible, therefore, that units described as "clays" may include

clayey silts or clayey sands. Unit names conform to those used by Weems and Lemon (1984a, 1984b), with the addition of the informal terms "Daniel Island beds" (for dense, clays and sands of probable early Pleistocene age) and the "Drayton Limestone" (for loose, bryozoan-rich sands of late Eocene and/or early Oligocene age), both of which were encountered sporadically throughout the area of these quadrangles. For holes drilled by Weems and others, The numbers correspond to field note numbers. For holes drilled by Gohn, Houser, and McCartan, new numbers were assigned. Their field numbers for these holes are given in parentheses after the locality locations to aid in correlating field notes with this text.

The major deep aquifers in this area lie in the middle Eocene Santee Group limestones and the Paleocene Black Mingo Group. These units lie far below the depths to which we augered. Only our core hole (OS-1) penetrated through the Santee Group and into the top of the Black Mingo Group. During drilling of OS-1, the Drayton Limestone proved to be an artesian aquifer. Therefore it may be a useful water source in the southern and western part of this area.

The stratigraphy in this report remains the same as that in previous open-file reports in this series, except for the age relationship between the Goose Creek Limestone and the Raysor Formation. Campbell (1989) recently has demonstrated that the Goose Creek is older than the Raysor.

References cited

Campbell, Matthew R., 1989, Resolution of the Goose Creek problem in the Charleston District of South Carolina: Bulletin of the South Carolina Academy of Science, vol. 51, p. 17-18.

Weems, Robert E., and Lemon, E. M., Jr., 1984a, Geologic map of the Mount Holly quadrangle, Berkeley and Charleston Counties, South Carolina: U. S. Geological Survey Geologic Quadrangle Map GQ-1579, scale 1:24,000.

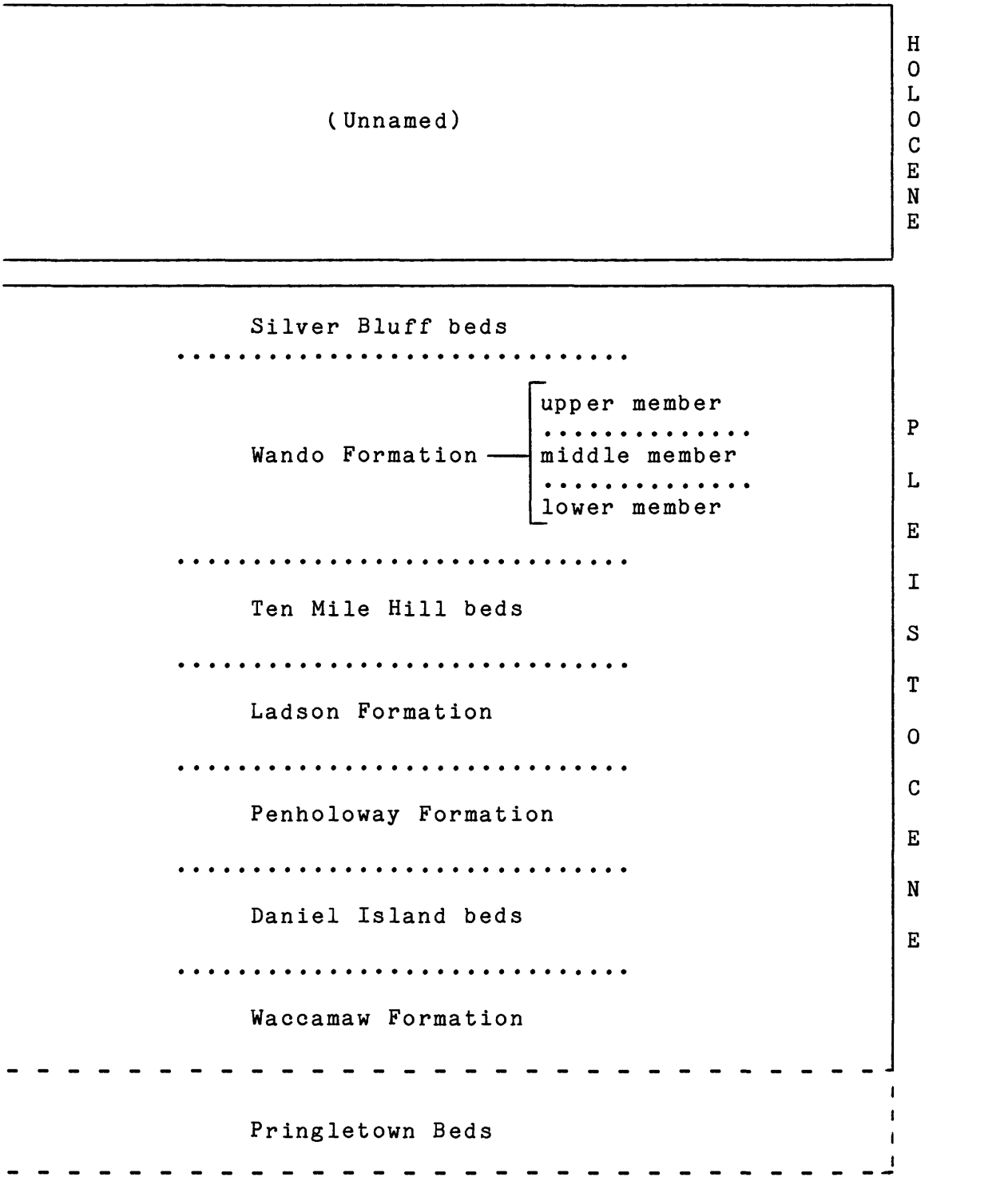
_____, 1984b, Geologic map of the Stallsville quadrangle, Dorchester and Charleston Counties, South Carolina: U. S. Geological Survey Geologic Quadrangle Map GQ-1581, scale 1:24,000.

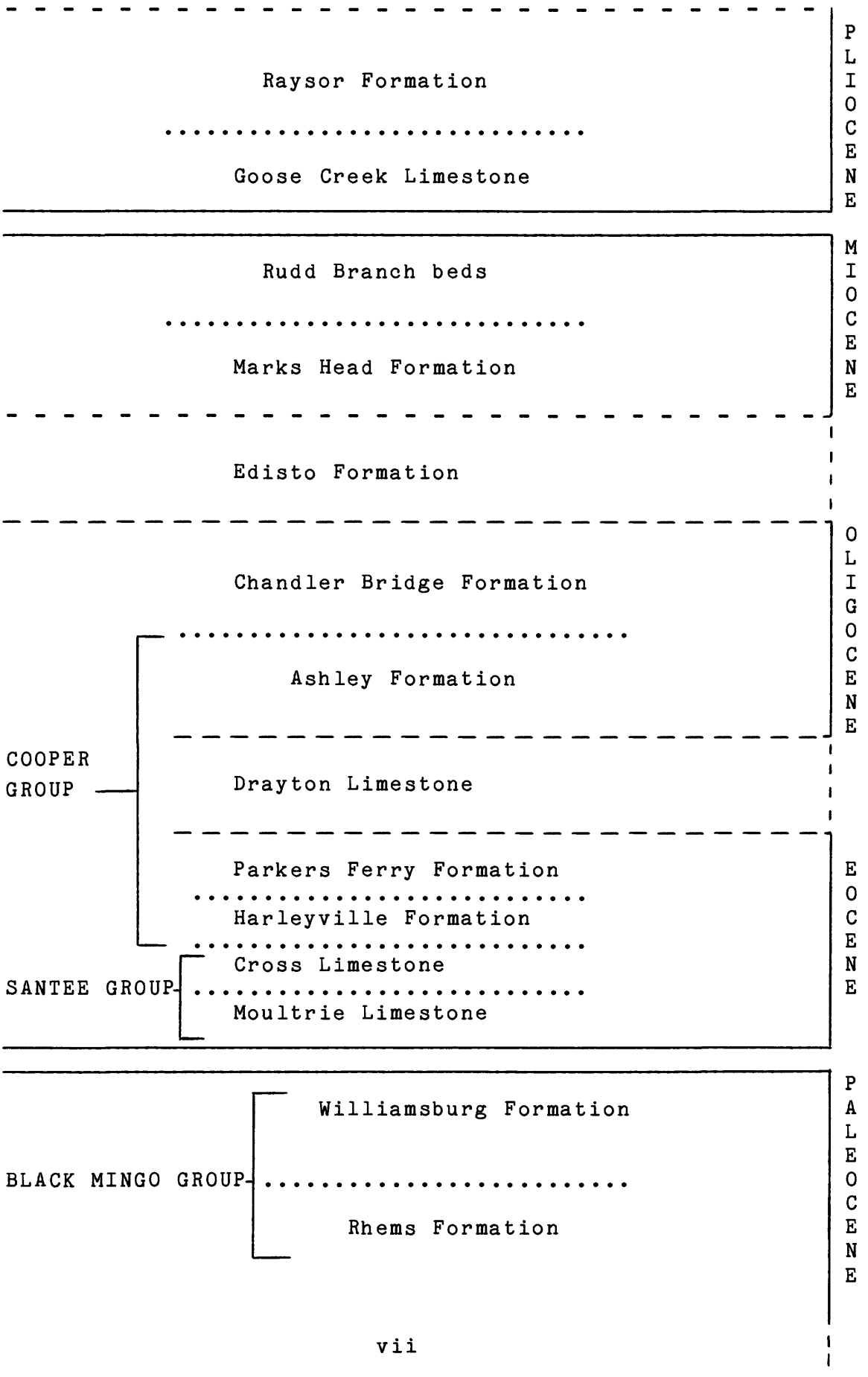
_____, in preparation, Geologic map of the Clubhouse Crossroads and Osborn quadrangles, Charleston and Dorchester counties, South Carolina: U.S. Geological Survey Geologic Map I-____, scale 1:24,000.

_____, in preparation, Geologic map of the Johns Island, Ladson, Ravenel and Stallsville quadrangles, Berkeley, Charleston, and Dorchester counties, South Carolina: U.S. Geological Survey Geologic Map I-____, scale 1:24,000.

Ages and Sequence of Regionally Recognized Geologic Units

(in any given section, many units will be missing due to erosion)




Raysor Formation
Goose Creek Limestone
PLIOCENE
Rudd Branch beds
Marks Head Formation
MIOCENE
Edisto Formation
Chandler Bridge Formation
Ashley Formation
OLIGOCENE
COOPER GROUP
Drayton Limestone
Parkers Ferry Formation
Harleyville Formation
Cross Limestone
SANTEE GROUP
Moultrie Limestone
EOCENE
Williamsburg Formation
BLACK MINGO GROUP
Rhems Formation
PALEOCENE

Clubhouse Crossroads Quadrangle

(Depths in feet)

CC-1: 1.05 miles W of east quad. border, 0.5 miles S of north quad. border. Surface elevation 52 feet.

PENHOLOWAY FORMATION	0-5	Clay, medium-reddish-orange grading down to medium-reddish-orange, medium-brown, and medium-gray mottled, dense, tough, silty (0-3)
	5-11	Sand, fine-grained, medium-reddish-orange with medium-gray clay laminae, silty and clayey
	11-15	Sand, fine-grained, medium-orange, clean, well sorted, contains very fine-grained heavies
	15-18	Sand, fine-grained, medium-brownish-orange, silty, contains very fine-grained heavies
	18-21	Sand, fine-grained, medium-brownish-orange, well sorted, slightly clayey, phosphate pebbles at base
EDISTO FORMATION	21-23	Calcarenite, fine-grained, light-brown, contains bryozoan fragments, sharp contact at base
ASHLEY FORMATION	23-45	Calcarenite, fine-grained, medium-olive-green, contains sand size phosphate and numerous large foraminifera

Base of Penholoway Formation: +31 feet above sea level
Base of Edisto Formation: +29 feet above sea level
Bottomed in Ashley Formation

CC-2: 2.4 miles W of east quad. border, 0.2 miles S of north quad. border. Surface elevation 16 feet.

ALLUVIUM	0-1	Sand, fine-grained, medium-gray, silty, grading down to
WANDO FM (UPPER MEM)	1-5	Clay, medium-gray and medium-orange mottled, sandy, grading down to
	5-13	Sand, medium- grading down to coarse-grained, medium-gray and medium-orange mottled; numerous quartz pebbles and sparse phosphate pebbles at base
ASHLEY FORMATION	13-20	Calcarenite, fine-grained, medium-olive-brown

Base of Alluvium: +15 feet above sea level
Base of Wando Formtion (upper member): +3 feet above sea level
Bottomed in Ashley Formation

CC-3: 2.4 miles W of east quad. border, 3.65 miles S of north quad. border. Surface elevation 50 feet.

LADSON FORMATION	0-6	Sand, fine-grained, light-brown grading down to dark-orange and medium-gray mottled, well sorted, gets clayey downward and becomes sandy clay by base
	6-8	Sand, coarse-grained, medium-brown and medium-gray mottled, subangular, clayey matrix
	8-10	Sand, bimodally fine-and coarse-grained, light-yellowish-brown, each fraction well sorted, grading down to fine-grained, micaceous, well sorted
	10-14	Sand, fine-grained, light-brown grading down to light-yellow, with lenses (about 1 cm thick) of light-gray to white clay, fine-grained heavies present near base
	14-32	Sand, fine-grained, medium-gray grading by 16 feet to light-gray to light-orange by 20 feet then to medium-orange by 24 feet, well sorted, silty, contains a bimodal coarse-grained fraction, clay blebs scattered throughout
MARKS HEAD FORMATION	32-37	Sand, fine-grained, dark-greenish-gray, well sorted, contains numerous small fish bones, abundant sand-size phosphate, sparse phosphate pebble bed at base
CHANDLER BRIDGE FM	37-43	Sand, very fine-grained, dark-greenish-gray, sparsely shelly, abundant sand-size phosphate, sharp contact with bed below, contains dinoflagellate assemblage of late Oligocene to early Miocene aspect
ASHLEY FORMATION	43-45	Calcarenite, fine-grained, medium-olive-brown, clayey

Base of Ladson Formation: +18 feet above sea level
Base of Marks Head Formation: +13 feet above sea level
Base of Chandler Bridge Formation: +7 feet above sea level
Bottomed in Ashley Formation

CC-4: 2.15 miles E of west quad. border, 2.9 miles N of south quad. border. Surface elevation 22 feet.

WANDO FM (UPPER MEM)	0-8	Sand, medium-grained, light-orangish-brown grading to light-gray, very fine-grained heavies scattered throughout, grades to
	8-12	Sand, coarse-grained, medium-orange, poorly sorted, feldspathic, pebbly, log at base
	at 12	Clay, dark-gray, roots at top
	12-18	Sand, coarse-grained, medium-gray, very pebbly (quartz and feldspar)
ASHLEY FORMATION	18-30	Calcarenite, fine-grained, medium-olive-brown, contains sand-size phosphate

Base of Wando Formation (upper member): +4 feet above sea level
Bottomed in Ashley Formation

CC-5: 3.45 miles W of east quad. border, 3.65 miles S of north quad. border. Surface elevation 20 feet.

WANDO FM (UPPER MEM)	0-2	Sand, medium-grained, dark- to medium-gray, subangular, poorly sorted, in clay matrix
	2-11	Sand, medium-grained, light-gray, subangular, clean, poorly sorted, sparsely pebbly, phosphate pebbles at base
ASHLEY FORMATION	11-20	Calcarenite, fine-grained, medium-olive-brown; contains calcite-cemented lumps

Base of Wando Formation (upper member): +9 feet above sea level
Bottomed in Ashley Formation

CC-6: 2.85 miles E of west quad. border, 1.9 miles S of north quad. border. Surface elevation 59 feet.

LADSON FORMATION	0-4	Sand, very fine-grained, light-brownish-orange, very silty
	4-21	Clay, medium-red, medium-orange, and light-gray mottled (4-5), grading rapidly to bright medium-red and light-gray mottled (5-12) then to medium-reddish-orange and medium-gray mottled, silty
	21-30	Sand, fine-grained, bright light-red grading to light-yellowish-brown by 25 feet, silty at top and less so downward, coarse-grained bimodal fraction appears by base
EDISTO FORMATION	30-34	Calcarenite, fine-grained, light-white, numerous oyster and bryozoan fragments, abundant sand-size phosphate, numerous phosphate pebbles at base; pebbles and coarse-grained quartz sand fill burrows into unit below; Globigerinoides trilobus present
ASHLEY FORMATION	34-35	Calcarenite, fine-grained, light-greenish-gray, abundant sand-size phosphate

Base of Ladson Formation: +29 feet above sea level
Base of Edisto Formation: +25 feet above sea level
Bottomed in Ashley Formation

CC-7: 0.5 miles E of west quad. border, 0.55 miles S of north quad. border. Surface elevation 58 feet.

PENHOLOWAY FORMATION	0-5	Clay, medium-reddish-orange, medium-gray, and dark-brown mottled, stiff, dense
	5-6	Sand, coarse-grained, color as above, subangular, clay matrix
	6-7	Sand, medium-grained, medium-yellowish-orange, much better sorted than above
	7-8	Sand, medium-brown, medium-grained, clayey
	8-15	Sand, fine-grained, light-yellowish-brown grading to medium-orangish-brown, silty
	15-16	Clay, medium-bluish-green, mottled with lighter shades, dense
	16-26.5	Sand, fine-grained, light-gray, with clay lenses (about 1 cm thick) colored as above; very fine-grained heavy minerals present below 25 feet
	26.5-27	Clay, medium-blue, with sand lenses (burrows?); contains phosphate lumps and quartz pebbles
ASHLEY FORMATION	27-30	Calcarenite, fine-grained, light-brown, contains sand-size phosphate and calcite-cemented lumps

Base of Penholoway Formation: +31 feet above sea level
Bottomed in Ashley Formation

CC-8: 1.7 miles E of west quad. border, 1.2 miles S of north quad. border. Surface elevation 51 feet. (=COE-19).

FILL	0-1	Road fill
LADSON FORMATION	1-13	Clay, medium-reddish-brown and medium-reddish-orange, silty, becomes interbedded with sands on a 2-5 cm scale below 8 feet, grades to:
	13-15	Sand, fine-grained, light-yellowish-orange, muddy
PENHOLOWAY FORMATION	15-16	Clay, light-olive-gray, silty, contains a few stringers of very fine-grained sand
	16-17	Gravel, mostly phosphate pebbles up to 3 cm in diameter, quartz granules abundant
EDISTO FORMATION	17-22	Calcarenite, fine-grained, grayish-orange-pink and pinkish-gray, muddy, microfossils and sand-size macrofossil fragments abundant, contains calcite-cemented nodules
ASHLEY FORMATION	22-30	Calcarenite, fine-grained, yellowish-gray grading down to light-olive, quartz sandy, more clayey than above

Base of Ladson Formation: +36 feet above sea level
Base of Penholoway Formation: +34 feet above sea level
Base of Edisto Formation: +29 feet above sea level
Bottomed in Ashley Formation

CC-9: 3.3 miles W of east quad.border, 0.85 miles S of north quad. border. Surface elevation 56 feet.

PENHOLOWAY FORMATION	0-5	Clay, medium-reddish-orange grading to medium-gray, medium-brown, and medium-reddish-orange mottled, crumbly in upper 3 feet
	5-10	Clay, medium-reddish-orange and medium-gray mottled, stiff, dense
	10-15	Sand, fine-grained, medium-orange, poorly sorted, clayey, grades to:
	15-30	Sand, fine-grained, medium-orange grading to light-gray by 27 feet and heavies visible below that, silty, well sorted but with coarse-grained bimodal fraction, phosphate pebble bed at base
EDISTO FORMATION	30-38	Calcarenite, dominantly fine-grained, light-brown, abundant oyster and bryozoan fragments, calcite-cemented lumps abundant, clayey, glauconitic; bed of angular phosphate pebbles at base; *Globigerinoides trilobus* present
ASHLEY FORMATION	38-40	Calcarenite, fine-grained, medium-brown, abundant sand-size phosphate

Base of Penholoway Formation: +26 feet above sea level
Base of Edisto Formation: +18 feet above sea level
Bottomed in Ashley Formation

CC-10: 1.95 miles E of west quad.border, 1.95 miles S of north quad. border. Surface elevation 30 feet. (=AH62-77-BBH)

FILL	0-3	Road fill
LADSON FORMATION	3-10	Clay, light-gray, contains fine-grained sand, sandier toward base
ASHLEY FORMATION	10-53	Calcarenite, fine-grained, dark-olive-brown
DRAYTON LIMESTONE	53-73	Calcarenite, fine-grained, light-olive-green, contains abundant bryozoan fragments

Base of Ladson Formation: +20 feet above sea level
Base of Ashley Formation: -23 feet below sea level
Bottomed in Drayton Limestone

CC-11: 0.95 miles W of east quad.border, 2.45 miles S of north quad. border. Surface elevation 16 feet.

WANDO FM (UPPER MEM)	0-2	Sand, medium-grained, light-gray with light-orange mottles, clayey, grading down to
	2-12	Sand, fine-to coarse-grained, light-gray with light-orange mottles, poorly sorted, subrounded to subangular, granular, feldspathic
CHANDLER BRIDGE FM	at 12	Clay, medium-yellowish-brown, silty, 5 cm thick
ASHLEY FORMATION	12-20	Calcarenite, very fine-grained, medium-olive-brown, contains large foraminifera and sand-size glauconite and foraminifera; upper 10 cm contains burrows filled with fine-grained, light-gray, quartz and phosphate sand of probable Chandler Bridge lithology

Base of Wando Formation (upper member): +4 feet above sea level
Base of Chandler Bridge Formation: +4 feet above sea level
Bottomed in Ashley Formation

CC-12: 0.25 miles E of west quad.border, 1.95 miles S of north quad. border. Surface elevation 46 feet.

