

U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Detailed sections from auger holes in the Bowling Green,  
Penola, Sparta, and Supply quadrangles, Virginia

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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

## Contents

	<u>Page</u>
Introduction.....	1
Ages and sequence of regionally recognized geologic units.....	3
References cited.....	4
Locality descriptions and detailed lithologic logs:	
Bowling Green quadrangle.....	5
Penola quadrangle.....	9
Sparta quadrangle.....	11
Supply quadrangle.....	13
Columnar sections of holes in the Supply and surrounding quadrangles.....	39
Symbols used in columnar sections for the Supply and surrounding quadrangles.....	62

## Introduction

While preparing a detailed map for the Supply 7.5-minute quadrangle, sediments from numerous auger holes were studied and recorded to determine their lithologic characteristics, spatial distribution, and temporal framework. The distribution of major geologic units and unit boundaries will be shown on a forthcoming map, but much of the detailed subsurface data could not be shown in such a visual manner. Therefore, these data are collected in this open-file report for geologists, engineers, and community planners. Lithologic logs are given for auger holes at 21 localities in the Supply quadrangle and for 6 nearby localities in adjacent quadrangles. These logs provide a shallow-subsurface stratigraphic framework for the Supply quadrangle. Surface elevations for each drill site were obtained by hand levelling from a locality of known elevation, commonly a bench mark or spot elevation point on the appropriate 7.5-minute quadrangle map.

The data in this report were gathered by augering with a truck-mounted, Mobile Drill B-40 power auger, using 5-foot drill stem sections. At first, one stem was augered into the ground and pulled to describe the soil profile. Subsequent runs added one, two, or three new stems, depending on depth and on how easily the augering proceeded. For greater accuracy, we attempted to keep sample rise on the drill stem to a minimum. Most auger holes targeted the lower Pliocene Yorktown Formation and its basal contact with the upper Miocene Eastover Formation.

level of the Yorktown outcrop belt. Older units penetrated by the auger were the Eastover Formation (upper Miocene), Calvert Formation (lower?/middle Miocene), and Nanjemoy Formation (lower Eocene). The St. Marys Formation (upper Miocene) and Choptank Formation (middle Miocene) were not recognized within these quadrangles. However, because the St. Marys is lithologically similar to the Eastover, and the Choptank is lithologically similar to the Calvert, it is possible that beds of these units were encountered and not identified.

Lithic descriptions were made with the aid of a 10X hand lens, grain-size and color charts, and occasionally a binocular microscope. In the following lithologic logs, samples collected for further analysis are indicated by an asterisk with an accompanying number representing the drill depth of the sample (for example, \*22). It is probable that units described as "clays" may include clayey silts or clayey sands. Unit names conform to those used in this region by Powars (1987), Mixon and others (1989a,b), and Ward and Powars (1989). In addition to the detailed lithologic descriptions, columnar sections were prepared for each auger hole by D.S. Powars. These columns, in conjunction with the detailed log descriptions, should aid the reader in visualizing the lithic and stratigraphic relationships of units in the Supply and surrounding quadrangles.

Age and Sequence of Units Penetrated during Augering

<u>Unit</u>	<u>Lithology</u>	<u>Age</u>
Artificial Fill	materials variable	HOLOCENE
Alluvium and Colluvium	Fine to coarse quartz sand; silty or clayey, pebbly, olive-gray to light-tan	HOLOCENE AND PLEISTOCENE
Yorktown Formation	Fine to coarse quartz sand, gravelly in part; reddish-brown, yellowish- orange, to gray; marine beds contain <u>Ophiomorpha</u>	PLIOCENE
Eastover Formation	Fine shelly quartz sand and silt; dark-gray to bluish-gray (fresh), orange to brown (weathered)	MIOCENE
Calvert Formation	Fine quartz or quartz/ phosphate sand, to clay-silt; diatomaceous, olive-gray	MIOCENE
Nanjemoy Formation	Fine quartz sand; glauconitic, shelly, muddy, micaceous, greenish-gray to black	EOCENE

### References cited

- Mixon, R.B., Powars, D.S., Ward, L.W., and Andrews, G.W., 1989a, Lithostratigraphy and molluscan and diatom biostratigraphy of the Haynesville cores -- outer Coastal Plain of Virginia: U.S. Geological Survey Professional Paper 1489, p.A1-A48.
- Mixon, R.B., Berquist, C.R., Jr., Newell, W.L., Johnson, G.H., Powars, D.S., Schindler, J.S., and Rader, E.K., 1989b, Geologic map of the Coastal Plain and adjacent parts of the Piedmont, Virginia with generalized geologic cross sections: U.S. Geological Survey Miscellaneous Investigations Map I-2033, scale 1:250,000.
- Powars, D.S., 1987, Geology of the King George quadrangle, King George County, Virginia, and a brief discussion of the regional stratigraphy and structure: Unpublished masters thesis, The George Washington University (Washington, D.C.), 194 p.
- Ward, L.W., and Powars, D.S., 1989, Tertiary stratigraphy and paleontology, Chesapeake Bay Region, Virginia and Maryland: International Geological Congress Field Trip T-216 (July 15-17, 1989), American Geophysical Union, 64 p.