LADSON FORMATION	0-11	Clay, medium-reddish-orange with light-gray mottles, dense, micaceous, sandy (fine-grading down to medium-grained)
CHANDLER BRIDGE FM	11-12	Sand, fine-grained, medium-gray, silty, contains brown sand-size phosphate grains and a shark's tooth, no basal pebble bed but small brown phosphate lumps (less than 1 cm in diameter) scattered throughout
ASHLEY FORMATION	12-25	Calcarenite, very fine-grained, light-brown grading by 18 feet to medium-olive-green, contains large foraminifera

Base of Ladson Formation: +35 feet above sea level
Base of Chandler Bridge Formation: +34 feet above sea level
Bottomed in Ashley Formation

CC-13: 1.65 miles E of west quad.border, 0.55 miles N of south quad. border. Surface elevation about 20 feet. (=AH-67-77)

FILL	0-3	Road Fill
WANDO FM (UPPER MEM)	3-6	Clay, medium-gray, silty and fine-grained sandy, grading to
	6-19	Sand, medium- to coarse-grained, brownish-gray, slightly muddy, quartz granules and sparse phosphate pebbles at base
TEN MILE HILL BEDS	19-26	Sand, medium- to coarse-grained, grayish-blue-green to medium-gray, clayey, grades to fine- to medium-grained and very muddy below 22 feet, wood fragments at 22 feet, sparse phosphate pebbles about 1 cm in diameter at base
ASHLEY FORMATION	26-85	Calcarenite, fine-grained, medium-olive-brown
PARKERS FERRY FM	85-105	Calcarenite, very fine-grained, dark-yellow-green, clayey

Base of Wando Formation (upper member): +1 foot above sea level
Base of Ten Mill Hill beds: -6 feet below sea level
Base of Ashley Formation: -65 feet below sea level
Bottomed in Parkers Ferry Formation

CC-14: 0.85 miles E of west quad.border, 0.65 miles N of south quad. border. Surface elevation about 22 feet (=COT-NE-1-H)

WANDO FM (UPPER MEM)	0-13	Sand, coarse-grained, light-yellowish-brown grading to medium-orange in basal foot, clean
TEN MILE HILL BEDS	13-23	Clay, dark-gray grading rapidly down to medium-gray, sticky, soft at top but denser downward
ASHLEY FORMATION	23-120	Calcarenite, fine-grained, medium-olive-green to medium-olive-brown, abundant sand-size phosphate between 23 and 45 feet

Base of Wando Formation (upper member): +9 feet above sea level
Base of Ten Mile Hill beds: -1 foot below sea level
Bottomed in Ashley Formation

CC-15: 0.5 miles E of west quad.border, 0.4 miles N of South quad. border. Surface elevation about 21 feet. (=COT-NE-2-H)

WANDO FM (UPPER MEM)	0-18	Sand, coarse- to very coarse-grained, light-gray grading in basal few feet to medium-brown, fairly clean, woody in basal few feet
ASHLEY FORMATION	18-110	Calcarenite, fine-grained, medium-olive-brown to medium-olive-green, scattered sand-size phosphate and phosphate nodules, basal five feet contains abundant phosphate pebbles and quartz sand
PARKERS FERRY FM	110-115	Calcilutite, light-olive-green, stiff

Base of Wando Formation (upper member): +3 feet above sea level
Base of Ashley Formation: -89 feet below sea level
Bottomed in Parkers Ferry Formation

CC-16: 1.1 miles E of west quad.border, 0.95 miles N of south quad. border. Surface elevation about 24 feet. (=COT-NE-3-H)

FILL	0-3	Road fill
WANDO FM (UPPER MEM)	3-5	Clay, light-gray, fine-grained sandy, contains phosphate pebbles
ASHLEY FORMATION	5-155	Calcarenite, fine-grained, light-yellowish-brown (5-10) grading to medium-olive-brown and medium-olive-green, phosphate sand abundant from 28 to 38 feet, clayey from 51-142

Base of Wando Formation (upper member): +19 feet above sea level
Bottomed in Ashley Formation

CC-17: 1.35 miles E of west quad.border, 1.2 miles N of south quad. border. Surface elevation about 26 feet. (=COT-NE-4-H)

FILL	0-2	Road fill
TEN MILE HILL BEDS	2-4	Sand, coarse-grained, light-gray, clayey, contains phosphate pebbles
CHANDLER BRIDGE FM	4-6	Clay, light-gray, no basal coarse bed
ASHLEY FORMATION	6-100	Calcarenite, fine-grained, dark-olive-brown (6-14) grading to medium-olive-brown, contains scattered phosphate pebbles, clayey from 25-31 feet

Base of Ten Mile Hill beds: +22 feet above sea level
Base of Chandler Bridge Formation: +20 feet above sea level
Bottomed in Ashley Formation

CC-18: 0.6 miles E of west quad.border, 0.2 miles N of south quad. border. Surface elevation 22 feet (= GL5 = COT-NE-5-H)

FILL	0-3	Road fill
WANDO FM (UPPER MEM)	3-5	Clay, brownish-black to black, silty
	5-19	Sand, coarse-grained, medium-olive-gray, slightly muddy at top but cleaner downward, very coarse-grained to conglomeratic at base
ASHLEY FORMATION	19-98	Calcarenite, fine-grained, medium-olive-brown, contains quartz and phosphate sand, very sparse phosphate pebbles at base
PARKERS FERRY FM	98-105	Calcilutite, medium-olive-green, very stiff

Base of Wando Formation (upper member): +3 feet above sea level
Base of Ashley Formation: -76 feet below sea level
Bottomed in Parkers Ferry Formation

CC-19: 0.45 miles E of west quad.border, 0.15 miles N of south quad. border. Surface elevation 21 feet.(= GL-6)

FILL	0-3	Road fill
WANDO FM (UPPER MEM)	3-8	Clay, silty and sandy, to sand, medium-grained, clayey and silty, brownish-black, abundant phosphate pebbles at base
ASHLEY FORMATION	8-55	Calcarenite, fine-grained, medium-olive-brown, abundant quartz and phosphate sand below 37 feet
PARKERS FERRY FM	55-65	Calcilutite, grayish-green

Base of Wando Formation (upper member): +13 feet above sea level
Base of Ashley Formation: -34 feet below sea level
Bottomed in Parkers Ferry Formation

CC-20: 2.7 miles W of east quad.border, 3.1 miles N of south quad. border. Surface elevation 19 feet (= GL-1).

FILL	0-2.5	Road fill
WANDO FM (UPPER MEM)	2.5-21	Sand, medium-grained rapidly grading down to coarse-grained, brownish-black (2.5-5) grading through brownish-gray (5-8.5) and pinkish-gray (8.5-15) back to brownish-gray, muddy, clay stringers at 8.5, pebbly at base
ASHLEY FORMATION	21-41	Calcarenite, fine-grained, medium-olive-brown, contains phosphate sand, very phosphatic at base
DRAYTON LIMESTONE	41-46	Calcilutite, grayish-green, shelly

Base of Wando Formation (upper member): -2 feet below sea level
Base of Ashley Formation: -22 feet below sea level
Bottomed in Drayton Limestone

CC-21: 1.65 miles W of east quad.border, 4.2 miles N of south quad. border. Surface elevation 18 feet. (=GL-2)

FILL	0-1	Road fill
WANDO FM (UPPER MEM)	1-14	Sand, coarse-grained to very coarse-grained, dark-yellowish-orange with red and gray mottles in upper foot, fairly well sorted, phosphate pebble bed in basal foot
ASHLEY FORMATION	14-52	Calcarenite, fine-grained, dark-yellow grading to light-olive by 17 feet, contains phosphate sand, clayey below 35 feet, phosphate pebbles up to 4 cm in diameter in basal 2 feet
PARKERS FERRY FM	52-70	Calcarenite, very fine-grained, grayish-green, very clayey

Base of Wando Formation (upper member): +4 feet above sea level
Base of Ashley Formation: -34 feet below sea level
Bottomed in Parkers Ferry Formation

CC-22: 0.7 miles W of east quad.border, 1.6 miles N of south quad. border. Surface elevation 16 feet. (= GL-3)

FILL	0-1	Road fill
WANDO FM (UPPER MEM)	1-8	Clay, medium-gray with dark-yellowish-orange mottles, silty and sandy becoming sandier downward
	8-10	Sand, fine-grained, light-gray, muddy
ASHLEY FORMATION	10-42	Calcarenite, fine-grained, yellowish-gray and light-olive-brown grading down to medium-olive-brown, sand-size phosphate and phosphate nodules up to 3 cm in diameter present in basal 2 feet
PARKERS FERRY FM	42-58	Calcarenite, very fine-grained, grayish-green, very clayey

Base of Wando Formation (upper member): +6 feet above sea level
Base of Ashley Formation: -26 feet below sea level
Bottomed in Parkers Ferry Formation

CC-23: 2.3 miles E of west quad.border, 0.5 miles N of south quad. border. Surface elevation 18 feet. (=AH-66-77)

FILL	0-3	Road fill
WANDO FM (UPPER MEM)	3-24	Sand, medium-grained (3-8) grading through fine- to medium-grained (8-10) and then to medium- to coarse- grained, medium-gray (3-8) grading through light-olive-gray (8-10), and brownish-gray (10-18) to grayish-blue-green, muddy; woody at 9 feet; clay interbeds present from 20-24
ASHLEY FORMATION	24-54	Calcarenite, fine-grained, medium-olive-brown, contains sand-size phosphate, phosphate pebbles 1-3 cm in diameter in basal foot
PARKERS FERRY FM	54-85	Calcarenite, very fine-grained, grayish-green, very clayey

Base of Wando Formation (upper member): -6 feet below sea level
Base of Ashley Formaton: -36 feet below sea level
Bottomed in Parkers Ferry Formation

CC-24: 2.3 miles E of west quad.border, 2.35 N of south quad. border. Surface elevation 20 feet. (=COE-100)

FILL	0-1	Road fill
WANDO FM (UPPER MEM)	1-7	Clay, grayish-black (1-4) grading to dark-gray and light-gray mottled, silty, wood fragments common
	7-10	Sand, coarse- to very coarse-grained, medium-gray, muddy
ASHLEY FORMATION	10-48	Calcarenite, fine-grained, medium-olive-brown, sand-size phosphate abundant from 25-29, clayey from 29-35
PARKERS FERRY FM	48-55	Calcarenite, very fine-grained, light-olive, very clayey, dry and nodular

Base of Wando Formation (upper member): +10 feet above sea level
Base of Ashley Formation: -28 feet below sea
Bottomed in Parkers Ferry Formation

CC-25: 2.3 miles E of west quad.border, 3.65 miles N of south quad. border. Surface elevation 22 feet. (=COE-101)

WANDO FM (UPPER MEM)	0-15	Sand, coarse- to very coarse-grained, dark-yellowish-orange grading down to grayish-orange, muddy, conglomeratic at base with mostly quartz and some phosphate pebbles
ASHLEY FORMATION	15-53	Calcarenite, fine-grained, medium-olive-brown (15-31) grading to dark-yellow and yellowish-gray, abundant phosphate sand between 25 and 29 feet, abundant phosphate nodules up to 6 cm in diameter in basal 3 feet
PARKERS FERRY FM	53-60	Calcarenite, very fine-grained, light-olive, very clayey

Base of Wando Formation (upper member): +7 feet above sea level
Base of Ashley Formation: -31 feet below sea level
Bottomed in Parkers Ferry Formation

CC-26: 0.2 miles E of west quad.border, 0.9 miles N of south quad. border. Surface elevation 22 feet. (=AH-70-77)

FILL	0-2	Fill
WANDO FM (UPPER MEM)	2-5	Clay, medium-gray to medium-bluish-gray, silty, medium-grained sandy
	5-11	Sand, coarse- to very coarse-grained, light-brownish-gray, quartz and phosphate pebbles in basal foot
ASHLEY FORMATION	11-48	Calcarenite, fine-grained, light-olive, contains sand-size phosphate
PARKERS FERRY FM	48-70	Calcarenite, very fine-grained, dark-yellow-green, clayey

Base of Wando Formation (upper member): +11 feet above sea level
Base of Ashley Formation: -26 feet below sea level
Bottomed in Parkers Ferry Formation

CC-27: 0.2 miles E of west quad.border, 3.25 miles N of south quad. border. Surface elevation 26 feet. (= AH-68-77)

TEN MILE HILL BEDS	0-1	Sand, medium- to coarse-grained, yellowish-gray sparsely mottled with dark-yellowish-orange, very clayey
	1-16	Sand, fine-grained with a minor coarse-grained fraction grading downward through medium-grained to coarse- and very coarse-grained by base, grayish-orange-pink, silty, quartz granules and wood at base
ASHLEY FORMATION	16-45	Calcarenite, fine-grained, light-olive, phosphate pebbles up to 4 cm in diameter in basal two feet
PARKERS FERRY FM	45-68	Calcarenite, very fine-grained, dark-yellowish-green, very clayey

Base of Ten Mile Hill beds: +10 feet above sea level
Base of Ashley Formation: -19 feet below sea level
Bottomed in Parkers Ferry Formation

CC-28: 0.85 mile W of east quad. border, 0.95 mile N of south quad. border. Surface elevation 26 feet.

TEN MILE HILL BEDS	0-5	Clay, light-gray and medium-orange with sparse medium-red and meduim-yellow mottles, fine-grained sandy, sparsely micaceous
	5-11	Clay, light-yellowish-brown grading through medium-gray (6-9) and dark-purplish-gray (9-10) to medium-gray again (10-11); no basal phosphate bed
ASHLEY FORMATION	11-48	Calcarenite, fine-grained, light-yellowish-brown (11-14) grading down to light-olive-brown and light-olive-green, glauconitic and phosphatic; some phosphate pebbles at 37 feet; brown phosphate pebbles 1-3 cm in diameter, glauconitic lumps 0.5 cm in diameter, and broken fragments of thin shells are present at base
PARKERS FERRY FM	48-49	Calcilutite, light-greenish-gray, dense, sticky

Base of Ten Mile Hill beds: +15 feet above sea level
Base of Ashley Formation: -22 feet below sea level
Bottomed in Parkers Ferry Formation

CC-29: 0.5 mile W of east quad. border, 3.25 miles N of south quad. border. Surface elevation 16 feet.

WANDO FM (UPPER MEM)	0-1	Clay, sandy, medium-reddish-brown, grades to
	1-5	Sand, medium- grading down to fine-grained, medium-yellowish-orange with light-gray mottles grading down to light gray with medium-yellowish-orange mottles
	5-7	Clay, light-brownish-gray with medium-yellowish-brown mottles; laminae of very fine-grained white sand interlayered
	7-16	Sand, fine- to medium-grained, sparse coarse grains present, light-brownish-gray; gets more angular downward and coarsens through medium- to coarse-grained, poorly sorted
CHANDLER BRIDGE FM	at 16	Clay, dark-brown, greasy, layer only about 3 cm thick
ASHLEY FORMATION	16-25	Calcarenite, fine-grained, medium-olive-brown, phosphatic and glauconitic; contains calcite-cemented lumps

Base of Wando Formation (upper member): ±0 feet at sea level
Base of Chandler Bridge Formation: ±0 feet at sea level
Bottomed in Ashley Formation

CC-30: 1.7 miles W of east quad. border, 2.1 miles N of south quad. border. Surface elevation 17 feet.

WANDO FM (UPPER MEM)	0-2	Clay, dark-gray, full of round to subround light-gray phosphate pebbles 0.5-2.0 cm in diameter
	2-5	Sand, fine-grained, dark-gray, clayey; contains abundant phosphate sand and black to gray phosphate pebbles 0.5-2.0 cm in diameter
EDISTO FORMATION	5-21	Calcarenite, very fine-grained, light-grayish-yellow, partially cemented in basal two feet
ASHLEY FORMATION	21-36	Calcarenite, fine-grained, medium-olive-brown, phosphatic and glauconitic, basal foot contains shell fragments and 0.5 cm diameter phosphate pebbles
PARKERS FERRY FM	36-41	Calcisiltite, light-olive-green, clayey, dense, very sticky; cut surfaces take a polish

Base of Wando Formation (upper member): +12 feet above sea level
Base of Edisto Formation: -4 feet below sea level
Base of Ashley Formation: -19 feet below sea level
Bottomed in Parkers Ferry Formation

CC-31: 3.2 miles E of west quad. border, 3.75 miles S of north quad. border. Surface elevation 22 feet.

FILL	0-1	Fill
WANDO FM (UPPER MEM)	1-6	Clay, very dark-gray, peaty, greasy, stiff, sticky; some root fragments present; no basal phosphate bed, basal 2 cm dark-brown
ASHLEY FORMATION	6-23	Calcarenite, fine-grained, medium-olive-brown, glauconitic and phosphatic; large foraminifera present; scattered phosphate pebbles present from 18-23 feet
DRAYTON LIMESTONE	23-41	Calcarenite, fine-grained, light-olive-green, clayey, very large foraminifera present

Base of Wando Formation (upper member): +16 feet above sea level
Base of Ashley Formation: -1 foot below sea level
Bottomed in Drayton Limestone

CC-32: 2.05 miles E of west quad. border, 2.8 miles S of north quad. border. Surface elevation 28 feet.

TEN MILE HILL BEDS	0-5	Clay, light-gray, medium-orange, and dark-red mottled (0-2 feet) grading through medium-orange with light-gray mottles (2-4 feet) to light-gray (4-5 feet), very dry, very crumbly
	5-10	Clay, fine-grained sandy, grading through sand, fine-grained, clayey, to sand, fine-grained; poorly sorted, light-brown
ASHLEY FORMATION	10-12	Sand, very fine- to fine-grained, light-brown, silty, grades rapidly to
	12-25	Calcarenite, fine-grained, light-brown (12-15 feet) grading down to medium-olive-brown (15-25 feet); contains large foraminifera

Base of Ten Mile Hill beds: +18 feet above sea level
Bottomed in Ashley Formation

CC-33: 2.3 miles W of east quad. border, 2.55 miles S of north quad. border. Surface elevation 22 feet.

WANDO FM (UPPER MEM)	0-11	Sand, coarse-grained, medium-purplish-brown grading down to light-brown (0-5 feet) and then medium-orangish-brown below that, poorly sorted, feldspathic and micaceous; 0.5 cm diameter quartz pebbles and 0.5-2.0 cm diameter black phosphate pebbles, rounded to subangular, present at base
TEN MILE HILL BEDS	11-12	Clay, medium-gray, interlaminated with well sorted fine-grained sand
ASHLEY FORMATION	12-20	Calcarenite, fine-grained, light-brown (12-13 feet) grading down to medium-olive-brown (13-20 feet), sparsely glauconitic; a few large foraminifera present

Base of Wando Formation (upper member): +11 feet above sea level
Base of Ten Mile Hill beds: +10 feet above sea level
Bottomed in Ashley Formation

CC-34: 1.55 miles E of west quad. border, 1.8 miles S of north quad. border. Surface elevation 43 feet.

LADSON FORMATION	0-1	Soil, black at top grading down to light-gray, fine-grained sandy
	1-5	Clay, medium-reddish-orange, medium-yellow, and light-gray grading down to medium-orange and light-gray, fine-grained sandy, dense
	5-13	Sand, fine- grading down to coarse-grained, light-orangish-brown; subrounded, 1-3 cm diameter quartz and phosphate pebbles present in basal two feet
EDISTO FORMATION	13-20	Calcarenite, very fine- to fine-grained, light-yellowish-brown to light-brown; bryozoan and shell fragments common; no basal phosphate bed
ASHLEY FORMATION	20-25	Calcarenite, fine-grained, medium-olive-brown; upper foot burrowed and burrows filled with matrix from overlying Edisto Formation

Base of Ladson Formation: +30 feet above sea level
Base of Edisto Formation: +23 feet above sea level
Bottomed in Ashley Formation

CC-35: 0.2 mile E of west quad. border, 0.4 mile N of south quad. border. Surface elevation 22 feet (=GS-1).

FILL	0-2.5	Sand, medium-grained, muddy, wood and red plastic at base
WANDO FM (UPPER MEM)	2.5-15	Sand, medium-grained, muddy, bluish-black to medium-gray, coarsens rapidly at base to
	15-16	Sand, very coarse-grained, granular, medium-gray
ASHLEY FORMATION	16-49	Calcarenite, no detailed log kept, notes indicate unit was part of NP24 at 45 feet
PARKERS FERRY FM?	49-68	No detailed log kept, notes indicate unit was part of NP20 at 53 feet

Base of Wando Formation (upper member): +6 feet above sea level
Bae of Ashley Formation: -27 feet below sea level
Bottomed in Parkers Ferry Formation?

CC-36: 3.15 miles E of west quad. border, 1.7 miles N of south quad. border. Surface elevation 18 feet (=GS-3).

FILL	0-1	Road base
WANDO FM (UPPER MEM)	1-9	Clay, sandy, grading down to sand, muddy, brownish-black to brownish-gray, phosphate pebbles abundant in basal 2 feet
ASHLEY FORMATION	9-43	Calcarenite, no detailed logs kept, notes indicate unit was part of NP24 at 40 feet
PARKERS FERRY FM?	43-85	No detailed logs kept, notes indicate unit was part of NP 20 at 46 feet

Base of Wando Formation (upper member): +9 feet above sea level
Base of Ashley Formation: -25 feet below sea level
Bottomed in Parkers Ferry Formation?

JOHNS ISLAND QUADRANGLE

(Depths in feet)

JI-1: 3.7 miles W of east quad. border, 0.4 miles S of north quad. border. Surface elevation about 8 feet (river bluff).

WANDO FM (UPPER MEM)	0-3	Sand, medium-grained, light-yellowish-orange, contains lumps and boulders of phosphate-rock along basal contact
ASHLEY FORMATION	3-13	Calcarenite, fine-grained, medium-olive-brown, contains abundant quartz and phosphate sand, sparse shells and bones (exposed to low tide level)

Base of Wando Formation (upper member): +5 feet above sea level
Bottom of section in Ashley Formation

JI-2: 2.7 miles E of west quad. border, 0.1 mile S of north quad. border. Surface elevation 10 feet (river bluff).

WANDO FM (UPPER MEM)	0-6	Sand, medium-grained, light-yellowish-orange, numerous lumps and boulders of phosphate along basal surface
ASHLEY FORMATION	6-15	Calcarenite, fine-grained, medium-olive-brown, quartzose and phosphatic (exposed to low tide level)

Base of Wando Formation (upper member): +4 feet above sea level
Bottom of section in Ashley Formation

JI-3: 0.8 miles E of west quad. border, 4.15 miles N of south quad. border. Surface elevation 10 feet.

WANDO FM (UPPER MEM)	0-12	Clay, medium-gray and medium-orange mottled, silty, micaceous
	12-19	Clay, dark-gray, soft and poorly compacted, micaceous, contains wood fragments, numerous lumps of phosphate in basal foot
ASHLEY FORMATION	19-35	Calcarenite, fine-grained, medium-olive-brown, contains quartz and phosphate sand

Base of Wando Formation (upper member): -9 feet below sea
Bottomed in Ashley Formation

JI-4: 3.2 miles E of west quad. border, 2.9 miles S of north quad. border. Surface elevation 13 feet.

WANDO FM (UPPER MEM)	0-8	Sand, fine-grained, white, slightly clayey, many phosphate lumps in basal foot
ASHLEY FORMATION	8-41	Calcarenite, fine-grained, medium-olive-brown, very phosphatic, phosphate lumps in basal foot. Some calcareous nodules and foraminifera scattered throughout; weathered in upper few feet
PARKERS FERRY FM	41-45	Calcilutite, light-greenish-gray, contains numerous delicate unfluted echinoid stems

Base of Wando Formation (upper member): +5 feet above sea level
Base of Ashley Formation: -28 feet below sea level
Bottomed in Parkers Ferry Formation

JI-5: 2.4 miles E of west quad. border, 0.75 miles S of north quad. border. Surface elevation 34 feet.

TEN MILE HILL BEDS	0-13	Sand, fine-grained, medium-yellow to white, clay stringer at 10 feet
	13-22	Sand, coarse-grained grading down to medium-grained, medium-orangish-red, muscovitic in upper half, phosphate lumps in basal foot
ASHLEY FORMATION	22-45	Calcarenite, fine-grained, medium-olive-brown, quartz and phosphate grains present, calcareous consolidated lumps present, sparse phosphate pebble bed at base
PARKERS FERRY FM	45-60	Calcarenite, fine-grained, light-greenish-gray, dense, grainy; no echinoid spines; sparse phosphate pebbles at base?
	60-80	Calcarenite, very fine-grained, light-greenish-gray, dense, sticky

Base of Ten Mile Hill beds: +12 feet above sea level
Base of Ashley Formation: -11 feet below sea level
Bottomed in Parkers Ferry Formation

JI-6: 1.8 miles S of north quad. border, 3.45 miles W of east quad. border. Surface elevation 10 feet.

FILL	0-7	Sand, fine-grained, carbonaceous; metal scraps scattered throughout
PARKERS FERRY FM	7-25	Calcilutite, light-gray, grading down to light-brown; calcareous lumps, oysters and echinoid fragments present

Bottomed in Parkers Ferry Formation

JI-7: 1.55 miles W of east quad. border, 3.6 miles S of north quad. border. Surface elevation 12 feet (Mark Clark Expressway borrow pit)

WANDO FM (UPPER MEM)	0-10	Sand, fine-grained, light-yellow, well sorted, very fine-grained heavies abundant
(MIDDLE MEM)	10-12	Sand, fine-grained, medium-blue, very shelly (*Mulinia* in this unit have an average aloisoleucine/isoleucine (alo/ile) ratio of 0.43); phosphate pebble bed at base; shells in life position at upper contact are partly eroded off at contact
(LOWER MEM)	12-13.5	Sand, fine-grained, medium-blue, very shelly, phosphate pebble bed at base; *Mulinia* in this unit have an average alo/ile value of 0.47
GOOSE CREEK LIMESTONE	13.5-14	Calcarenite, fine-grained, light-yellowish-brown, loose, *Amusium mortoni* and *Argopecten eboreus* present; occurs only in small patchy lenses, elsewhere absent; where present, phosphate pebbles and rock phosphate bed at base
ASHLEY FORMATION	14-19	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate sand present

Base of Wando Formation (upper member): +2 feet above sea level
Base of Wando Formation (middle member):-1.5 feet below sea level
Base of Wando Formation (lower member): -2 feet below sea level
Base of Goose Creek Limestone: -2 feet below sea level
Bottomed in Ashley Formation

JI-8: 0.8 miles W of east quad. border, 0.05 miles N of south quad. border. Surface elevation 5 feet.

SILVER BLUFF BEDS	0-3	Sand, fine-grained, light-orangish-red
	3-8	Sand, fine-grained, light-orange, slightly silty, well sorted, very fine-grained heavies abundant
WANDO FM (UPPER MEM)	8-21	Silt, medium-blue, sandy to clay, silty; Contains fine-grained mica and shells
	21-26	Sand, coarse-grained, medium-blue, angular, phosphate pebble bed at base
ASHLEY FORMATION	26-35	Calcarenite, fine-grained, medium-olive-brown, dense, contains quartz and phosphate sand grains

Base of Silver Bluff beds: -3 feet below sea level
Base of Wando Formation (upper member): -21 feet below sea level
Bottomed in Ashley Formation

JI-9: 1.05 miles E of west quad. border, 4.35 miles N of south quad. border. Surface elevation 12 feet.

WANDO FM (UPPER MEM)	0-10	Sand, fine-grained, medium-yellowish-orange, clayey and silty, dense
	10-12	Gravel, full of phosphate pebbles and cobbles
ASHLEY FORMATION	12-20	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate sand present

Base of Wando Formation (upper member): ±0 feet below sea level
Bottomed in Ashley Formation

JI-10: 2.5 miles E of west quad. border, 3.45 miles S of north quad. border. Surface elevation 15 feet.

WANDO FM (UPPER MEM)	0-9	Sand, fine-grained, medium-orange grading down to medium-yellow, tightly packed; very fine-grained heavies abundant; coarsens to base
GOOSE CREEK LIMESTONE	9-12	Calcarenite, fine-grained, light-yellowish-brown, loose, very phosphatic, Argopecten eboreus present, phosphate pebble bed at base
ASHLEY FORMATION	12-15	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate grains present

Base of Wando Formation (upper member): +6 feet above sea level
Base of Goose Creek Limestone: +3 feet above sea level
Bottomed in Ashley Formation

JI-11: 0.4 miles E of west quad. border, 1.25 miles N of south quad. border. Surface elevation 13 feet.

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, medium-orange mottled medium-gray, clayey, a few coarse grains present
	5-11	Sand, fine-grained, light-yellow grading down to sand, medium-grained, light-gray, angular
	11-15	Sand, fine-grained, medium-orange, well sorted, very fine-grained heavies abundant
	15-17	Sand, medium-grained, medium-orange, poorly sorted, subangular to rounded, gradational from above
	17-25	Sand, fine-grained, light-yellowish-orange, well sorted,very fine-grained heavies abundant, sparse small phosphate pebbles at base
EDISTO FORMATION	25-27	Calcarenite, fine-grained, light-brown, full of fine-grained phosphate sand, fairly dense. Phosphate pebble bed at base
ASHLEY FORMATION	27-35	Calcarenite, very fine-grained, light-olive-gray, full of calcareous lumps, oyster shell near top, contains quartz and phosphate sand

Base of Wando Formation (upper member): -12 feet below sea level
Base of Edisto Formation: -14 feet below sea level
Bottomed in Ashley Formation

JI-12: 1.7 miles E of west quad. border, 0.75 miles N of south quad. border. Surface elevation 21 feet.

WANDO FM (UPPER MEM)	0-3	Sand, fine-grained, medium-yellowish-brown, loose, well sorted
	3-6	As above but dark-brown, humate-rich
	6-15	Sand, fine-grained, light-gray, loose, well sorted, micaceous; very fine-grained heavies abundant; some silt and rare clay blebs present
	15-20	Sand, fine-grained, medium-bluish-gray, silty, clay lenses present
	20-30	As above but shelly, phosphate pebble bed at base
ASHLEY FORMATION	30-35	Calcarenite, fine-grained, medium-olive-brown, dense, lumpy, sparse quartz sand, much phosphate sand; large foraminifera present

Base of Wando Formation (upper member): -9 feet below sea level
Bottomed in Ashley Formation

JI-13: 3.05 miles E of west quad. border, 0.9 miles N of south quad. border. Surface elevation 10 feet.

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, medium-orange and medium-gray mottled, clayey, tough
	5-9	Sand, fine-grained, light-gray, silty
	9-13	Sand, fine-grained, medium-gray; silty, very fine-grained heavies abundant
	13-18	As above but shelly
	18-25	Sand, medium-grained, medium-gray, silty, shelly, very fine-grained heavies abundant; phosphate pebble bed at base
ASHLEY FORMATION	25-30	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate sand grains present as well as large foraminifera

Base of Wando Formation (upper member): -15 feet below sea level
Bottomed in Ashley Formation

JI-14: 2.95 miles W of east quad. border, 0.05 miles N of south quad. border. Surface elevation 10 feet.

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, medium-yellow grading down to light-gray, well sorted, very fine-grained heavies abundant
	5-17	Sand, fine-grained, medium-gray, well sorted, micaceous, very fine-grained heavies abundant
	17-18	Sand, medium-grained, black, angular, poorly sorted
(MIDDLE MEM)	18-31	Sand, fine-grained, medium-gray, silty, occasional clay lenses; very shelly (*Anadara brasiliana*, *Chione*, etc.); gets more clayey downward; phosphate pebble bed at base
ASHLEY FORMATION	31-35	Calcarenite, fine-grained, medium-olive-brown, dense; quartz and phosphate sands scattered throughout; foraminifera present

Base of Wando Formation (upper member): -8 feet below sea level
Base of Wando Formation (middle member): -21 feet below sea level
Bottomed in Ashley Formation

JI-15: 1.8 miles W of east quad. border, 0.95 miles N of south quad. border. Surface elevation 5 feet.

SILVER BLUFF BEDS	0-4	Clay, medium-orange, fine-grained sandy
WANDO FM (UPPER MEM)	4-8	Sand, fine-grained, light-gray, well sorted, micaceous
	8-9	As above but grades rapidly to medium-gray
	9-17	Sand, fine-grained, dark-gray, silty interbedded with clay, fine-grained sandy; grades down to silty clay
	17-21	Silt, dark-gray, clayey, very shelly (Dinocardium, Polinices, Anadara brasiliana, etc.), phosphate pebble bed at base
ASHLEY FORMATION	21-23	Calcarenite, fine-grained, light-brown, dense and very calcareous
	23-25	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate sand scattered throughout

Base of Silver Bluff beds: +1 foot above sea level
Base of Wando Formation (upper member): -16 feet below sea level
Bottomed in Ashley Formation

JI-16: 3.1 miles E of west quad. border, 3.55 miles N of south quad. border. Surface elevation 15 feet.

WANDO FM (UPPER MEM)	0-5	Clay, medium-gray and medium-orange mottled, sandy, tough
	5-10	Sand, fine-grained, medium-gray, silty, loose
(MIDDLE MEM)	10-21	Clay, medium-gray, silty, sticky, shelly (Olivella, Dinocardium, Mulinia, etc.) small phosphate pebbles at base
ASHLEY FORMATION	21-25	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate sand present

Base of Wando Formation (upper member): +5 feet above sea level
Base of Wando Formation (middle member) -6 feet below sea level
Bottomed in Ashley Formation

JI-17: 1.45 miles E of west quad. border, 2.7 miles N of south quad. border. Surface elevation 9 feet.

MINE SPOIL	0-5	Sand, fine-grained, light-gray; shelly in upper 3 feet and phosphate pebbles and quartz granules in 3-5 foot interval
WANDO FM (UPPER MEM)	5-15	Sand, medium-grained, medium-gray, clayey and silty, poorly sorted, coarse fraction angular, sparse phosphate pebble bed at base
ASHLEY FORMATION	15-20	Calcarenite, fine-grained, medium-olive-brown, dense, some quartz and much phosphate sand

Base of Wando Formation (upper member): -6 feet below sea level
Bottomed in Ashley Formation

JI-18: 0.7 miles W of east quad. border, 2.45 miles N of south quad. border. Surface elevation 14 feet.

WANDO FM (UPPER MEM)	0-3	Sand, fine-grained, medium-orangish-red, well sorted
	3-7	Sand, fine-grained, light-gray, well sorted, silty, very fine-grained heavies abundant
	7-18	As above except medium-gray, shelly
	18-28	Sand, fine-grained, medium-gray, silty interbedded with clay, medium-gray, sticky, shelly throughout; angular phosphate pebble bed at base
ASHLEY FORMATION	28-35	Calcarenite, fine-grained, medium-olive-brown, grading down to medium-olive-green, dense; quartz and phosphate sand and large foraminifera present

Base of Wando Formation (upper member): -14 feet below sea level
Bottomed in Ashley Formation

JI-19: 2.1 miles W of east quad. border, 3.75 miles N of south quad. border. Surface elevation 20 feet.

WANDO FM (UPPER MEM)	0-15	Sand, fine-grained, well sorted, medium-orange at top grading to medium-gray by 3 feet down, very fine-grained heavies abundant, some mica present
	15-15.5	Clay, medium-blue
	15.5-23	Sand, fine-grained, well sorted, medium-gray, micaceous; contains abundant very fine-grained heavies
	23-26	Sand, as above except shelly and with a few clay lenses
	26-28	Clay, medium-gray, shelly
	28-33	Sand, fine-grained, silty, interbedded with clay, both medium-gray, both shelly
	33-35	Clay, sandy, medium-gray, many phosphate lumps
ASHLEY FORMATION	35-40	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate grains present, foraminifera; contains calcite-cemented lumps

Base of Wando Formation (upper member): -15 feet below sea level
Bottomed in Ashley Formation

JI-20: 2.8 miles W of east quad. border, 3.35 miles S of north quad. border. Surface elevation 14 feet.

WANDO FM (UPPER MEM)	0-4	Clay, medium-orange and medium-gray mottled, sandy
	4-6	Sand, fine-grained, medium-gray, silty, interbedded with clay, medium-gray, shelly
	6-18	Sand, fine-grained, medium-gray, silty and clayey inter-beds, shelly
	18-20	As above but with many pebbles of phosphate
ASHLEY FORMATION	20-25	Calcarenite, fine-grained, medium-olive-brown, dense, quartz and phosphate and foraminifera and glauconite sand grains present

Base of Wando Formation (upper member): -6 feet below sea level
Bottomed in Ashley Formation

JI-21: 0.5 miles W of east quad. border, 3.95 miles N of south quad. border. Surface elevation 21 feet.

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, medium-brown, well sorted micaceous, humate-rich
	5-27	As above but with abundant very fine-grained heavies
	27-31	Sand, fine-grained, well sorted, medium-gray, interbedded with clay, medium-gray
	31-36	Sand, fine-grained, well sorted, medium-gray, very fine-grained heavies abundant
	36-50	Sand, fine-grained, well sorted, medium-gray, interbedded with clay, medium-gray, dense
	50-58	As above but shelly
	58-59	Phosphate pebble bed
ASHLEY FORMATION	59-65	Calcarenite, fine-grained, medium-olive-brown, dense; quartz and phosphate sand grains present; large foraminifera present

Base of Wando Formation (upper member): -38 feet below sea level
Bottomed in Ashley Formation

JI-22: 2.3 miles N of south quad. border, 2.9 miles W of east quad. border. Surface elevation 8 feet.

WANDO FM (UPPER MEM)	0-2	Sand, fine-grained, light-gray, well sorted, loose
	2-7	Clay, dark-gray to black, humic, stiff and dense
(MIDDLE MEM)	7-14	Sand, fine-grained, dark-gray, well sorted
	14-17	As above but shelly
	17-19	Clay, dark-gray, sandy, shelly, contains numerous phosphate pebbles
ASHLEY FORMATION	19-20	Calcarenite, fine-grained, medium-olive-brown, dense, quartzose and very phosphatic

Base of Wando Formation (upper member) +1 feet below sea level
Base of Wando Formation (middle member): -11 feet below sea level
Bottomed in Ashley Formation

JI-23: 0.02 miles E of west quad. border, 3.75 miles S of north quad. border. Surface elevation 9 feet.

HOLOCENE BEDS	0-1	Sand, very fine-grained, white, loose (dune sand?)
SILVER BLUFF BEDS	1-5	Clay, fine-grained sandy, medium-gray with medium-orange mottles
	5-12	As above but contains large phosphate lumps, some of which are internal molds of clams
ASHLEY FORMATION	12-30	Calcarenite, fine-grained, medium-olive-brown, dense, contains large foraminifera; quartz and phosphate grains and some calcite-cemented lumps present

Base of Holocene beds: +8 feet above sea level
Base of Silver Bluff beds: -3 feet below sea level
Bottomed in Ashley Formation

JI-24: 0.2 miles W of east quad. border, 2.15 miles S of north quad. border. Surface elevation 30 feet.

WANDO FM (LOWER MEM)	0-4	Sand, fine-grained, light-orange, well sorted, sparse very fine-grained heavies present
	4-6	As above but dark-brown, humic
	6-15	Sand, fine-grained, light-brown, well sorted, micaceous, very fine-grained heavies abundant
	15-23	As above but medium-gray
	23-28	As above but shelly, mostly Mulinia but Tellina, Dinocardium, Mercenaria, Dosinia, Anadara brasiliana, Polinices and sand dollar fragments also present; diversity increases downward
	28-30	As above, but matrix mostly silt
	30-32	Clay, medium-gray, soft, shelly
DANIEL ISLAND BEDS	32-37	Clay, medium-gray, stiff, unfossiliferous
	37-38	As above, but sandy and with many phosphate lumps
GOOSE CREEK LIMESTONE	38-41	Calcarenite, fine-grained, light-brownish-gray, very phosphatic, loose; Argopecten eboreus present
ASHLEY FORMATION	41-50	Calcarenite, fine-grained, medium-olive-brown, dense; quartz and phosphate sand present; foraminifera present; upper foot burrowed, with above lithology and phosphate pebbles filling burrows

Base of Wando Formation (lower member): -2 feet below sea level
Base of Daniel Island beds: -8 feet below sea level
Base of Goose Creek Limestone: -11 feet below sea level
Bottomed in Ashley Formation

JI-25: 0.65 miles S of north quad. border, 3.1 miles W of east quad. border. Surface elevation 26 feet.

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, light-orange, well sorted
	5-14	As above but very fine-grained heavies present and sporadic coarse sand grains
ASHLEY FORMATION	14-25	Calcarenite, fine-grained, medium-olive-brown, dense; foraminifera, phosphate and quartz sand present; upper foot burrowed, with Pleistocene shells and sand filling the burrows

Base of Wando Formation (upper member): +12 feet above sea level
Bottomed in Ashley Formation

JI-26: 0.3 miles W of east quad. border, 0.6 miles S of north quad. border. Surface elevation 30 feet.

WANDO FM (LOWER MEM)	0-5	Sand, fine-grained, dark-brown, well sorted, humate-rich
	5-19	Sand, fine-grained, dark-brown grading rapidly down to medium-gray, micaceous, fine-grained heavies present
	19-20	As above but shelly
	20-24	Clay, medium-gray, sparsely shelly
	24-26	Silt, medium-gray, soft, shelly
	26-28	Clay, medium-gray
	28-32	Silt, medium-gray
	32-34.5	As above, but contains abundant phosphate pebbles
GOOSE CREEK LIMESTONE	34.5-35	Calcarenite, fine-grained, light-brownish-gray, loose, contains Amusium mortoni fragments; fills burrows penetrating underlying unit
ASHLEY FORMATION	35-45	Calcarenite, fine-grained, medium-olive-brown, dense, large foraminifera and quartz grains abundant, sparse phosphate grains present

Base of Wando Formation (lower member): -4.5 feet below sea level
Base of Goose Creek Limestone: -5 feet below sea level
Bottomed in Ashley Formation

JI-27: 2.85 miles E of west quad. border, 3.1 miles N of south quad. border. Surface elevation 7 feet.

SILVER BLUFF BEDS	0-7	Sand, medium- to coarse-grained, light-brownish-orange and light-gray mottled, clayey
WANDO FM (UPPER MEM)	7-14	Sand, fine-grained, medium-bluish-gray, clayey, shelly (Mulinia, Anadara ovalis, Noetia ponderosa, Busycon, etc.), shells quite lustrous, phosphate pebble bed at base
ASHLEY FORMATION	14-40	Calcarenite, fine-grained, light-brown rapidly grading down to medium-olive-brown; phosphate and quartz sand present; phosphate pebble bed at base
PARKERS FERRY FM	40-55	Calcarenite, very fine-grained, medium-greenish-gray, foraminifera present, no quartz or phosphate sand

Base of Silver Bluff beds:	±0 feet at sea level
Base of Wando Formation (upper member):	-7 feet below sea level
Base of Ashley Formation:	-33 feet below sea level

Bottomed in Parkers Ferry Formation

JI-28: 1.6 miles E of west quad. border, 1.9 miles N of south quad. border. Surface elevation 12 feet.

WANDO FM (UPPER MEM)	0-12	Sand, fine- to medium-grained, light-brown in upper two feet and light-brown, medium-yellowish-orange and light-gray mottled below that, clayey, thin medium-gray clay lens at base
	12-22	Sand, medium-grained, medium-yellow, very fine-grained heavies abundant, phosphate pebble bed at base
ASHLEY FORMATION	22-56	Calcarenite, fine-grained, medium-yellowish-greenish-gray, sparse phosphate sand and more abundant quartz sand
PARKERS FERRY FM	56-60	Calcilutite, medium-yellowish-green, dense, stiff

Base of Wando Formation (upper member): -10 feet below sea level
Base of Ashley Formation: -44 feet below sea level
Bottomed in Parkers Ferry Formation

JI-29: 2.9 miles E of west quad. border, 4.15 miles S of north quad. border. Surface elevation 12 feet.

WANDO FM UPPER MEM)	0-8	Sand, fine-grained, medium-yellowish-orange and light-gray mottled grading down to light-gray, clayey matrix
	8-13	Sand, medium-grained, light-gray, shelly (Mulinia, Astarte, etc.), phosphate pebbles abundant in basal foot
ASHLEY FORMATION	13-62	Calcarenite, fine-grained, medium-olive-brown; quartz and phosphate sand present, becoming very abundant near base

Base of Wando Formation (upper member): -1 foot below sea level
Bottomed in Ashley Formation

JI-30: 3.35 miles W of east quad. border, 0.2 miles S of north quad. border. Surface elevation 10 feet.

FILL	0-2	Sand, medium-grained, medium-brown, road fill
MINE SPOIL	2-5	Soil underlain by light-gray mine spoil rich in phosphate lumps
ASHLEY FORMATION	5-36	Calcarenite, fine-grained, medium-olive-brown, contains sparse quartz and phosphate sand; sparse phosphate pebbles at base
PARKERS FERRY FM	36-45	Calcilutite, medium-greenish-gray, contains echinoid spines

Base of Wando Formation: formerly +5 feet above sea level
Base of Ashley Formation: -26 feet below sea level
Bottomed in Parkers Ferry Formation

JI-31: 1.9 miles E of west quad. border, 1.95 miles S of north quad. border. Surface elevation 13 feet.

WANDO FM (UPPER MEM)	0-5	Sand, medium-grained, medium-orange grading down through medium-gray to light-gray, phosphate lumps in basal two feet
ASHLEY FORMATION	5-47	Calcarenite, fine-grained, medium-olive-brown, quartz and phosphate sand abundant, especially near base
PARKERS FERRY FM	47-65	Calcarenite, very fine-grained, medium-greenish-gray, contains foraminifera

Base of Wando Formation (upper member): +8 feet above sea level
Base of Ashley Formation: -34 feet below sea level
Bottomed in Parkers Ferry Formation

JI-32: 2.2 miles W of east quad. border, 2.6 miles N of south quad. border. Surface elevation 8 feet.

FILL	0-2	Fill
SILVER BLUFF BEDS	2-5	Sand, fine-grained, light-orangish-brown and medium-gray mottled, well sorted, micaceous, slightly silty
WANDO FM (UPPER MEM)	5-21	Sand, fine-grained grading down to medium-grained, dark-gray, silty, micaceous; includes a few thin clay lenses; shelly below 13 feet (Olivella, Mulinia, Anadara ovalis, Polinices, oyster, etc.); phosphate pebble bed at base
ASHLEY FORMATION	21-30	Calcarenite, fine-grained, medium-olive-brown; contains quartz and phosphate-sand and calcite-cemented lumps

Base of Silver Bluff beds: +3 feet above sea level
Base of Wando Formation (upper member): -13 feet below sea level
Bottomed in Ashley Formation

JI-33: 1.45 miles W of east quad. border, 1.9 miles N of south quad. border. Surface elevation 6 feet.

FILL	0-2	Fill
HOLOCENE BEDS	2-6	Peat, dark-brown, clayey, odiferous
WANDO FM (UPPER MEM)	6-20	Sand, medium-grained, medium-gray, silty, well sorted
	at 20	Clay, medium-gray, sandy, 5 cm thick
	20-23	Sand, coarse-grained, medium-gray, contains lumps of phosphate
ASHLEY FORMATION	23-30	Calcarenite, fine-grained, medium-olive-brown; contains abundant quartz and phosphate sand and calcite-cemented lumps

Base Holocene beds: ±0 feet above sea level
Base of Wando Formation (upper member): -17 feet below sea level
Bottomed in Ashley Formation

JI-34: 0.85 miles E of west quad. border, 0.95 miles S of north quad. border. Surface elevation 20 feet.

WANDO FM (UPPER MEM)	0-8	Sand, fine-grained, well-sorted, medium-yellowish-orange grading down to medium-gray, phosphate lumps 1-2 cm in diameter at base
ASHLEY FORMATION	8-33	Calcarenite, fine-grained, medium-olive-brown, contains quartz and phosphate sand and calcite-cemented lumps
PARKERS FERRY FM	33-50	Calcilutite, medium-greenish-gray, dense

Base of Wando Formation (upper member): +12 feet above sea level
Base of Ashley Formation: -13 feet below sea level
Bottomed in Parkers Ferry Formation

JI-35: 1.35 miles E of west quad. border, 0.45 miles N of south quad. border. Surface elevation 22 feet.

WANDO FM (UPPER MEM)	0-15	Sand, fine-grained, dark-brown grading down through medium-yellowish-brown to medium-dark-gray, well sorted, muscovitic
	15-21	Sand, medium-grained, dark-gray, silty, muscovitic, very fine-grained heavies abundant
	21-22	Clay, medium-gray, sticky
	22-39	Sand, fine- to medium-grained, medium-gray, muscovitic, phosphatic, medium-grained and shelly in basal 9 feet; phosphate pebble bed at base
ASHLEY FORMATION	39-67	Calcarenite, fine-grained, medium-yellowish-brown, shelly, very phosphatic; grades downward to a medium-greenish-gray
PARKERS FERRY FM	67-75	Calcilutite to calcarenite, very fine-grained, medium-olive-brown, shelly, contains echinoid spines, very sticky

Base of Wando Formation (upper member): -17 feet below sea level
Base of Ashley Formation: -45 feet below sea level
Bottomed in Parkers Ferry Formation

JI-36: 3.05 miles E of west quad. border, 1.85 miles S of north quad. border. Surface elevation 24 feet.

WANDO FM (UPPER MEM)	0-9	Sand, fine-grained, grading down to medium-grained, medium-orange grading through light-brown to medium-gray, well sorted; phosphate pebble bed at base
(MIDDLE MEM)	9-13	Clay, medium-orange and medium-gray mottled, contains oysters in basal two feet
(LOWER MEM)	13-19	Sand, medium-grained, medium- to light-gray; phosphate pebble bed at base with pebbles up to 5 cm in diameter and also shark teeth and quartz granules
ASHLEY FORMATION	19-25	Calcarenite, fine-grained, light-brown grading down to medium-olive-brown, very phosphatic, contains calcite-cemented lumps

Base of Wando Formation (upper member): +15 feet above sea level
Base of Wando Formation (middle member): +11 feet above sea level
Base of Wando Formation (lower member): +5 feet above sea level
Bottomed in Ashley Formation

JI-37: 3.36 miles W of east quad. border, 2.3 miles S of north quad. border. Surface elevation 22 feet.

WANDO FM (UPPER MEM)	0-8	Sand, fine- to medium-grained, medium-gray grading down through medium-gray and medium-orange mottled to white, micaceous; contains psuedoplinthite, very fine-grained heavies abundant
	8-12	Sand, medium- to coarse-grained, bright medium-orange, muscovitic, contains sand-size phosphate
(MIDDLE MEM)	12-24	Clay, medium-bluish-gray, sandy, shelly, (mostly *Mulinia* and *Anadara ovalis* at top, oysters present below 14 feet)
(LOWER MEM)	24-26	Sand, coarse-grained, medium-bluish-gray, shelly, contains numerous phosphate pebbles up to 3 cm in diameter
PARKERS FERRY FM	26-30	Calcilutite, light-green, stiff, contains echinoid spines

Base of Wando Formation (upper member): +10 feet above sea level
Base of Wando Formation (middle member): -2 feet below sea level
Base of Wando Formation (lower member): -4 feet below sea level
Bottomed in Parkers Ferry Formation

JI-38: 3.35 miles W of east quad. border, 2.8 miles S of north quad. border. Surface elevation 11 feet

WANDO FM (UPPER MEM)	0-6	Sand, fine- to medium-grained, medium-brown, medium-orange and light-gray mottled, clayey, micaceous
	6-9	Sand, medium-grained, light-brown, silty, shelly (*Mulinia*, *Anadara ovalis*, *Noetia ponderosa*, oysters); contains phosphate lumps
ASHLEY FORMATION	9-29	Calcarenite, fine-grained, light-brown grading down to medium-olive-brown, very phosphatic; numerous large foraminifera and sparse shells present; phosphate pebbles up to 5 cm in diameter present at base
PARKERS FERRY FM	29-35	Calcilutite, medium-greenish-gray, dense, sticky, contains numerous echinoid spines

Base of Wando Formation (upper member): +2 feet above sea level
Base of Ashley Formation: -18 feet below sea level
Bottomed in Parkers Ferry Formation

JI-39: 0.25 miles W of east quad. border, 3.8 miles N of south quad. border. Surface elevation 21 feet.

WANDO FM (UPPER MEM)	0-15	Sand, fine- to medium-grained, dark-brownish-black, muscovitic, humic, well sorted
	15-30	Sand, fine-grained, medium-gray, muscovitic, phosphatic, silty
	30-37	Clay, sticky, and sand, fine-grained, interbedded, grading down to sand, medium-grained, silty, medium-gray, shelly (*Mulinia*, *Anadara*, sparse oysters), phosphate pebble bed at base
ASHLEY FORMATION	37-50	Calcarenite, fine-grained, light-yellowish-brown grading down through medium-olive-brown back to light-yellowish-brown, phosphatic; calcite-cemented lumps at 44 feet

Base of Wando Formation (upper member): -16 feet below sea level
Bottomed in Ashley Formation

JI-40: 2.55 miles W of east quad. border, 2.6 miles S of north quad. border. Surface elevation 5 feet.

FILL	0-4	Fill
WANDO FM (UPPER MEM)	4-9	Sand, fine- to medium-grained, light-orange, medium-brown and light-gray mottled, clayey
	at 9	Clay, medium-blue, stiff, 5 cm thick layer
	9-15	Sand, fine- to medium-grained, medium- to light-gray, silty, shelly in basal two feet, phosphate pebble bed at base
ASHLEY FORMATION	15-28	Calcarenite, fine-grained, medium-olive-brown, contains large foraminifera, sparse shell fragments, and occasional lumps of phosphate about 5 cm in diameter
PARKERS FERRY FM	28-35	Calcilutite, medium-greenish-gray, silty, contains echinoid spines

Base of Wando Formation (upper member): -10 feet below sea level
Base of Ashley Formation: -23 feet below sea level
Bottomed in Parkers Ferry Formation

JI-41: 3.05 miles E of west quad. border, 2.7 miles S of north quad. border. Surface elevation 10 feet.

MINE SPOIL	0-3	Mine spoil
ASHLEY FORMATION	3-52	Calcarenite, fine-grained, medium-yellowish-brown, contains abundant foraminifera, phosphate sand, sparse shells, and calcite-cemented lumps; phosphate lumps up to 10 cm in diameter present along basal contact and burrows penetrate underlying unit
PARKERS FERRY FM	52-55	Calcilutite, medium-greenish-gray, very dense, sticky, contains echinoid spines

Base of mine spoil: +7 feet above sea level
Base of Ashley Formation: -42 feet below sea level
Bottomed in Parkers Ferry Formation

JI-42: 3.15 miles W of east quad. border, 3.7 miles N of south quad. border. Surface elevation 5 feet.

FILL	0-4	Road fill
HOLOCENE BEDS	4-7	Clay, dark-gray, sticky, greasy, humic, wood fragments at base, probably compacted during road construction
SILVER BLUFF BEDS	7-12	Clay, medium- to light-bluish-gray and dark-green, dense, sticky; small, sparse phosphate pebbles at base
ASHLEY FORMATION	12-63	Calcarenite, fine-grained, medium-olive-brown; contains quartz and phosphate sand; phosphate pebble bed at base
PARKERS FERRY FM	63-65	Calcilutite, medium-greenish-gray, dense, contains echinoid spines

Base of Holocene beds: -2 feet below sea level
Base of Silver Bluff beds: -7 feet below sea level
Base of Ashley Formation: -58 feet below sea level
Bottomed in Parkers Ferry Formation

JI-43: 2.0 miles W of east quad. border, 0.7 miles S of north quad. border. Surface elevation about 13 feet (excavation pit).

WANDO FM (UPPER MEM)	0-4	Sand, medium-grained, medium-orangish-yellow, clean, well sorted, contains sparse oyster shells near base
	4-5	Boulders, up to 1 meter in length, coarse sand and pebble matrix, bones, teeth, boulders composed of phosphatized Edisto Formation with numerous voids formed by bivalve molds
PENHOLOWAY FORMATION	5-6	Sand, medium-grained, medium-orangish-yellow, contains numerous shells, all badly deteriorated
ASHLEY FORMATION	6-8	Calcarenite, fine-grained, medium-olive-brown, contains quartz and phosphate sand

Base of Wando Formation (upper member): +8 feet above sea level
Base of Penholoway Formation: +7 feet above sea level
Base of section in Ashley Formation

JI-44: 1.95 miles W of east quad. border, 0.75 miles S of north quad. border. Surface elevation about 13 feet (excavation pit).

WANDO FM (UPPER MEM)	0-4	Sand, medium-grained, medium-orangish-yellow, clean, well sorted, contains sparse oyster shells near base
	4-5	Boulders, up to 1 meter in length, coarse sand and pebble matrix, bones, teeth (including Carcharodon carcharias); boulders composed of phosphatized Edisto Formation with numerous voids formed by bivalve molds
CHANDLER BRIDGE FM	5-6	Sand, fine-grained, medium-gray, silty, contains skeletons of porpoises and turtles
ASHLEY FORMATION	6-8	Calcarenite, fine-grained, medium-olive-brown, contains quartz and phosphate sand

Base of Wando Formation (upper member): +8 feet above sea level
Base of Chandler Bridge Formation: +7 feet above sea level
Basse of section in Ashley Formation

JI-45: 1.1 miles E of west quad. border, 2.0 miles N of south quad. border. Surface elevation about 8 feet. (= AH-63-77)

FILL	0-1	Fill
SILVER BLUFF BEDS	1-7	Clay, medium-greenish-gray with mottles and streaks of light-brown
WANDO FM (UPPER MEM)	7-26	Sand, fine- to medium-grained, medium-greenish-gray grading down to medium-dark-gray, clayey and silty, becoming cleaner downward; basal phosphate pebble bed present with 1-2 cm pebbles
ASHLEY FORMATION	26-50	Calcarenite, fine-grained, light-olive; quartz and phosphate sand present; more phosphatic toward base
PARKERS FERRY FM	50-75	Calcilutite, medium-greenish-gray

Base of Silver Bluff beds: +1 foot above sea level
Base of Wando Formation (upper member): -18 feet below sea level
Base of Ashley Formation: -42 feet below sea level
Bottomed in Parkers Ferry Formation

JI-46: 2.8 miles E of west quad. border, 1.4 miles N of south quad. border. Surface elevation about 13 feet (= AH-64-77)

FILL	0-1	Fill
WANDO FM (UPPER MEM)	1-6	Sand, medium-grained, dark-yellowish-orange, sharp contact at base
(MIDDLE MEM)	6-25	Clay, medium-light-bluish-gray, with some lenses of silt and fine-grained sand, micaceous; sparsely shelly below 16 feet (Donax, etc.)
	25-28	Sand, medium- to coarse-grained, shelly, contains lumps of phosphate up to 4 cm in diameter
ASHLEY FORMATION	28-45	Calcarenite, dark-greenish-yellow; contains quartz and phosphate sand; very shelly in basal 3 feet
PARKERS FERRY FM	45-55	Calcilutite, light-greenish-gray

Base of Wando Formation (upper member): +7 feet above sea level
Base of Wando Formation (middle member): -15 feet below sea level
Base of Ashley Formation: -32 feet below sea level
Bottomed in Parkers Ferry Formation

JI-47: 2.85 miles W of east quad. border, 2.3 miles N of south quad. border. Surface elevation 7 feet (= JOI-3-H).

FILL	0-5	Fill
WANDO FM (UPPER MEM)	5-24	Sand, fine-grained, clayey interbedded with clay, sandy, medium-gray, soft, very shelly (Donax, Mercenaria, etc); phosphate pebble bed at base
ASHLEY FORMATION	24-50	Calcarenite, fine-grained, medium-olive-brown; quartz sand present but phosphate sand sparse to absent

Base of Wando Formation (upper member): -17 feet below sea level
Bottomed in Ashley Formation

JI-48: 1.15 miles W of east quad. border, 3.6 miles S of north quad. border. Surface elevation 7 feet (= JOI-5-H).

SILVER BLUFF BEDS	0-8	Clay, medium-red and medium-gray mottled grading down to medium-brown, stiff
	8-10	Clay, light-gray, soft and fine-grained sand interbedded
WANDO FM (UPPER MEM)	10-13	Sand, fine-grained, light brown
	13-17	Sand, medium- to coarse-grained, muddy, dark-gray
(MIDDLE MEM)	17-22	Clay, medium-bluish-green, sandy, occasional shells
ASHLEY FORMATION	22-70	Calcarenite, fine-grained, medium-olive-green; quartz and phosphate sand present; phosphate increasingly abundant downward
PARKERS FERRY FM	70-80	Calcilutite, light-greenish-gray

Base of Silver Bluff beds: -3 feet below sea level
Base of Wando Formation (upper member): -10 feet below sea level
Base of Wando Formation (middle member): -15 feet below sea level
Base of Ashley Formation: -63 feet below sea level
Bottomed in Parkers Ferry Formation

JI-49: 2.9 miles W of east quad. border, 4.3 miles S of north quad. border. Surface elevation 7 feet.

SILVER BLUFF BEDS	0-5	Clay, light-gray, very stiff
WANDO FM (UPPER MEM)	5-13	Clay, medium-gray, soft, shelly, sandy at base
ASHLEY FORMATION	13-45	Calcarenite, fine-grained, medium-olive-brown, quartz and phosphate sand present, phosphate increases downward
PARKERS FERRY FM	45-50	Calcilutite, medium-greenish-gray, soft, crumbly

Base of Silver Bluff beds: +2 feet above sea level
Base of Wando Formation (upper member): -6 feet below sea level
Base of Ashley Formation: -38 feet below sea level
Bottomed in Parkers Ferry Formation

JI-50: 3.1 miles W of east quad. border, 2.1 miles S of north quad. border. Surface elevation 13 feet (= JOI-1-H).

WANDO FM (UPPER MEM)	0-12	Sand, fine-grained, light-brown except for top 3 feet which are oxidized medium-gray and medium-red, clayey, phosphate pebble bed at base
ASHLEY FORMATION	12-33	Calcarenite, fine-grained, medium-olive-brown, contains some quartz and abundant phosphate sand
	33-35	Gravel, composed of phosphate pebbles
PARKERS FERRY FM	35-45	Calcilutite, greenish-olive-brown, stiff

Base of Wando Formation (upper member): +1 foot above sea level
Base of Ashley Formation: -22 feet below sea level
Bottomed in Parkers Ferry Formation

JI 51: 3.0 miles W of east quad. border, 2.0 miles S of north quad. border. Surface elevation 8 feet (= JOI-101).

WANDO FM (UPPER MEM)	0-7	Sand, fine- to medium-grained, dark-yellowish-orange, muddy, abundant large phosphate pebbles at base
ASHLEY FORMATION	7-25	Calcarenite, fine-grained, medium-olive-brown, abundant sand-size phosphate and some quartz sand; phosphate pebble bed at base
PARKERS FERRY FM	25-30	Calcilutite, light-green to light-bluish-green

Base of Wando Formation (upper member): +1 foot below sea level
Base of Ashley Formation: -17 feet below sea level
Bottomed in Parkers Ferry Formation

JI-52: 2.65 miles W of east quad. border, 1.6 miles S of north quad. border. Surface elevation 5 feet (= JOI-100).

FILL	0-8	Fill
HOLOCENE BEDS	8-14	Clay, medium-grayish-blue to grayish-blue-green, silty, sticky
	14-16	Peat, strong odor of H_2S
WANDO FM (UPPER MEM)	16-27	Sand, coarse-grained, medium-grayish-orange grading rapidly down to medium-bluish-gray, muddy at top but cleaner downward; quartz granules up to 4 mm in diameter present but no phosphate
PARKERS FERRY FM	27-101	Calcarenite, very fine-grained, grading to calcilutite, light-green

Base of Holocene beds: -11 feet below sea level
Base of Wando Formation (upper member): -22 feet below sea level
Bottomed in Parkers Ferry Formation

JI-53: 2.5 miles W of east quad. border, 1.5 miles S of north quad. border. Surface elevation 10 feet (= JOI-102).

WANDO FM (LOWER MEM)	0-3	Sand, medium-grained, dark-yellowish-orange, muddy, phosphate pebble bed at base, pebbles up to 2 cm in diameter
ASHLEY FORMATION	3-8	Calcarenite, fine-grained, medium-olive-brown, very phosphatic; phosphate pebbles up to 1 cm in diameter at base
PARKERS FERRY FM	8-15	Calcilutite, medium-greenish-gray, and light-olive-brown mottled, silty

Base of Wando Formation (lower member): +7 feet above sea level
Base of Ashley Formation: +2 feet above sea level
Bottomed in Parkers Ferry Formation

JI-54: 2.1 miles W of east quad. border, 1.5 miles S of north quad. border. Surface elevation 25 feet (= JOI-103).

WANDO FM (LOWER MEM)	0-10	Sand, fine-grained, medium-orangish-gray grading down to medium-yellowish-gray, slightly silty, micaceous; phosphate pebble bed at base with pebbles up to 4 cm in diameter
ASHLEY FORMATION	10-57	Calcarenite, fine-grained, medium-olive-brown; contains abundant quartz and phosphate sand; pebble bed at base with pebbles up to 4 cm in diameter
PARKERS FERRY FM	57-70	Calcilutite, light-olive, silty

Base of Wando Formation (lower member): +15 feet above sea level
Base of Ashley Formation: -32 feet below sea level
Bottomed in Parkers Ferry Formation

JI-55: 1.5 miles W of east quad. border, 1.3 miles S of north quad. border. Surface elevation 33 feet (= JOI-104).

FILL	0-1	Fill
WANDO FM (LOWER MEM)	1-11	Sand, fine- to medium-grained, light-brown grading through orangish-gray and pinkish-gray to yellowish-gray, silty, slightly clayey, becomes better sorted downward
	11-23	Clay, silty and sandy, grading down rapidly to sand, fine- to medium-grained, medium-bluish-gray, micaceous; shelly below 15 feet; indurated phosphate pebble bed in basal two feet
ASHLEY FORMATION	23-79	Calcarenite, fine-grained, medium-olive-brown, quartzose and phosphatic; sparse mollusk fragments present; very phosphatic in basal 3 feet
PARKERS FERRY FM	79-80	Calcilutite, medium-olive-brown, silty, no phosphate

Base of Wando Formation (lower member): +10 feet above sea level
Base of Ashley Formation: -46 feet below sea level
Bottomed in Parkers Ferry Formation

JI-56: 2.05 miles W of east quad. border, 2.0 miles S of north quad. border. Surface elevation 6 feet (= JOI-2-H).

SILVER BLUFF BEDS	0-5	Clay, medium- to dark-gray, sandy, stiff
ASHLEY FORMATION	5-42	Calcarenite, fine-grained, medium-olive-brown; contains quartz and phosphate sand; numerous phosphate pebbles in basal two feet
PARKERS FERRY FM	42-45	Calcilutite, light-greenish-gray, stiff, sticky

Base of Silver Bluff beds: +1 foot above sea level
Base of Ashley Formation: -36 feet below sea level
Bottomed in Parkers Ferry Formation

JI-57: 0.65 mile W of east quad. border, 1.55 miles S of north quad. border. Surface elevation 10 feet

WANDO FM (UPPER MEM)	0-7	Sand, medium-grained, light-yellow and light-gray mottled(0-2) grading down through bright medium-orange (2-5) to medium-gray; clayey in upper two feet; shelly in basal two feet
(LOWER MEM)	7-10	Clay, light-blue, dense, medium-grained sandy; no phosphate pebbles at base
GOOSE CREEK LIMESTONE	10-14	Calcarenite, medium-grained, light-yellowish-brown, soft, very phosphatic; phosphate pebble bed at base
ASHLEY FORMATION	14-20	Calcarenite, fine-grained, medium-olive-brown, quartzose and phosphatic

Base of Wando Formation (upper member): +3 feet above sea level
Base of Wando Formation (lower member): ±0 feet at sea level
Base of Goose Creek Limestone: -4 feet below sea level
Bottomed in Ashley Formation

JI-58: 1.25 miles W of east quad. border, 2.25 miles S of north quad. border. Surface elevation 10 feet.

WANDO FM (UPPER MEM)	0-8	Sand, fine-grained, light-yellow grading down to medium-gray, clayey
(LOWER MEM)	8-12	Clay, dark-gray, silty, shelly (*Anadara*, *Mulinia*, etc.)
	12-15	Clay, medium-bluish-gray, stiff, sandy, sparsely shelly; no phosphate pebble bed at base
GOOSE CREEK LIMESTONE	15-17	Calcarenite, medium-grained, light-yellowish-brown; hard phosphate pebble bed at base
ASHLEY FORMATION	17-20	Calcarenite, fine-grained, medium-olive-brown, quartzose and phosphatic

Base of Wando Formation (upper member): +2 feet above sea level
Base of Wando Formation (lower member): -5 feet below sea level
Base of Goose Creek Limestone: -7 feet below sea level
Bottomed in Ashley Formation

JI-59: 1.75 miles W of east quad. border, 0.05 mile N of south quad. border. Surface elevation 7 feet.

SILVER BLUFF BEDS	0-11	Sand, fine-grained, medium- reddish-brown and medium-gray mottled (0-5) grading down to medium-gray, clayey and silty, well sorted, micaceous
	11-12	Clay, medium-gray
WANDO FM (UPPER MEM)	12-24	Sand, medium-grained, medium-gray, well sorted, phosphatic; shells and phosphate pebbles in basal foot
ASHLEY FORMATION	24-30	Calcarenite, fine-grained, medium-olive-brown, quartzose but not very phosphatic

Base of Silver Bluff beds: -5 feet below sea level
Base of Wando Formation (upper member): -17 feet below sea level
Bottomed in Ashley Formation

JI-60: 3.3 miles E of west quad. border, on the south quad. border. Surface elevation 15 feet.

WANDO FM (UPPER MEM)	0-6	Sand, medium-grained but with a minor coarse fraction, light-brown and light-gray mottled, bimodally well sorted; very fine-grained heavies abundant
	6-17	Sand, medium-grained, light-orangish-brown
	17-30	Sand, medium-grained, medium-bluish-gray, micaceous; gets finer (but still medium-grained) down to 27 feet, then coarsens below that; phosphate pebbles up to 5 cm in diameter at base
ASHLEY FORMATION	30-34	Calcarenite, fine-grained, light-brown with calcite-cemented lumps grading down to medium-olive-brown and phosphatic, lumps of phosphate at base
PARKERS FERRY FM	34-35	Calcilutite, light-greenish-gray, contains echinoid spines

Base of Wando Formation (upper member): -15 feet below sea level
Base of Ashley Formation: -19 feet below sea level
Bottomed in Parkers Ferry Formation

JI-61: 3.55 miles W of east quad. border, 1.4 miles N of south quad. border. Surface elevation 7 feet.

SILVER BLUFF BEDS	0-7	Sand, fine-grained, medium-reddish-brown and medium-gray mottled, well sorted, silty
	7-8	Clay, medium-gray
WANDO FM (UPPER MEM)	8-23	Sand, medium-grained, medium-gray, phosphatic; shelly (oyster, Mulinia, etc) but most are broken to a shell hash; coarsens downward; phosphate pebbles at base
ASHLEY FORMATION	23-40	Calcarenite, medium-yellowish-brown, sparsely phosphatic; contains large foraminifera and sparse thin shell fragments

Base of Silver Bluff beds: -1 foot below sea level
Base of Wando Formation (upper member): -16 feet below sea level
Bottomed in Ashley Formation

JI-62: 1.9 miles W of east quad. border, 2.2 miles N of south quad. border. Surface elevation 11 feet.

FILL	0-1	Road fill
WANDO FM (UPPER MEM)	1-8	Sand, fine-grained grading down to medium-grained, medium-orange grading down through light-yellow to medium-blue (5-8), well sorted; very fine-grained heavies abundant
	8-9	Clay, medium-blue
	9-29	Sand, medium-grained, medium-blue, shelly
ASHLEY FORMATION	29-52	Calcarenite, fine-grained, medium-olive-brown, quartzose and slightly phosphatic

Base of Wando Formation (upper member): -18 feet above sea level
Bottomed in Ashley Formation

JI-63: 0.3 mile W of east quad. border, 4.15 miles S of north quad. border. Surface elevation 18 feet.

WANDO FM (UPPER MEM)	0-20	Sand, fine-grained, light-orange (0-3) grading through light-brownish-gray (3-10) to medium-gray (10-20), well sorted, micaceous, clayey below 10 feet; pseudoplinthite in upper three feet; very fine-grained heavies abundant below three feet
	20-22	Clay, medium-gray
	22-30	Sand, fine-grained, medium-gray, shelly; sparse phosphate pebbles at basal contact
ASHLEY FORMATION	30-50	Calcarenite, fine-grained, medium-olive-brown

Base of Wando Formation (upper member): -12 feet below sea level
Bottomed in Ashley Formation

Osborn Quadrangle

(Depths in feet)

OS-1: 1.15 miles W of east quad. border, 4.0 miles N of south quad. border. Surface elevation 13 feet (type section for Drayton Limestone).

WANDO FM	0-23	Sands and clays, not logged
ASHLEY FORMATION	23-59	Calcarenite, fine-grained, medium-olive-brown, sand-size phosphate locally abundant, large foraminifera present
DRAYTON LIMESTONE	59-91	Calcarenite, medium-grained, white grading down to light-brown, largely composed of fragments of bryozoans
	91-115	Calcisiltite, medium-greenish-gray, massive, contains occasional echinoid spines, phosphate pebble bed at base
PARKERS FERRY FM	115-227	Calcilutite, light-olive, mostly unconsolidated but contains occasional 1-2 inch thick semi-indurated layers, phosphate pebble bed at base
HARLEYVILLE FORMATION	227-255	Calcarenite, fine-grained, light-yellowish-olive; phosphate pebble bed at base
SANTEE GROUP	255-446	(not logged in detail)
BLACK MINGO GROUP	446-480	(not logged in detail)

Base of Wando Formation:	-10 feet below sea level
Base of Ashley Formation:	-46 feet below sea level
Base of Drayton Limestone:	-102 feet below sea level
Base of Parkers Ferry Formation:	-214 feet below sea level
Base of Harleyville Formation:	-242 feet below sea level
Base of Santee Limestone:	-433 feet below sea level

Bottomed in Black Mingo Group

OS-2: 0.75 miles E of west quad. border, 1.4 miles S of north quad. border. Surface elevation 42 feet.

FILL	0-1	Road fill
LADSON FORMATION	1-5	Clay, dark-reddish-orange with medium-gray mottles (1-3) grading to medium-brownish-gray with medium-orange mottles, silty, very fine-grained sandy
	5-8	Silt, medium-brownish-orange with a medium-reddish-brown zone at base, clayey, micaceous
	8-17	Clay, light-gray, stiff, basal 3 feet has abundant fine-to coarse-grained sand and quartz granules
	17-34	Sand, coarse-grained, light-orange grading down to light-gray, poorly sorted, feldspathic, pebbly and subangular near base
MARKS HEAD FORMATION	34-39	Sand, fine-grained, grayish-olive (10 Y 4/2), silty, less than 1 mm diameter mica-like flakes present, contains shark teeth and teleost teeth (Cybrium, etc.), phosphate pebbles abundant near base
ASHLEY FORMATION	39-40	Calcarenite, very fine-grained, light-olive-gray, contains fragments of thin shells

Base of Ladson Formation: +8 feet above sea level
Base of Marks Head Formation: +3 feet above sea level
Bottomed in Ashley Formation

OS-3: 1.1 miles W of east quad. border, 2.0 miles N of south quad. border. Surface elevation 50 feet.

TEN MILE HILL BEDS	0-53	Sand, very fine- to fine-grained, light-yellowish-brown (0-3) grading through medium-brownish-gray (3-5), light-brownish-gray (5-26), and light-gray (26-38) to medium-gray, less well-sorted below 42 feet; 1 inch thick light-gray clay lense at 21 feet; 1 inch thick dark-gray clay lense at 34 feet; 1 inch thick medium-gray clay lense at 50 feet; very fine-grained heavies abundant; 1-2 mm mica flakes present; becomes very clayey below 50 feet and grades to
	53-57	Clay, dark-gray, sticky, micaceous, sparsely shelly, phosphate pebbles at base
ASHLEY FORMATION	57-60	Calcarenite, very fine-grained, medium-olive-brown

Base of Ten Mile Hill beds: -7 feet below sea level
Bottomed in Ashley Formation

OS-4: 1.45 miles W of east quad. border, 0.65 miles N of south quad. border. Surface elevation 39 feet.

TEN MILE HILL BEDS	0-31	Sand, fine-grained, light- and medium-orange (0-3) grading through light-brownish-gray (3-12) to medium-gray; very fine-grained heavies abundant below 3 feet; micaceous, silty below 12 feet; indurated calcarenite lumps in basal foot but no phosphate
RAYSOR FORMATION	31-35	Calcarenite, medium-grained, greenish-gray (5 GY 6/1), very loose on stem, pecten and echinoid fragments present, phosphate pebble bed at base
MARKS HEAD FORMATION	35-55	Sand, fine-grained, olive gray (5 Y 3/2) to moderate-olive-brown (5 Y 4/4) grading to mostly olive gray by 40 feet, less than 1 mm, mica-like flakes abundant, upper foot burrowed and burrows filled with above lithology

Base of Ten Mile Hill beds: +8 feet above sea level
Base of Raysor Formation: +4 feet above sea level
Bottomed in Marks Head Formation

OS-5: 1.6 miles E of west quad. border, 0.2 miles N of south quad. border. Surface elevation 31 feet.

TEN MILE HILL BEDS	0-3	Clay, light-reddish-orange and light-gray mottled, fine-grained sandy, grading down to
	3-10	Sand, very fine-grained, light-gray, silty and clayey, grades rapidly to
	10-20	Sand, fine- to coarse-grained, light-brown grading down to medium-gray, poorly sorted, subangular, silty matrix, quartz granules and clay lumps come in below 14 feet, grades to
	20-24	Sand, fine-grained, medium-gray, silty, grades to
	24-26	Silt, medium-gray, fine-grained sandy, grades to
	26-28	Sand, fine-grained, medium-gray, silty
	at 28	Clay, dark-gray, greasy, about 1 inch thick layer
	28-38	Sand, fine-grained, medium-gray, poorly sorted with a few subangular coarse grains present, grades downward to coarse-grained, poorly sorted and very silty
	38-40	Clay, dark-gray, greasy
	40-43	Sand, fine- to coarse-grained, dark-gray, very poorly sorted
MARKS HEAD FORMATION	43-50	Sand, fine-grained, medium-olive-brown, grainy; contains sparse shell fragments (oyster, pecten); phosphate sand and lumps abundant at 48-49, 49-50 clayey and not calcareous

Base of Ten Mile Hill beds: -12 feet below sea level
Bottomed in Marks Head Formation

OS-6: 1.65 miles E of west quad. border, 3.1 miles N of south quad. border. Surface elevation 32 feet.

TEN MILE HILL BEDS	0-5	Clay, dark-reddish-orange with light-gray mottles grading down to dark-orange with more abundant light-gray mottles, sandy, stiff
	5-20	Sand, fine-grained, light-brownish-gray, abundant very fine-grained heavies, silty, contains a minor bimodal fraction of coarse-grained sand, coarsens to medium-grained by 18 feet and basal few inches are coarse-grained and subangular
LADSON FORMATION	20-26	Clay, dark-gray, micaceous, grading down to fine-grained sand; very hard bed at base but no recovery, possibly a large block of detrital rock phosphate was present and pushed aside during drilling.
MARKS HEAD FORMATION	26-31	Sand, fine-grained, dark-olive-brown, very calcareous, shelly with pecten fragments recognizable; contains lower Miocene microfauna
EDISTO FORMATION?	at 31	Impenetrable hard bed; possibly the top of phosphatized or lithified Edisto Formation but no recovery

Base of Ten Mile Hill Beds: +12 feet above sea level
Base of Ladson Formation: +6 feet above sea level
Base of Marks Head Formation: +1 foot above sea level?
Bottomed on Edisto Formation?

OS-7: 3.2 miles W of east quad. border, 3.95 miles N of south quad. border. Surface elevation 28 feet.

TEN MILE HILL BEDS	0-1	Soil, dark-gray, humic
	1-2	Clay, dark-brownish-gray and medium-yellowish-orange mottled, slightly sandy, grades to
	2-5	Clay, medium-gray mottled medium-orange, increasingly sandy downward
	5-13	Silt, light-greenish-gray, fine-grained sandy, grading to medium- to coarse-grained and subangular sandy below 8 feet, a few dark-green clay lumps present between 7-10 feet, grades to
	13-17	Sand, coarse-grained, light-greenish-gray grading to light-bluish-gray, light-greenish-gray and medium-orange mottled, very silty, thin lenses of sandy clay present
	17-27	Clay, light-bluish-gray to light-greenish-gray, micaceous, contains fine-grained sand-filled burrows and stiff clay lumps
	27-30	Gravel, phosphate pebble bed
MARKS HEAD FORMATION	30-46	Sand, fine-grained, medium-brown grading down to dark-brown, very calcareous and phosphatic; bed of black, subrounded, about 1 cm diameter phosphate pebbles at base
EDISTO FORMATION	46-46.5	Calcarenite, fine-grained, light-gray; this lithology and phosphate pebbles fill burrows into underlying unit
ASHLEY FORMATION	46.5-50	Calcarenite, fine-grained, medium-yellowish-olive-brown, very phosphatic

Base of Ten Mile Hill beds: -2 feet below sea level
Base of Marks Head Formation: -18 feet below sea level
Base of Edisto Formation: -18.5 feet below sea level
Bottomed in Ashley Formation

OS-8: 0.5 miles E of west quad. border, 3.75 miles S of north quad. border. Surface elevation 32 feet.

TEN MILE HILL BEDS	0-5	Clay, light-yellowish-orange and medium-yellowish-orange, siltier and sandier toward base
	5-10	Sand, light-orange, medium- to coarse-grained, subangular, poorly sorted, contains lenses of dense, light-greenish-gray clay
	10-23	Clay, light-greenish-gray (10-10.25) grading through light-orange, medium-orange and light-greenish-gray mottled (10.25-11.5) to light-bluish-green mottled medium-brownish-orange (11.5-15) then to light-bluish-gray and light-greenish-gray with dark-greenish-gray hard lumps (15-19) and finally to dark-bluish-gray and dark-greenish-gray, a few layers of fine-grained sand present, phosphate pebble bed at base
MARKS HEAD FORMATION	23-28	Sand, fine- to medium-grained, light-olive-gray (5 Y 5/2) to grayish-olive-(10 Y 4/2), salt and pepper textured ("salt" = quartz, "pepper" = phosphate and glauconite); scattered sharks teeth (*Myliobatis*) and (*Hemipristis*, *Sphyrna*?), ray teeth (*Myliobatis*) and well-rounded small quartz pebble present; basal 1 inch rich in phosphate and contains a few chalky white shell fragments
ASHLEY FORMATION	28-30	Calcarenite, very fine-grained, medium-olive-brown, denser and more clayey than above; contains calcite-cemented lumps in lower foot

Base of Ten Mile Hill beds: +9 feet above sea level
Base of Marks Head Formation: +4 feet above sea level
Bottomed in Ashley Formation

OS-9: 1.35 miles W of east quad. border, 0.3 miles S of north quad. border. Surface elevation 31 feet.

TEN MILE HILL BEDS	0-7	Silt, clayey, grading through fine-grained silty and clayey sand to medium-grained and finally coarse-grained subangular silty and clayey sand, medium-reddish-orange with light-gray mottles
	7-18	Clay, light-gray, dense; contains medium-green very dense lumps at about 12 feet
	18-20	Clay, medium-orange grading down to medium-bluish-green, sparse phosphate pebbles at base
MARKS HEAD FORMATION	20-23	Sand, medium-grained, medium-brownish-gray, salt and pepper textured, soft, contains shark teeth (Galeocerdo) and phosphatized internal molds of clams
ASHLEY FORMATION	23-57	Calcarenite, very fine-grained, medium-olive-brown, dense, slightly clayey; contains large foraminifera and sparse phosphate and glauconite sand, basal 3 feet rich in glauconite and phosphate sand and phosphate pebbles
DRAYTON LIMESTONE	57-60	Calcarenite, fine-grained, light-yellowish-brown, silty, sand fraction composed of numerous bryozoan fragments

Base of Ten Mile Hill beds: +11 feet above sea level
Base of Marks Head Formation: +8 feet above sea level
Base of Ashley Formation: -26 feet below sea level
Bottomed in Drayton Limestone

OS-10: 3.4 miles E of west quad. border, 1.6 miles S of north quad. border. Surface elevation 27 feet. (=GS-7A).

FILL	0-2	Road fill
TEN MILE HILL BEDS	2-5	Clay, medium-gray mottled with light-orange and light-red
	5-13	Sand, fine-grained, light-orange, muddy, with thin stringers of medium-gray silty clay
	13-19	Clay, light-gray with sparse light-orange mottles, silty
	19-25	Sand, fine-grained, dark-gray, muddy with sparse dark-gray silty clay stringers; phosphate pebbles abundant at base
ASHLEY FORMATION	25-52	Calcarenite, fine-grained, medium-olive-brown; shelly from 34-40; sand and pebble-size phosphate abundant in basal 2 feet
PARKERS FERRY FM	52-65	Calcilutite, light-greenish-gray

Base of Ten Mile Hill beds: +2 feet above sea level
Base of Ashley Formation: -25 feet below sea level
Bottomed in Parkers Ferry Formation

OS-11: 1.2 miles E of west quad. border, 1.4 miles S of north quad. border. Surface elevation 20 feet. (=COSE-100).

FILL	0-3	Road fill
WANDO FM (UPPER MEM)	3-6	Clay, medium-gray with sparse light-orange mottles, silty and fine-grained sandy
	6-10	Sand, medium-grained grading down to very coarse-grained, medium-gray and medium-yellow
TEN MILE HILL BEDS	10-15	Sand, fine- to medium-grained, medium- to light-orange; phosphate pebbles up to 1 cm in diameter at base
ASHLEY FORMATION	15-16	Calcarenite, fine-grained, medium-olive-brown, contains fragments of mollusk shells
PARKERS FERRY FM	16-25	Calcilutite, light-olive-green, silty

Base of Wando Formation: +10 feet above sea level
Base of Ten Mile Hill beds: +5 feet above sea level
Base of Ashley Formation: +4 feet above sea level
Bottomed in Parkers Ferry Formation

OS-12: 0.75 miles W of east quad. border, 2.85 miles N of south quad. border. Surface elevation 10 feet. (=AH-38-76)

FILL	0-3	Road base
WANDO FM (UPPER MEM)	3-28	Sands and clays, not logged
ASHLEY FORMATION	28-57	Calcarenite, fine-grained, medium-olive-brown
DRAYTON LIMESTONE	57-85	Calcarenite, medium-grained, white grading down to light-olive-green, composed mostly of bryozoan fragments

Base of Wando Formation (upper member): -18 feet below sea level
Base of Ashley Formation: -47 feet below sea level
Bottomed in Drayton Limestone

OS-13: 1.2 miles W of east quad. border, 3.6 miles N of south quad. border. Surface elevation about 13 feet. (=AH-39-76).

WANDO FM (UPPER MEM)	0-35	Sand and clay, not logged
ASHLEY FORMATION	35-56	Calcarenite, fine-grained, medium-olive-brown
DRAYTON LIMESTONE	56-70	Calcarenite, medium-grained, white grading down to interlayed white and light-olive-green, composed mostly of bryozoan fragments

Base of Wando Formation (upper member): -22 feet below sea level
Base of Ashley Formation: -43 feet below sea level
Bottomed in Drayton Limestone

OS-14: 1.2 miles W of east quad. border, 4.3 miles N of south quad. border. Surface elevation about 23 feet. (=AH-40-76).

TEN MILE HILL BEDS	0-37	Sand and clay, not logged
ASHLEY FORMATION	37-63	Calcarenite, fine-grained, medium-olive-brown
DRAYTON LIMESTONE	63-65	Calcarenite, medium-grained, white, composed mostly of bryozoan fragments

Base of Ten Mile Hill beds: -14 feet below sea level
Base of Ashley Formation: -40 feet below sea level
Bottomed in Drayton Limestone

OS-15: 0.95 miles E of west quad. border, 1.85 miles N of south quad. border. Surface elevation 23 feet.

TEN MILE HILL BEDS	0-5	Clay, dark-orange and light-gray banded, fine-grained sandy in upper part
	5-15	Sand, fine-grained, light-orange, grades to
	15-25	Sand, medium-grained grading by base to coarse-grained, medium-gray; phosphate pebbles (0.5 cm. diameter) at base
DANIEL ISLAND BEDS	25-31	Clay, dark-gray, micaceous (1 mm flakes); phosphate pebbles (1 cm diam) at base
MARKS HEAD FORMATION	31-33	Sand, fine-grained, medium-olive-gray; slightly calcareous with some shell and barnacle fragments
	33-35	Gravel, phosphate (0.5-1 cm) densely packed, very hard drilling
ASHLEY FORMATION	35-50	Calcarenite, fine-grained, medium-olive brown, abundant glauconite and phosphate sand; small foraminifera visible; phosphate grains near base are up to 3 mm in diameter

Base of Ten Mile Hill beds: -2 feet below sea level
Base of Daniel Island beds: -8 feet below sea level
Base of Marks Head Formation: -12 feet below sea level
Bottomed in Ashley Formation

OS-16: 2.4 miles W of east quad. border, 3.75 miles S of north quad. border. Surface elevation 14 feet. (=AH-42-76).

FILL	0-6	Road base
WANDO FM (UPPER MEM)	6-25	Sand, clay, and peat, not logged
ASHLEY FORMATION	25-45	Calcarenite, fine-grained, medium-olive-brown
DRAYTON LIMESTONE	45-65	Calcarenite, medium-grained, white grading down to light-olive-green; mostly composed of bryozoans in upper part but they become scarcer downward

Base of Wando Formation (upper member): -11 feet below sea level
Base of Ashley Formation: -31 feet below sea level
Bottomed in Drayton Limestone

OS-17: 3.3 miles E of west quad. border, 3.05 miles N of south quad. border. Surface elevation 14 feet. (=AH-43-76).

WANDO FM (UPPER MEM)	0-20	Sand, clay, and peat, not logged
EDISTO FORMATION	20-23	Calcarenite, fine-grained, light-yellowish-brown, hard bed at base
ASHLEY FORMATION	20-53	Calcarenite, fine-grained, medium-olive-brown
PARKERS FERRY FM	53-60	Calcilutite, medium-olive-green

Base of Wando Formation (upper member): -6 feet below sea level
Base of Edisto Formation: -9 feet below sea level
Base of Ashley Formation: -39 feet below sea level
Bottomed in Parkers Ferry Formation

OS-18: 1.1 miles E of west quad. border, 3.55 miles S of north quad. border. Surface elevation 29 feet. (=AH-29-76).

TEN MILE HILL BEDS	0-18	Sand, fine-grained grading down to coarse-grained, medium-orange, medium-red and medium-gray (0-5) grading down to light-yellow and light-gray
	18-31	Sand, coarse-grained, dark-bluish-gray (18-22) grading through medium-orange (22-25) to light-yellowish-brown, clayey from 18-22
MARKS HEAD FORMATION	31-33	Sand, fine-grained, medium-brown, clayey
ASHLEY FORMATION	33-35	Calcarenite, fine-grained, medium-olive-brown

Base of Ten Mile Hill beds: -2 feet below sea level
Base of Marks Head Formation: -4 feet below sea level
Bottomed in Ashley Formation

OS-19: 1.65 miles E of west quad. border, 4.05 miles S of north quad. border. Surface elevation 16 feet. (=COT-SE-1-H).

WANDO FM (UPPER MEM)	0-15	Clay, dark-brownish-gray (0-5) grading to dark-gray, slick
TEN MILE HILL BEDS	15-19	Sand, very coarse-grained, dark-gray, angular
MARKS HEAD FORMATION	19-20	Sand, fine-grained, dark-olive-brown
ASHLEY FORMATION	20-51	Calcarenite, fine-grained, medium-olive-green, sand-size phosphate common from 20-30
PARKERS FERRY FM	51-60	Calcilutite, medium-grayish-green, very stiff

Base of Wando Formation (upper member): +1 foot above sea level
Base of Ten Mile Hill beds: -3 feet below sea level
Base of Marks Head Formation: -4 feet below sea level
Base of Ashley Formation: -35 feet below sea level
Bottomed in Parkers Ferry Formation

OS-20: 3.1 miles W of east quad. border, 1.6 miles S of north quad. border. Surface elevation 19 feet. (=AH-53-77).

FILL	0-10	Road base
WANDO FM (UPPER MEM)	10-18	not logged
ASHLEY FORMATION	18-38	Calcarenite, fine-grained, medium-olive-brown, phosphate pebbles at base
PARKERS FERRY FM	38-98	Calcilutite, light-grayish-green

Base of Wando Formation (upper member): +1 foot above sea level
Base of Ashley Formation: -19 feet below sea level
Bottomed in Parkers Ferry Formation

OS-21: 2.25 miles E of west quad. border, 1.5 miles S of north quad. border. Surface elevation 17 feet. (=AH-54-77).

HOLOCENE BEDS	0-2.5	Muck, black
WANDO FM (UPPER MEM)	2.5-11	Sand, medium- to coarse-grained, medium-orangish-brown, grading down to coarse-grained, dark-gray
ASHLEY FORMATION	11-29*	Calcarenite, fine-grained, medium-olive-brown, turtle bones at 23 feet
PARKERS FERRY FM	29-78	Calcilutite, medium-greenish-gray

Base of Holocene beds: +14.5 feet above sea level
Base of Wando Formation (upper member): +6 feet above sea level
Base of Ashley Formation: about -12 feet below sea level
Bottomed in Parkers Ferry Formation

*Boundary was not spotted in drilling, but a sample at 24 feet was in nannoplankton zone NP24 (Ashley Formation) and a sample at 34 feet was in nannoplankton zone NP20 (Parkers Ferry Formation). Thus the boundary is estimated to be at 29±5 feet depth

OS-22: 0.6 miles W of east quad. border, 2.4 miles S of north quad. border. Surface elevation 35 feet. (=AH-55-77)

TEN MILE HILL BEDS	0-18	Sand, fine-grained, medium-orange and light-gray, interlaminated with clay, white and medium-orange, sandy
	18-23	Clay, medium- to dark-gray, fine-grained sandy, micaceous
	23-35	Clay, medium-green, hard, with white, fine-grained sand stringers
	35-39	Clay, medium-gray, medium-grained sandy, soft
	39-42	Sand, medium-grained, medium-gray
ASHLEY FORMATION	42-69	Calcarenite, fine-grained, medium-olive-brown
PARKERS FERRY FM	69-78	Calcilutite, light-olive

Base of Ten Mile Hill beds: -7 feet below sea level
Base of Ashley Formation: -34 feet below sea level
Bottomed in Parkers Ferry Formation

OS-23: 0.65 miles W of east quad. border, 2.65 miles N of south quad. border. Surface elevation 31 feet. (=AH-37-76)

TEN MILE HILL BEDS	0-5	Sand, fine-grained, light-brown, clean
	5-25	Sand, fine-grained, grading down to clay, fine-grained sandy, medium-gray; light-yellowish-orange sand and light-gray clay present from 22-23
	25-28	Sand, medium- to coarse-grained, light-brownish-yellow to medium-orangish-brown
	28-40	Sand, fine-grained, medium-gray, with thin medium-gray clay stringers, grading down to clay, medium-gray, fine-grained sandy
ASHLEY FORMATION	40-78	Calcarenite, fine-grained, medium-olive-brown
DRAYTON LIMESTONE	78-85	Calcarenite, medium-grained, white to very light-greenish-gray, mostly composed of bryozoan fragments

Base of Ten Mile Hill beds: -9 feet below sea level
Base of Ashley Formation: -47 feet below sea level
Bottomed in Drayton Limestone

OS-24: 3.35 miles W of east quad. border, 0.95 miles N of south quad. border. Surface elevation 43 feet. (=AH-12-76)

TEN MILE HILL BEDS	0-15	Sand, fine-grained, medium-orange and purplish-brown mottled, humic, well-sorted
	15-19	Clay medium-gray, micaceous, oily
	19-25	Sand, medium-grained, medium-gray, clean
	25-46	Clay, medium-gray, silty, with laminae of fine- to medium-grained sand, oily, shelly in sandier intervals from 40-46
MARKS HEAD FORMATION	46-65	Sand, fine,grained, medium-olive-brown and medium-gray mottled, shells and rounded phosphate lumps at base
ASHLEY FORMATION	46-95	Calcarenite, fine-grained, medium-olive-brown; shelly from 60-65

Base of Ten Mile Hill beds: -3 feet below sea level
Base of Marks Head Formation: -22 feet below sea level
Bottomed in Ashley Formation

OS-25: 0.5 miles E of west quad. border, 0.15 miles S of north quad. border. Surface elevation about 27 feet. (=AH-GP8)

TEN MILE HILL BEDS	0-5	Sand, medium- to coarse-grained, medium-red and medium-gray mottled, muddy
	5-8	Sand, coarse-grained, light-gray, some quartz granules present
	8-17	Sand, fine-grained, medium-yellowish-brown (8-14) grading down to light-gray (14-17), muddy
ASHLEY FORMATION	17-43	Calcarenite, fine-grained, medium-olive-brown
PARKERS FERRY FM	43-85	Calcilutite, medium-greenish-gray

Base of Ten Mile Hill beds: +10 feet above sea level
Base of Ashley Formation: -16 feet below sea level
Bottomed in Parkers Ferry Formation

OS-26: 0.6 mile E of west quad., 0.35 mile N of south quad. border. Surface elevation about 17 feet.

FILL?	0-1	Sand, fine-grained, light-brown grading down to medium-brown, well sorted, sharp contact with unit below
WANDO FM (UPPER MEMBER)	1-5	Clay, medium-orange and light-gray marbled with medium-red streaks grading down to light-gray with sparse medium-orange mottles; gets sandier downward
	5-10	Sand, fine- grading through medium- to coarse-grained by 7 feet, medium-purplish-brownish-gray (5-7) grading down to bright medium-orange, poorly sorted, quartz pebbly, subrounded to subangular
(MIDDLE MEMBER)	10-11	Sand, fine- to coarse grained, dark-orange, poorly sorted, very clayey
	11-19	Sand, fine- to medium-grained grading down to dominantly medium-grained but with fine- to coarse-grained fractions, light-yellowish-orange, poorly sorted, subrounded, micaceous, very fine-grained heavies present; grades rapidly to
	19-23	Sand, dominantly medium-grained but with fine- and coarse-grained fractions grading down to coarse-grained and quartz pebbly, light-gray, poorly sorted, subangular; sparse 0.5 cm diameter phosphate pebbles at base
TEN MILE HILL BEDS	23-29	Sand, coarse-grained, medium-gray, very clayey, quartz pebbly, grading down to medium-grained and dark-gray; medium-gray micaceous clay lense present; shelly in basal two feet including oyster fragments; very hard basal bed of black phosphate pebbles present
ASHLEY FORMATION	29-57	Calcarenite, fine-grained, medium-olive-brown grading down to light-olive-brown; one foot bed of black, 1 cm diameter subrounded phosphate pebbles at base

PARKERS FERRY FM	57-65	Calcilutite, light-olive-green; a bit grainy from foraminifera but still quite clayey and sticky; had to be cut off stems

Base of Wando Formation (upper member): +7 feet above sea level
Base of Wando Formation (middle member): -6 feet below sea level
Base of Ten Mile Hill beds: -12 feet below sea level
Base of Ashley Formation: -40 feet below sea level
Bottomed in Parkers Ferry Formation

OS-27: 2.65 miles E of west quad. border, 3.2 miles N of south quad. border. Surface elevation 19 feet.

WANDO FM (UPPER MEMBER)	0-9	Sand, fine- to coarse-grained, medium-brownish-orange (0-4) grading through medium-brownish-orange with sparse light-gray mottles(4-5) to light-brown (5-9), subrounded to subangular, very clayey
	9-30	Sand, fine- to coarse-grained, light-orange, quartz pebbly (0.5 cm diameter), sparsely micaceous (3-4 mm diameter)
	30-31	Sand, coarse-grained, dark-brown; contains sparse, 1 cm diameter subrounded phosphate pebbles
ASHLEY FORMATION	31-40	Calcarenite, fine-grained, medium-olive-brown; shark tooth (Galeocerdo) present

Base of Wando Formation (upper member): -12 feet below sea level
Bottomed in Ashley Formation

OS-28: 1.6 miles W of east quad. border, 3.4 miles S of north quad. border. Surface elevation about 42 feet.

TEN MILE HILL BEDS	0-5	Sand, fine-grained, light-yellowish-orange grading to light-brownish-orange, well sorted
	5-15	Sand, fine- to very fine-grained, very light-gray; very fine-grained heavies abundant; two 1 cm thick lenses of very light-gray clay present between 12 and 15 feet
	15-16	Sand, fine-grained, medium-orangish-brown
	16-20	Sand, fine-grained, bright medium-orange, well sorted, interbedded with clay, medium-gray

Bottomed in Ten Mile Hill beds

OS-29: 2.0 miles W of east quad. border, 2.1 miles S of north quad. border. Surface elevation about 28 feet.

TEN MILE HILL BEDS	0-6	Sand, fine-grained, clayey, grading down to clay, fine-grained sandy, dominantly medium-yellowish-brown with medium-orange and light-gray mottles (gray increases and yellowish-brown decreases with depth), micaceous
	6-19	Sand, fine- to very fine-grained, light-yellowish-brown grading down to light-orange, silty, very fine-grained heavies abundant; thin lenses of light-gray and medium-gray clay present
	19-21	Clay, medium-bluish-gray, greasy, micaceous
	21-29	Sand, fine- to very fine-grained grading down to medium-grained, medium-gray, very silty; 1-3 cm diameter, subrounded black phosphate pebbles, 1-3 cm diameter, rounded, medium-olive-brown indurated lumps of Ashley Formation, and 0.5 cm diameter, subrounded quartz pebbles are all present in basal foot; one phosphate pebble was an internal mold of a clam shell which retained a sharp (unabraded) rim at the hinge line
ASHLEY FORMATION	29-40	Calcarenite, fine-grained, medium-olive-brown, phosphatic and glauconitic; large foraminifera present

Base of Ten Mile Hill beds: -1 foot below sea level
Bottomed in Ashley Formation

Ravenel Quadrangle

(Depths in feet)

RA-1: On south quad. border, 2.2 miles W of east quad. border. Surface elevation 10 feet.

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, medium reddish-orange, silty, micaceous
	5-6	Clay, medium-gray
(MIDDLE MEM)	6-19	Sand, fine-grained, silty, poorly sorted, light-brownish-gray, sparsely pebbly; no distinct basal boundary
ASHLEY FORMATION	19-48	Calcarenite, fine-grained, medium-olive-brown, quartz and phosphate sand present; sparsely calcareous at top grading down to calcite-enriched zone with calcareous lumps; sparse shell fragments present; phosphate pebble bed at base
DRAYTON LIMESTONE	48-60	Fell off stem, hence loose and poorly compacted; only the Drayton has this characteristic among units older than Pliocene in age

Base of Wando Formation (upper member): +4 feet above sea level
Base of Wando Formation (middle member): -9 feet below sea level
Base of Ashley Formation: -38 feet below sea level
Bottomed in Drayton Limestone

RA-2: 3.1 miles E of west quad. border, 2.2 miles N of south quad. border. Surface elevation 15 feet.

TEN MILE HILL BEDS	0-2	Clay, sandy, medium-red and medium-orange mottled; about one inch thick, medium-gray, micaceous clay bed at base
	2-6	Sand, fine-grained, well-sorted, light-gray, very fine-grained heavies abundant
	6-10	Sand, fine-grained, medium-orange and white, clayey sand and clay lenses interbedded
	10-12	Clay, medium-blue
	12-16	Sand, coarse-grained, medium-orange, angular
	16-22	Sand, fine-grained, medium-orange, well-sorted, very fine-grained heavies abundant
	22-24	Sand, fine-grained, medium-bluish-gray, well-sorted, very fine-grained heavies abundant; phosphate pebbles at base
ASHLEY FORMATION	24-30	Calcarenite, fine-grained, medium-olive-brown, phosphate sand abundant

Base of Ten Mile Hill beds: -9 feet below sea level
Bottomed in Ashley Formation

RA-3: 0.3 mile E of west quad. border, 0.9 mile N of south quad. border. Surface elevation 37 feet.

HOLOCENE?	0-1	Sand, fine-grained, loose, light-gray; dune sand or road fill
TEN MILE HILL BEDS	1-5	Sand, fine-grained, well-sorted, dark-brown, micaceous, rich in humate
	5-14	As above but rapidly grades to medium-brown, very fine-grained heavies become visible
	14-18	Clay, medium-gray, micaceous and silty, fine-grained sand interbedded
	18-31	Sand, fine-grained, medium-gray, well-sorted, micaceous, very fine-grained heavies abundant
	31-34	Clay, medium-gray
	34-48	Sand, medium-gray, fine-grained, well-sorted; occasional clay stringers present; shelly in basal 6 feet; sparse phosphate at base
MARKS HEAD FORMATION	48-58	Sand, fine-grained, quartzose and phosphatic, dark-olive-brown, faintly calcareous, crumbly
ASHLEY FORMATION	58-60	Calcarenite, fine-grained, light-brown, phosphate sand abundant

Base of Ten Mile Hill beds: -11 feet below sea level
Base of Marks Head Formation: -21 feet below sea level
Bottomed in Ashley Formation

RA-4: 1.6 miles E of west quad. border, 2.1 miles N of south quad. border. Surface elevation 33 feet.

TEN MILE HILL BEDS	0-3	Sand, fine-grained, dark-brown, well-sorted, humate-rich
	3-5	Clay, medium-gray, sandy, stiff
	5-35	Sand, fine-grained, light-gray, well-sorted, micaceous, very fine-grained heavies abundant; clay blobs scattered throughout
	35-38	As above but medium-orange
	38-45	Sand, coarse-grained, medium-gray, phosphate pebbles in basal 2 feet; some blue quartz present
ASHLEY FORMATION	45-50	Calcarenite, fine-grained, medium-olive-brown, phosphate sand abundant

Base of Ten Mile Hill beds: -12 feet below sea level
Bottomed in Ashley Formation

RA-5: 0.1 miles E of west quad. border, 2.5 miles N of south quad. border. Surface elevation 41 feet.

TEN MILE HILL BEDS	0-5	Sand, fine-grained, dark brown, well-sorted, humate-rich
	5-12	As above but light-brown
	12-28	Sand, fine-grained, medium-gray, silty with medium-blue clay interbedded
	28-44	Sand, fine-grained, medium-gray, silty; very fine-grained heavies abundant; shelly from 40-44 feet; sparse phosphate pebbles at base
ASHLEY FORMATION	44-90	Calcarenite, fine-grained, medium-brown grading down to medium-olive-brown, weathered in upper few inches

Base of Ten Mile Hill beds: -3 feet below sea level
Bottomed in Ashley Formation

RA-6: 2.6 miles W of east quad. border, 2.1 miles N of south quad. border. Surface elevation 10 feet

HOLOCENE?	0-1	Sand, fine-grained, white, well-sorted; dune sand or road fill
WANDO FM (UPPER MEM)	1-4	Sand, fine-grained, medium-orange, slightly clayey
	4-6	Clay, medium-gray
(MIDDLE MEM)	6-13	Sand, bimodally medium- and fine-grained, each fraction well-sorted, light-yellow, gets orangish downward
	13-17	Sand, fine-grained, medium-orange, well-sorted, micaceous, very fine-grained heavies abundant
	17-24	Clay, medium-blue; contains wood fragments and angular, medium-grained sand
(LOWER MEM)	24-28	Sand, medium-grained at top grading down to coarse-grained at bottom, poorly sorted; humate brown at top grading down to reddish-brown at base; granules of coarse sand at base; coarse sand size tourmaline prism observed
ASHLEY FORMATION	28-30	Calcarenite, fine-grained, medium-olive-brown, upper foot browner than below, phosphate-rich

Base of Wando Formation (upper member): +4 feet above sea level
Base of Wando Formation (middle member): -14 feet below sea level
Base of Wando Formation (lower member): -18 feet below sea level
Bottomed in Ashley Formation

RA-7: 0.1 miles E of west quad. border, 2.0 miles S of north quad. border. Surface elevation 38 feet.

TEN MILE HILL BEDS	0-3	Sand, fine-grained, white, loose, well sorted, with very fine-grained heavy minerals (road fill?)
	3-6	Clay, medium-orange and medium-gray mottled grading down to medium-gray, stiff
	6-19	Sand, fine-grained, light-gray, contains scattered coarse grains but otherwise well-sorted, very fine-grained heavies abundant
	19-38	Clay, medium-gray, grading down to clayey fine-grained sand with clay lenses, medium-gray; sand fraction poorly sorted
	38-48	Clay, medium-gray in upper foot turning dark-bluish-gray below that, micaceous; burrows filled with fine-grained sand in basal foot and 2 inch phosphate pebble bed at base
ASHLEY FORMATION	48-50	Calcarenite, fine-grained, medium-olive-brown, dense; sand-size quartz and phosphate present; large foraminifera abundant

Base of Ten Mile Hill beds: -10 feet below sea level
Bottomed in Ashley Formation

RA-8: 0.9 miles E of west quad. border, 3.9 miles S of north quad. border. Surface elevation 41 feet.

TEN MILE HILL BEDS	0-4	Sand, fine-grained, medium-gray, well-sorted
	4-10	Sand, fine-grained, dark-gray to dark-brown, well-sorted, humate-rich
	10-44	Mixed up due to prolonged chattering on phosphate bed at 44 feet
ASHLEY FORMATION	44-60	Calcarenite, fine-grained, medium-olive-brown, dense, quartzose and phosphatic sand present; calcite-cemented lumps abundant

Base of Ten Mile Hill beds: -3 feet below sea level
Bottomed in Ashley Formation

RA-9: 2.2 miles E of west quad. border, 3.2 miles S of north quad. border. Surface elevation 40 feet.

TEN MILE HILL BEDS	0-5	Sand, fine-grained, medium-yellowish-brown, well-sorted
	5-25	As above but light-yellow grading down to medium-yellowish-orange; very fine-grained heavies abundant
	25-36	Clay, medium-blue, sticky, shells at 35-36 feet
	36-43	Sand, fine-grained, medium-gray except dark-gray in basal few inches; fine-grained sand-size phosphate and maybe other heavies present, dense phosphate bed at base
ASHLEY FORMATION	at 43	Calcarenite, fine-grained, medium-olive-brown on very tip of stem

Base of Ten Mile Hill beds: -3 feet below sea level
Bottomed in Ashley Formation

RA-10: 2.8 miles W of east quad. border, 3.7 miles S of north quad. border. Surface elevation 12 feet.

WANDO FM (UPPER MEM)	0-4	Clay, medium-red and medium-gray mottled, sandy
	4-7	Sand, fine-grained, medium-orange, clayey
	7-12	Sand, fine-grained, medium-brownish-orange, well-sorted with very fine-grained heavies abundant
	12-16	As above but slightly clayey and with a few clay stringers
	16-18	Clay, medium-bluish-gray
(LOWER MEM)	18-23	Sand, coarse-grained, medium-gray, angular, well-sorted; phosphate pebbles in basal 1/2 foot
ASHLEY FORMATION	23-30	Calcarenite, fine-grained, medium-olive-brown, dense, slightly quartzose and very phosphatic

Base of Wando Formation (upper member): -6 feet below sea level
Base of Wando Formation (lower member): -11 feet below sea level
Bottomed in Ashley Formation

RA-11: 1.9 miles W of east quad. border, 4.2 miles S of north quad. border. Surface elevation 11 feet.

WANDO FM (UPPER MEM)	0-6	Sand, fine-grained, medium-red and medium-gray mottled, clayey grading to sandy clay and back to clayey sand, stiff
	6-12	Sand, fine-grained, light-gray, well-sorted, very fine-grained heavies abundant
	12-16	As above but with a few medium-blue clay stringers, probably churned up from 15-16 foot interval
(LOWER MEM)	16-30	Sand, coarse-grained, medium-gray, well-sorted; medium-blue clay lense at 20 feet; coarse quartz pebbles below 28 feet
	30-32	Sand, coarse-grained, medium-gray, quartz pebbly, shelly
	32-33	Sand, coarse-grained, medium-gray, contains abundant quartz and phosphate pebbles
ASHLEY FORMATION	33-40	Calcarenite, fine-grained, medium-olive-brown, dense, sparsely quartzose and very phosphatic

Base of Wando Formation (upper member): -5 feet below sea level
Base of Wando Formation (lower member): -22 feet below sea level
Bottomed in Ashley Formation

RA-12: 0.3 miles E of west quad. border, 0.3 miles S of north quad. border. Surface elevation 18 feet.

TEN MILE HILL BEDS	0-8	Sand, medium- grading down to coarse-grained, medium-orange and medium gray mottled grading down to light-yellowish-brown, clayey, scattered small pebbles near base
	8-19	Clay, medium gray, stiff, contains medium green mottles
	19-26	Sand, fine-grading down to medium-grained, clayey, very phosphatic; phosphate pebble bed at base
ASHLEY FORMATION	26-35	Calcarenite, fine-grained, medium-olive-brown; sparse shell fragments, phosphate sand, and large foraminifera present

Base of Ten Mile Hill beds: -8 feet below sea level
Bottomed in Ashley Formation

RA-13: 1.4 miles E of west quad. border, 0.6 miles S of north quad. border. Surface elevation 9 feet.

FILL	0-2	Fill
HOLOCENE BEDS	2-3	Soil, black
	3-5	Clay, sandy, dark gray
WANDO FM (LOWER MEM)	5-13	Sand, coarse-grained, medium-brown, poorly sorted, angular, pebbly, silty, grading down to sand, medium-grained, better sorted, phosphatic
	13-17	Sand, medium-grained, medium-gray, poorly sorted; scattered wood fragments and clay lenses present
	17-18	Gravel; consists of phosphate lumps about 2 cm in diameter
ASHLEY FORMATION	18-20	Calcarenite, fine-grained, medium-olive-brown; large foraminifera and phosphate sand abundant; scattered phosphatized clam internal molds present

Base of Holocene beds: +4 feet above sea level
Base of Wando Formation (lower member): -9 feet below sea level
Bottomed in Ashley Formation

RA-14: 1.8 miles W of east quad. border, 4.2 miles N of south quad. border. Surface elevation 5 feet.

FILL	0-3	Fill
HOLOCENE BEDS	3-5	Clay, dark-gray, greasy, contains plant roots
SILVER BLUFF BEDS	5-18	Sand, fine-grained, dark-gray, silty; contains a few clay lenses and wood fragments
	18-22	Clay, dark-gray, loose, greasy
WANDO FM (MIDDLE MEM)	22-24	Sand, medium-grained, dark-gray, phosphate sand abundant, *Mulinia* and oysters present; phosphate pebble bed at base
ASHLEY FORMATION	24-25	Calcarenite, fine-grained, medium-olive-brown

Base of Holocene beds: ±0 feet at sea level
Base of Silver Bluff beds: -17 feet below sea level
Base of Wando Formation (middle member): -19 feet below sea level
Bottomed in Ashley Formation

RA-15: 1.0 mile W of east quad. border, 0.9 mile N of south quad. border. Surface elevation 15 feet.

FILL	0-2	Sand, medium-grained, medium-gray, loose, humic (fill?)
WANDO FM (LOWER MEM)	2-18	Sand, medium-grained grading down to coarse-grained, medium-orange and medium-gray mottled grading down through light-orange to medium-gray, silty and micaceous, poorly sorted, phosphate and quartz pebbles abundant in basal few feet, shelly in basal foot
ASHLEY FORMATION	18-20	Calcarenite, fine-grained, medium-olive-brown, dense, rich in foraminifera and phosphate sand

Base of Wando Formation (lower member): -3 feet below sea level
Bottomed in Ashley Formation

RA-16: 1.4. miles W of east quad. border, 2.3 miles N of south quad. border. Surface elevation 20 feet.

WANDO FM (LOWER MEM)	0-2	Sand, fine-grained, medium-orange and medium-gray mottled, clayey, dense, tough
	2-5	Sand, medium-grained, light-orange and light-gray mottled, well-sorted, loose, grading down to
	5-22	Sand, medium-grained, light-gray grading into light-reddish-brown in basal 3 feet, poorly sorted, phosphate pebble bed at base
ASHLEY FORMATION	22-50	Calcarenite, fine-grained, medium-olive-brown, shelly below 37 feet

Base of Wando Formation (lower member): -2 feet below sea level
Bottomed in Ashley Formation

RA-17: 0.6 miles E of west quad. border, on south quad. border. Surface elevation 34 feet.

WANDO FM (LOWER MEM)	0-21	Sand, medium-grained, light-brown to white, well-sorted, very fine-grained heavies abundant, muscovitic, silty, blue clay stringers near base
	21-22	Silt, clayey, medium-blue, Mulinia present
	22-26	Silt, sandy, medium-brownish-gray, Mulinia abundant
	26-34	Sand, medium-grained, medium-brownish-gray, silty; very fine-grained heavies abundant; Mulinia and oysters abundant
	34-49	Sand, medium- to coarse-grained, medium-brownish-gray; shelly with shell hash lenses present; phosphate pebbles scattered through basal few feet
TEN MILE HILL BEDS	at 49	Shell-hash, light-gray, shells much more rotten and softer than above, both aragonitic and calcitic shells present; unit 3 inches thick
MARKS HEAD FORMATION	49-50	Sand, fine-grained, dark-brownish-gray

Base of Wando Formation (lower member): -15 feet below sea level
Base of Ten Mile Hill beds: -15 feet below sea level
Bottomed in Marks Head Formation

RA-18: 2.3 miles E of west quad. border, 1.5 miles N of south quad. border. Surface elevation 32 feet.

TEN MILE HILL BEDS	0-13	Sand, fine-grained, light-orange grading down to light-gray, well-sorted, clean; very fine-grained heavies and coarse muscovite flakes abundant; humic in top foot
	13-13.5	Clay, bright orange
	13.5-40	Sand, fine-grained grading down to medium-grained by 28 feet, medium-orange grading down to light-orangish-gray; very fine-grained heavies scattered throughout
	40-45	Sand, coarse-grained, bright medium-orange, poorly sorted, pebbly
DANIEL ISLAND BEDS	45-53	Clay, medium-gray grading down to medium-blue, sticky, micaceous, plant fragments abundant; shelly in basal 3 feet; no phosphate bed at base
ASHLEY FORMATION	53-70	Calcarenite, fine-grained, medium-brown, shelly around 60 feet

Base of Ten Mile Hill beds: -13 feet below sea level
Base of Daniel Island beds: -21 feet below sea level
Bottomed in Ashley Formation

RA-19: 0.2 miles W of east quad. border, 3.3 miles N of south quad. border. Surface elevation 5 feet.

SILVER BLUFF BEDS	0-1	Sand, medium-grained, medium-brown, humic, loose, poorly sorted
	1-8	Sand, medium-grained, medium-brown and medium-gray mottled, clayey and silty, phosphate pebble bed at base
ASHLEY FORMATION	8-45	Calcarenite, fine-grained, medium-brown, shelly from 37 to 45 feet, scattered phosphate pebbles

Base of Silver Bluff beds: -3 feet below sea level
Bottomed in Ashley Formation

RA-20: 0.7 miles W of east quad. border, 4.2 miles S of north quad. border. Surface elevation 11 feet.

WANDO FM (UPPER MEM)	0-9	Sand, fine-grained grading down to medium-grained, medium-red and light-gray mottled grading down to light-orange and light-gray mottled, clayey grading down to silty, well-sorted; thin phosphate pebble bed at base
ASHLEY FORMATION	9-15	Calcarenite, fine-grained, medium-brown, calcite-cemented lumps abundant

Base of Wando Formation (upper member): +2 feet above sea level
Bottomed in Ashley Formation

RA-21: 2.4 miles W of east quad. border, 1.3 miles N of south quad. border. Surface elevation 23 feet.

WANDO FM (LOWER MEM)	0-6	Sand, fine-grained, dull light-orange to light-yellow or light-gray, well-sorted; very fine-grained heavies abundant
	6-15	Clay, medium-bluish-gray, sticky, micaceous, shelly in basal foot
	15-21	Sand, fine-grained, medium-bluish-gray, clayey, silty, numerous Mulinia and oyster fragments
	21-25	Clay, medium-bluish-gray, contains sandy lenses, unfossiliferous
	25-33	Sand, fine-grained, medium-bluish-gray, sparse Mulinia present; thin lenses of clay and very clean sand interspersed
	33-39	Clay, bluish-gray, sticky, unfossiliferous except for a lense of clean sand at 36 feet containing Mulinia and oysters
	39-41	Sand, medium-grained, bluish-gray, silty and coquina, containing whole specimens of oysters, Mulinia and Anadara brasiliana
	41-42	Sand, coarse-grained, medium-brown, humic, wood fragments present
	42-48	Sand, coarse-grained, medium-brown, pebbly, shelly
	48-56	Coquina, mostly fragmented Mulinia; quartz and phosphate pebbles abundant near base
	56-57	Sand, medium-grained, medium-gray, well-sorted
ASHLEY FORMATION	57-60	Calcarenite, fine-grained, medium-yellowish-brown, shelly

Base of Wando Formation (lower member): -34 feet below sea level
Bottomed in Ashley Formation

RA-22: 0.2 miles E of west quad. border, 1.8 miles N of south quad. border. Surface elevation 41 feet.

TEN MILE HILL BEDS	0-3	Sand, fine-grained, light-orange, well-sorted, very fine-grained heavies abundant; scattered tree roots present
	3-25	Sand, fine-grained, light-gray, well-sorted, very fine-grained heavies abundant; muscovitic below 14 feet
	25-25.5	Sand, medium-grained, clayey, bright medium-orange
	25.5-30	Sand, dominantly coarse-grained, poorly sorted, dark-gray, scattered thin clay lenses present, grades to
	30-59	Clay, dark gray, muscovitic, stiff, dense, sticky; sparse wood fragments present; sparse oysters and phosphate pebbles in basal foot; sand-filled burrows penetrate underlying unit
ASHLEY FORMATION	59-60	Calcarenite, fine-grained, light-brown grading quickly to dark-brown, abundant sand-size phosphate

Base of Ten Mile Hill beds: -18 feet below sea level
Bottomed in Ashley Formation

RA-23: 1.3 miles W of east quad. border, 1.4 miles N of south quad. border. Surface elevation 30 feet.

WANDO FM (LOWER MEM)	0-14	Sand, medium-grained, light-orange, medium-yellow and medium-gray mottled grading down through medium-brown and medium-gray mottled to dark-brown, well-sorted
	14-25	Sand, fine-grained, light-greenish-gray, silty, very fine-grained heavies abundant, grading down to sand, medium-grained, very fine-grained heavies sparse but mica abundant
	25-26	Sand, medium-grained, medium-brown, woody
	26-27	Sand, coarse-grained, dark-gray, pebbly (including blue quartz pebbles)
	27-34	Sand, medium-grained, dark gray, very fine-grained heavies and shells (Mulinia, Anadara, oyster) abundant; phosphate lumps abundant in basal 3 feet
ASHLEY FORMATION	34-35	Calcarenite, fine-grained, medium-olive-brown, sand-sized phosphate abundant

Base of Wando Formation (lower member): -4 feet below sea level
Bottomed in Ashley Formation

RA-24: 1.9 miles E of west quad. border, 3.4 miles N of south quad. border. Surface elevation 6 feet.

SILVER BLUFF BEDS	0-4	Clay, dark-gray grading down to medium-gray and medium-orange mottled, sparsely sandy, sticky
	4-5	Sand, fine- to coarse-grained, poorly sorted, medium-gray
WANDO FM (LOWER MEM)	5-30	Sand, medium-grained, well-sorted, medium-gray, micaceous; shelly (*Mulinia*, *Dinocardium*(?), *Anadara*, oysters) in basal 5 feet
ASHLEY FORMATION	at 30	Hard bed, not penetrated, a few wisps of medium-olive-brown, fine-grained calcarenite recovered on tip of stem

Base of Silver Bluff beds: +1 foot above sea level
Base of Wando Formation (lower member): -24 feet below sea level
Bottomed on Ashley Formation

RA-25: 2.9 miles E of west quad. border, 3.35 miles N of south quad. border. Surface elevation 4 feet.

FILL	0-5	Road fill, sand, medium-grained, dark-gray to dark-brown, peaty clay in basal few inches
HOLOCENE BEDS	5-18	Clay, sandy, medium-gray, very soft and loose
WANDO FM (MIDDLE MEM)	18-31	Sand, medium-grained, medium-gray, poorly sorted, micaceous, much denser than above, grading down to sand, coarse-grained, angular, pebbly by 24 feet; angular pebbles and feldspar grains (ca. 3 mm diameter) in basal 3 feet
(LOWER MEM)	31-32	Sand, medium-grained, medium-gray, well-sorted, micaceous, shelly, phosphate pebbles at base
ASHLEY FORMATION	32-40	Calcarenite, fine-grained, medium-yellowish-brown, shelly

Base of Holocene beds: -14 feet below sea level
Base of Wando Formation (middle member): -27 feet below sea level
Base of Wando Formation (lower member): -28 feet below sea level
Bottomed in Ashley Formation

RA-26: 2.8 miles W of east quad. border, 3.1 miles N of south quad. border. Surface elevation 9 feet.

WANDO FM (UPPER MEM)	0-5	Sand, dominantly medium-grained, poorly sorted, medium-orange with medium-gray mottles near base, clayey near top
	5-12	Sand, medium-grained, light-gray with medium-orange mottles
	12-12.5	Clay, light-gray
(MIDDLE MEM)	12.5-19	Sand, medium- to coarse-grained, medium-orange, loose; better sorted toward base and interlayered with thin clay lenses
	19-22	Sand, coarse-grained, angular, medium-gray interbedded with clay, dark-gray, soft, sticky, greasy; phosphate pebbles abundant in basal foot
ASHLEY FORMATION	22-25	Calcarenite, fine-grained, medium-brown, sand-sized phosphate abundant

Base of Wando Formation (upper member): -3.5 feet below sea level
Base of Wando Formation (middle member): -13 feet below sea level
Bottomed in Ashley Formation

RA-27: 3.5 miles W of east quad. border, 3.6 miles N of south quad. border. Surface elevation 7 feet.

SILVER BLUFF BEDS	0-3	Clay, medium-gray and medium-orange mottled, sandy
WANDO FM (UPPER MEM)	3-5	Sand, coarse-grained, angular, medium-orange, loose
	5-7	Sand, medium-grained, light-gray, well-sorted, contains very fine-grained heavies
	7-12	Clay, medium-gray, soft, greasy
(MIDDLE MEM)	12-26	Sand, coarse-grained, angular, medium-gray, grading down to medium-grained with very fine-grained heavies from 14-16 feet then back to coarse-grained; pebbly in lowest 6 feet
	26-28	Sand, coarse-grained, medium-gray, shelly (*Mulinia*, *Anadara*)
ASHLEY FORMATION	28-30	Calcarenite, fine-grained, medium-olive-brown, sand-sized phosphate abundant

Base of Silver Bluff beds: +4 feet above sea level
Base of Wando Formation (upper member): -5 feet above sea level
Base of Wando Formation (middle member): -21 feet below sea level
Bottomed in Ashley Formation

RA-28: 1.0 mile W of east quad. border, 0.7 mile S of north quad. border. Surface elevation 30 feet.

TEN MILE HILL BEDS	0-3	Sand, medium-grained, medium-gray, clayey
	3-6	Sand, medium-grained, dark-gray, medium-orange and medium-gray mottled, micaceous, plinthitic, clay lense at base
	6-18	Sand, medium-grained, medium-gray, well-sorted, micaceous, silty, very fine-grained heavies abundant
	18-26	Sand, coarse-grained, medium-gray, poorly sorted, angular, feldspar grains present; phosphate pebble bed at base
ASHLEY FORMATION	26-30	Calcarenite, fine-grained, medium-olive-brown, contains abundant sand-sized phosphate

Base of Ten Mile Hill beds: +4 feet above sea level
Bottomed in Ashley Formation

RA-29: 2.8 miles W of east quad. border, 1.4 miles S of north quad. border. Surface elevation 11 feet.

FILL	0-1	Fill, sand, bricks, etc.
WANDO FM (UPPER MEM)	1-5	Clay, light-gray, sandy, sticky, calcareous nodules at base
TEN MILE HILL BEDS	5-9	Sand, medium-grained, medium-gray and medium-orange mottled, clayey, well-sorted; very fine-grained heavies abundant; sharp contact with above bed; phosphate pebbles in basal foot
ASHLEY FORMATION	9-10	Calcarenite, fine-grained, light-brown

Base of Wando Formation (upper member): +6 feet above sea level
Base of Ten Mile Hill beds: +2 feet above sea level
Bottomed in Ashley Formation

RA-30: 1.9 miles W of east quad. border, 1.4 miles S of north quad. border. Surface elevation 11 feet.

WANDO FM (UPPER MEM)	0-5	Clay, sandy, grading down to sand, medium-grained, clayey, medium-reddish-orange, light-gray and medium-gray mottled
	5-9	Sand, medium-grained, light-gray, well-sorted; very fine-grained heavies abundant; phosphate pebble bed at base
ASHLEY FORMATION	9-10	Calcarenite, fine-grained, medium-olive-brown, contains abundant sand-sized phosphate

Base of Wando Formation (upper member): +2 feet above sea level
Bottomed in Ashley Formation

RA-31: 1.5 miles W of east quad. border, 0.2 miles S of north quad. border. Surface elevation 43 feet.

TEN MILE HILL BEDS	0-22	Sand, medium-grained, light-orange grading down by 2 feet to light-gray, well-sorted, abundant very fine-grained heavies and muscovite below 12 feet
	22-32	Clay, silty, and silt, clayey, interbedded, medium-gray, muscovitic
	32-36	Clay, medium-gray with dark green mottles; contains wood fragments; sparse oyster shells and abundant lumps of phosphate in basal 1/2 foot
ASHLEY FORMATION	36-40	Calcarenite, fine-grained, medium-olive-brown; contains abundant sand-size phosphate and calcite-cemented lumps

Base of Ten Mile Hill beds: +7 feet above sea level
Bottomed in Ashley Formation

RA-32: 3.7 miles W of east quad. border, 3.2 miles S of north quad. border. Surface elevation 8 feet.

FILL	0-3	Road fill
HOLOCENE BEDS	3-5	Clay, sandy, medium-gray and medium-orange mottled
WANDO FM (UPPER MEM)	5-15	Sand, fine-grained, dark-gray, silty, contains scattered clay lenses; grades down from subrounded to angular and poorly sorted by base; no basal phosphate bed
ASHLEY FORMATION	15-35	Calcarenite, fine-grained, medium-olive-brown grading to medium-yellowish-brown; indurated zone from 22 to 29 feet, shelly below indurated zone

Base of Holocene beds: +3 feet above sea level
Base of Wando Formation (upper member): -7 feet below sea level
Bottomed in Ashley Formation

RA-33: 2.8 m. E of west quad. border, 2.0 miles S of north quad. border. Surface elevation 13 feet.

FILL	0-2	Road fill
WANDO FM (UPPER MEM)	2-3	Black soil
	3-6	Clay, dark-gray, sticky, lumpy
	6-19	Clay, light-gray with medium-orange mottles grading by 14 feet to light-greenish-gray, sticky, dense, silty in basal 5 feet
	19-21	Sand, coarse-grained, medium-greenish-gray, angular, silty matrix
	21-23	Sand, fine-grained, medium-gray, clayey
	23-25	Sand, coarse-grained, light-gray, pebbly; phosphate pebble bed at base dense and impossible to penetrate

Base of Wando Formation (upper member): about -12 feet below sea level (bottomed on basal Pleistocene phosphate bed overlying Ashley(?) Formation, so unit could be up to 1-2 feet thicker than indicated depending on the thickness of the basal lag deposit)

RA-34: 3.5 miles W of east quad. border, 2.0 miles S of north quad. border. Surface elevation 4 feet.

FILL	0-2	Road fill
HOLOCENE BEDS	2-7	Clay, dark-gray, sticky, woody, grades to
	7-10	Clay, light-gray with medium-orange mottles, sticky
WANDO FM (UPPER MEM)	10-14	Sand, coarse-grained, angular, medium-gray, well-sorted, silty, contains feldspar grains, grades to
	14-21	Sand, coarse-grained, angular, medium-gray, well-sorted, clean, contains feldspar grains; quartz and phosphate pebble bed at base
ASHLEY FORMATION	21-25	Calcarenite, fine-grained, medium-yellowish-brown, sparsely phosphatic

Base of Holocene beds: -6 feet below sea level
Base of Wando Formation (upper member): -17 feet below sea level
Bottomed in Ashley Formation

RA-35: 2.3 miles W of east quad. border, 2.5 miles S of north quad. border. Surface elevation 5 feet.

FILL	0-5	Road fill
HOLOCENE BEDS	5-10	Clay, medium-gray grading down to dark-gray, sandy, silty
WANDO FM (UPPER MEM)	at 10	Clay, sandy, medium-orange, contains wood fragments
	10-25	Clay, medium-greenish-gray grading down to medium-bluish-green, scattered lenses of fine-grained sand present
	25-26	Clay, medium-bluish-green, contains phosphate lumps, lenses of coarse-grained sand, and *Anadara ponderosa*
ASHLEY FORMATION	26-30	Calcarenite, fine-grained, medium-yellowish-brown, large foraminifera abundant

Base of Holocene beds: -5 feet below sea level
Base of Wando Formation (upper member): -21 feet below sea level
Bottomed in Ashley Formation

RA-36: 1.4 miles E of west quad. border, 1.8 miles S of north quad. border. Surface elevation 28 feet.

TEN MILE HILL BEDS	0-5	Sand, medium-grained, bright medium-orangish-red with medium-gray mottles, clayey, muscovitic
	5-12	Sand, dominantly medium-grained, light-yellowish-brown, poorly sorted
	12-26	Sand, fine- to medium-grained, light-gray, well-sorted, micaceous, lenses of clay present below 20 feet; no basal phosphate bed
MARKS HEAD FORMATION	26-27	Sand, fine-grained, dark-brown, phosphatic
ASHLEY FORMATION	27-40	Calcarenite, fine-grained, medium-olive-brown, sand-size phosphate abundant below 36 feet

Base of Ten Mile Hill beds: +2 feet above sea level
Base of Marks Head Formation: +1 foot above sea level
Bottomed in Ashley Formation

RA-37: 0.2 miles E of west quad. border, 1.0 miles S of north quad. border. Surface elevation 9 feet.

FILL	0-1	Road fill
HOLOCENE BEDS	1-4	Soil, woody, dark-gray
	4-5	Clay, sandy, dark-gray
WANDO FM (UPPER MEM)	5-9	Sand, medium-grained, dark-gray, silty, moderately well-sorted, angular, grades to
	9-14	Sand, coarse grained, dark-gray, feldspathic; phosphate pebble bed at base
ASHLEY FORMATION	14-25	Calcarenite, fine-grained, medium-olive-brown, large foraminifera present

Base of Holocene beds: +4 feet above sea level
Base of Wando Formation (upper member): -5 feet below sea level
Bottomed in Ashley Formation

RA-38: 1.2 miles E of west quad. border, 2.9 miles S of north quad. border. Surface elevation 36 feet.

TEN MILE HILL BEDS	0-5	Sand, medium-grained, light-gray and light-orange mottled, well-sorted, clayey, micaceous
	5-9	Clay, sandy, light-gray and light-orange mottled grading down to light-gray
	9-14	Sand, medium-grained, light-brown, well-sorted, silty, very fine-grained heavies abundant
	14-17	Sand, fine-grained, medium-bluish-gray, silty, micaceous, contains thin clay lenses, grades down to
	17-24	Clay and silt, sandy, interbedded, medium-bluish-gray, micaceous, sparse shell and wood fragments present, grades down to
	24-36	Clay, medium-blue, stiff, dense, lumpy, sparse shells and phosphate pebbles in basal foot
ASHLEY FORMATION	36-45	Calcarenite, fine-grained, light-brown grading down to medium-yellowish-brown

Base of Ten Mile Hill beds: ±0 feet at sea level
Bottomed in Ashley Formation

RA-39: 3.1 miles W of east quad. border, 2.1 miles N of south quad. border. Surface elevation 11 feet.

WANDO FM (UPPER MEM)	0-5	Sand, medium-grained, medium-orange and medium-gray mottled, well sorted, micaceous, clayey in upper 3 feet
	5-22	Sand, medium-grained, light-brown to medium-orange, well-sorted, silty, sparse phosphate pebbles at base
ASHLEY FORMATION	22-50	Calcarenite, fine-grained, light-green, loose, shelly, no obvious foraminifera or sand-sized phosphate

Base of Wando Formation (upper member): -11 feet below sea level
Bottomed in Ashley Formation

RA-40: 2.1 miles W of east quad. border, 2.2 miles N of south quad. border. Surface elevation 19 feet.

WANDO FM (LOWER MEM)	0-5	Sand, medium-grained, well-sorted, clayey, medium-orange with a few light-gray mottles
	5-8	Clay, stiff, light-gray
	8-22	Clay, sandy, medium-gray grading down to clay, greasy, soft, medium-gray
	22-22.5	Peat, medium-brown
	22.5-35	Silt, sandy, soft, loose, medium-gray, thin bed of medium-gray clay at base
ASHLEY FORMATION	35-70	Calcarenite, fine-grained, medium-yellowish-brown, sparse shell fragments present

Base of Wando Formation (upper member): -16 feet below sea level
Bottomed in Ashley Formation

RA-41: 3.1 miles E of west quad. border, 3.4 miles S of north quad. border. Surface elevation 35 feet (= AH-56-77 of Gohn).

WANDO FM (LOWER MEM)	0-16	Sand, fine-grained, light-gray with sparse medium-orange streaks at top grading down to medium-orange by base; very fine-grained heavy minerals abundant
TEN MILE HILL BEDS	16-24	Clay, greasy, medium-bluish-gray with blotches of light-gray, sandy and micaceous lenses scattered into lower half
	24-37	Sand, fine-grained, silty, phosphatic, medium-gray; shelly below 28 foot depth (Mulinia, Anadara, ponderosa, Dinocardium, oyster, etc.); sparse wood fragments present
	37-40	Sand, coarse-grained, contains phosphate lumps and quartz pebbles
ASHLEY FORMATION	40-89	Calcarenite, fine-grained, medium-brown, very little recovery
DRAYTON LIMESTONE	89-103	Calcarenite, coarse-grained, white

Base of Wando Formation (lower member): +19 feet above sea level
Base of Ten Mile Hill beds: -5 feet below sea level
Base of Ashley Formation: -54 feet below sea level
Bottomed in Drayton Limestone

RA-42: 2.6 miles E of west quad. border, 3.2 miles S of north quad. border. Surface elevation 42 feet.

TEN MILE HILL BEDS	0-26	Sand, fine-grained, light-gray, well-sorted, very fine-grained heavy minerals abundant; clay layer at 20 feet depth, light-gray, stiff
	26-30	Sand, fine-grained, medium-orange grading down to medium-gray and clayey
	30-38	Clay, greasy, medium-bluish-gray, micaceous and sandy layers in lower half
	38-46	Sand, fine-grained, clayey and silty, medium-bluish-gray, shelly (Anadara ovalis, Dosinia discus, Mulinia, Petricola, oyster) with some coral and wood fragments; blebs of dense, medium-green clay in basal foot
ASHLEY FORMATION	46-50	Calcarenite, fine-grained, medium-olive-brown; upper foot weathered and less calcareous than below

Base of Ten Mile Hill beds: -4 feet below sea level
Bottomed in Ashley Formation

RA-43: 2.0 miles E of west quad. border, 3.7 miles S of north quad. border. Surface elevaton 43 feet.

TEN MILE HILL BEDS	0-29	Sand, medium-grained, well-sorted, very fine-grained heavies abundant and micaceous below 2 feet depth, grades from medium-orange (0-2 feet) through light-yellow (2-4 feet) through light-gray (4-26) to medium-orange (26-29 feet)
	29-30	Clay, medium-gray, sticky
	30-35	Sand, medium-grained, well-sorted, very fine-grained heavies and mica abundant, medium-gray
	35-40	Clay, medium-gray, sticky
	40-41	Gravel, composed of quartz and phosphate pebbles in angular quartz sand matrix
LADSON FORMATION?	41-44	Sand, medium-grained, well-sorted, micaceous, phosphatic, medium-gray, no basal phosphate bed
ASHLEY FORMATION	44-45	Calcarenite, fine-grained, phosphatic, medium-olive-brown; numerous burrows present filled with above lithology

Base of Ten Mile Hill beds: +2 feet above sea level
Base of Ladson Formation?: -1 foot below sea level
Bottomed in Ashley Formation

RA-44: 2.9 miles E of west quad. border, 0.7 miles S of north quad. border. Surface elevation 7 feet. (= RA-3-H of Houser)

HOLOCENE BEDS	0-5	Fill and swamp muck
WANDO FM (UPPER MEM)	5-20	Sand, coarse-grained organic-rich in upper part and clean downward; sparse phosphate pebbles at base
ASHLEY FORMATION	20-60	Calcarenite, fine-grained, medium-olive-green, shell fragments and large foraminifera present, increasingly phosphatic downward
DRAYTON LIMESTONE	60-85	Calcarenite, coarse-grained grading down to fine-grained, light-greenish-gray, glauconitic in basal 5 feet

Base of Holocene beds: +2 feet above sea level
Base of Wando Formation (upper member): -13 feet below sea level
Base of Ashley Formation: -53 feet below sea level
Bottomed in Drayton Limestone

RA-45: 0.4 miles W of east quad. border, 0.1 miles S of north quad. border. Surface elevation about 39 feet. (= RA-6-H of Houser)

TEN MILE HILL BEDS	0-7	Sand, medium-grained, clean, medium-orange grading down to light-brown
	7-12	Sand, fine- to medium-grained; clean, micaceous, dark-brown (humic)
	at 12	Clay, medium-gray, soft, thin lamina
	12-35	Sand, fine- to medium-grained, clean, micaceous, light-gray
	35-38	Clay, sandy, medium-bluish-green, soft
ASHLEY FORMATION	38-68	Calcarenite, fine-grained, medium-olive-brown, scattered sand-size phosphate, sparse phosphate pebbles at base
PARKERS FERRY FM	68-85	Calcilutite, stiff, plastic, light-greenish-gray

Base of Ten Mile Hill beds: +1 feet at sea level
Base of Ashley Formation: -29 feet below sea level
Bottomed in Parkers Ferry Formation

RA-46: 1.2 miles W of east quad. border, 1.3 miles S of north quad. border. Surface elevation 18 feet. (= RA-5-H of Houser)

WANDO FM (UPPER MEM)	0-5	Clay, sandy, micaceous, stiff, medium-gray and medium-brown mottled grading down to medium-gray
	5-13	Sand, medium-grained, micaceous, soft, silty, light-bluish-gray, phosphate pebbles at base
ASHLEY FORMATION	13-98	Calcarenite, fine-grained, medium-olive-green to medium-olive-brown; phosphate rare above 62 feet depth, abundant below
PARKERS FERRY FM	98-105	Calcarenite, fine-grained, light-grayish-green, denser than above

Base of Wando Formation (upper member): +5 feet above sea level
Base of Ashley Formation: -80 feet below sea level
Bottomed in Parkers Ferry Formation

RA-47: 1.5 miles W of east quad. border, 4.0 miles S of north quad. border. Surface elevation 7 feet. (= AH-57-77 of Gohn)

SILVER BLUFF BEDS	0-11	Sand, medium- to coarse-grained, medium-orange and light-greenish-gray mottled grading down to light-greenish gray
WANDO FM (MIDDLE MEM)	11-15	Sand, medium- to coarse-grained, clayey, dark-gray
	15-17	Clay, stiff, dark-gray
(LOWER MEM)	17-23	Sand, medium- to very coarse-grained, dark gray
ASHLEY FORMATION	23-58	Calcarenite, fine-grained, medium-olive-brown
PARKERS FERRY FM	58-118	Calcilutite, stiff, plastic, light-olive-green

Base of Silver Bluff beds: -4 feet below sea level
Base of Wando Formation (middle member): -10 feet below sea level
Base of Wando Formation (lower member): -16 feet below sea level
Base of Ashley Formation: -51 feet below sea level
Bottomed in Parkers Ferry Formation

RA-48: 4.0 miles W of east quad. border, 4.5 miles S of north quad. border. Surface elevation 12 feet. (=RA-4-H of Houser)

WANDO FM (UPPER MEM)	0-6	Clay, sandy, stiff, medium-red and medium-gray mottled
	6-18	Sand, medium-grained, silty, loose, light-brown
(MIDDLE MEM)	18-30	Sand, fine-grained grading down to medium-grained, light-gray
	30-40	Clay, silty, micaceous, soft, medium-gray, contains laminae of fine-grained sand
(LOWER MEM)	40-43	Sand, medium-grained, silty, phosphatic, medium-gray; sparse wood fragments present
ASHLEY FORMATION	43-70	Calcarenite, fine-grained, medium-olive-brown, shelly in upper 7 feet, very phosphatic in basal 7 feet
DRAYTON LIMESTONE	70-80	Calcarenite, coarse-grained (bryozoan hash), white

Base of Wando Formation (upper member): -6 feet below sea level
Base of Wando Formation (middle member): -28 feet below sea level
Base of Wando Formation (lower member): -31 feet below sea level
Base of Ashley Formation: -58 feet below sea level
Bottomed in Drayton Limestone

RA-49: 1.1 miles W of east quad. border, 3.2 miles N of south quad. border. Surface elevation 7 feet. (= RA-1-H of Houser)

WANDO FM (UPPER MEM)	0-10	Sand, medium- to coarse-grained, white, light-brown and medium-orange mottled
	10-15	Clay, sandy, micaceous, sticky, light-gray
(MIDDLE MEM)	15-19	Sand, medium- to coarse-grained, clayey, soft, medium-gray
ASHLEY FORMATION	19-66	Calcarenite, fine-grained, medium-olive-green, shelly; scattered sand-size phosphate becomes abundant in basal 11 feet
PARKERS FERRY FM	66-70	Calcilutite, soft, slightly granular, medium-greenish-gray

Base of Wando Formation (upper member): -8 feet below sea level
Base of Wando Formation (middle member): -12 feet below sea level
Base of Ashley Formation: -59 feet below sea level
Bottomed in Parkers Ferry Formation

RA-50: 0.1 mile W of east quad. border, 0.5 mile N of south quad. border. Surface elevation 15 feet. (= RA-7-H of Houser)

WANDO FM (UPPER MEM)	0-5	Sand, fine-grained, micaceous, clean, white
	5-23	Sand, medium- grading down to coarse-grained, light-gray grading down to dark-orange in basal 6 feet
	23-23.2	Clay, medium-gray, contains grains of coarse sand
(LOWER MEM)	23.2-25	Sand, coarse-grained, dark-gray, shelly, phosphatic; phosphate pebbles at base
EDISTO FORMATION	25-29	Calcarenite, fine-grained, light-yellowish-brown, softer than below
ASHLEY FORMATION	29-76	Calcarenite, fine-grained, medium-olive-brown; phosphate very abundant in basal 26 feet
PARKERS FERRY FM	76-80	Calcilutite, stiff, light-olive-green

Base of Wando Formation (upper member): -8.2 feet below sea level
Base of Wando Formation (lower member): -10 feet below sea level
Base of Edisto Formation: -14 feet below sea level
Base of Ashley Formation: -61 feet below sea level
Bottomed in Parkers Ferry Formation

RA-51: 0.5 mile W of east quad. border, 1.8 miles N of south quad. border. Surface elevation 15 feet. (= RA-2-H of Houser)

WANDO FM (UPPER MEM)	0-5	Clay, contains fine-grained sand, medium-gray and medium-orange mottled
	5-10	Sand, fine-grained, clayey, medium-gray and light-brown mottled
	10-16	Sand, fine-grained, silty, dark-gray
ASHLEY FORMATION	16-75	Calcarenite, fine-grained, medium-olive-brown; abundant to scattered sand-size phosphate; very shelly between 38 and 41 feet depth
PARKERS FERRY FM	75-100	Calcilutite, moderately stiff, moderately plastic, medium-greenish-gray

Base of Wando Formation (upper member): -1 foot below sea level
Base of Ashley Formation: -60 feet below sea level
Bottomed in Parkers Ferry Formation

RA-52: 0.6 miles N of south quad. border, 2.1 miles E of west quad. border. Surface elevation 15 feet. (= AH-58-77 of Gohn)

WANDO FM (UPPER MEM)	0-7	Sand, fine- to medium-grained, clean, light-brownish-gray grading down to medium-orange
	7-13	Sand, fine- to medium-grained, silty, light-brownish-gray grading down to medium-orange
	at 13	Clay, medium-gray
(LOWER MEM)	13-28	Sand, fine- to medium-grained, slightly clayey; shelly below 23 feet depth, medium-gray grading down to dark gray
ASHLEY FORMATION	28-73	Calcarenite, fine-grained, medium-olive-brown

Base of Wando Formation (upper member): +2 feet above sea level
Base of Wando Formation (lower member): -13 feet below sea level
Bottomed in Ashley Formation

RA-53: 3.4 miles E of west quad. border, 2.2 miles N of south quad. border. Surface elevation 17 feet. (= AH-14-76 of Gohn)

FILL	0-5	Fill
WANDO FM (UPPER MEM)	5-14	Sand, medium-grained, clean, micaceous, white except for bright orange between 10 and 12 feet depth
	14-20	Sand, fine-grained, micaceous, dark-gray, interbedded with clay, sticky, dark-gray
	20-27	Clay, sticky, dark-gray
	27-29	Gravel, composed of phosphate pebbles
ASHLEY FORMATION	29-65	Calcarenite, fine-grained, medium-olive-brown, scattered shell fragments present
DRAYTON LIMESTONE	65-140	Calcarenite, coarse-grained grading down to fine-grained, loose, light-greenish-gray

Base of Wando Formation (upper member): -12 feet below sea level
Base of Ashley Formation: -48 feet below sea level
Bottomed in Drayton Limestone