Locality Descriptions and Detailed Lithologic Logs

BOWLING GREEN QUADRANGLE  
(depths in feet)

-----  
BG-91-1: 0.4 mi. W of east quad. (quadrangle) border, 2.2 mi. S  
of north quad. border, near site of Hicks Mill  
(77°15'29"W, 38°05'37"N). Surface elevation 98 feet.  
-----

FILL                      0-5      Artificially mixed Pliocene and Miocene  
sands, silts and clays, tan and gray, shoved  
around during dam construction

.....  
ALLUVIUM                5-23      Sand and silty sand, poorly sorted, mostly  
loose, light-tan to light-gray, pebble bed  
at base 2 inches thick, pebbles up to 3 cm  
in diameter and a few olive-gray (5Y3/2)  
clay clasts eroded from unit below

.....  
CALVERT FM            23-28      Silt, sandy, olive-gray (5Y3/2); top 4  
inches stained by iron oxides producing  
yellow, tan, and orange mottling; contains  
\*24                                      fragments of fish bones; basal foot sandy  
with sparse pebbles up to 0.5 cm

.....  
NANJEMOY FM          28-37      Sand, fine-grained, more than 20%  
glauconite, micaceous, olive-black (5Y2/1)  
to dark-greenish-gray (5GY4/1); sparsely  
\*36-37                                      shelly at top and more shelly downward,  
sparse wood fragments present

-----  
Base of Alluvium:                                      75 feet above sea level  
Base of Calvert Formation:                                      70 feet above sea level  
Bottomed in Nanjemoy Formation





-----  
BG-91-3: 2.95 mi. W of east quad. border, 2.75 mi. S of north  
quad. border (77°18'12"W, 38°05'07"N). Surface  
elevation 205 feet.  
-----

FILL	0-7	Sand, very fine- to coarse-grained, medium orangish-brown, silt/clay matrix, dense, gray clay blobs at base
.....		
YORKTOWN FM	7-12	Sand, fine- to very coarse-grained, yellowish-orange, silty matrix, pebbly (subrounded to subangular, up to 1.5 cm diameter), dense, tough drilling
	at 12	Clay beds (0.5 to 1.0 cm thick) interbedded with sand or clay clasts in sand matrix, light-gray
	12-20	Sand, fine- to medium-grained, poorly sorted, grading through poorly sorted clayey sand to sandy clay and silt in basal foot;; a few clay clasts present, yellow to brown to pinkish-red; very tough drilling from 16- 20 feet
	20-23	Sand, medium- to very coarse-grained, brownish-yellow, grading down to gravel in coarse-grained sand matrix, with quartz pebbles up to 1.5 cm and light-gray clay lenses or rip-up clasts, yellowish-orange
	23-33	Sand, dominantly medium-grained with coarse to fine fractions, clayey and silty, yellow to medium-pink, sparse angular 0.25 cm pebbles present, thixotropic at 28 feet, abundant very fine-grained heavy minerals present, some blue quartz, sorting increases downward to 30 feet, then grades rapidly to coarse-grained sand with abundant blue quartz, some of which is in burrows into finer sediment from 31-33
	33-34.5	Sand, medium- to very coarse-grained, light- pink, with scattered pebbles up to 1 cm in diameter; sharp basal contact with burrows 1 foot into unit below
	34.5-36	Clay, sandy, interbedded with silt, very fine- to fine-grained sandy, light-brown to yellowish-brown to orange with very thin

BG-91-31 (continued)

light-gray clay-silt layers or burrows;  
grades rapidly to:

- 36-48 Sand, fine-grained, well sorted, yellow to tan to pink, with abundant thin light-gray to pink clay-silt layers and/or burrow linings around 37 feet and 39 feet; sand thixotropic, grades down to medium- to coarse-grained by 45 feet, pink to yellow, then back to fine-grained, then back to dominantly medium-grained with a few granules and very fine pebbles; 3 inch bed of light gray clay at base
- 48-56 Sand, medium- to very coarse-grained, poorly sorted, brown to yellow, with scattered granules and pebbles up to 0.5 cm, interbedded with light-gray to yellow clay beds 1 inch thick; dense 6-inch thick gray clay bed at 52 feet
- 56-61 Sand, medium- to very coarse grained, poorly sorted, brown to yellow, with scattered granules and pebbles up to 0.5 cm, smooth and subangular; blue quartz abundant; coarsens downward to sharp basal contact with burrows extending 2 feet into sand below; grains coated by iron oxides to produce yellow, orange, and brown mottling.
- 61-64 Sand, medium-grained, yellow, well sorted, some granules and heavy minerals present, grades down to:
- 64-71 Sand, medium- to very coarse-grained, silty better sorted than coarse sands above, brownish-yellow to yellow, basal two feet pebbly (up to 2 cm) with pebbles subrounded to subangular and smooth; basal foot has a dark-brown clay matrix with pebbles concentrated at basal contact; burrows into clay below for 2 feet; wood fragment at 68 feet

.....  
EASTOVER FM 71-76 Clay, silty, dense, moderate-yellowish-olive to tan, grades rapidly to dark-greenish-gray (5G5/1 to 5G4/1) in basal 2 feet; olive portion has abundant plenthitic lumps; very fine-grained sand streaks in basal part

-----  
Base of fill: 198 feet above sea level  
Base of Yorktown Formation: 134 feet above sea level  
Bottomed in Eastover Formation

# PENOLA QUADRANGLE

-----  
PE-91-1: 2.15 mi. E of west quad. border, 0.4 mi. S of north  
quad. border (77°20'11"W, 37°59'40"N). Surface elevation  
194 feet.  
-----

FILL	0-1	Road bed material
.....		
YORKTOWN FM	1-3	Sand, medium- to very coarse-grained, some blue quartz, sparsely pebbly (up to 0.5 cm), clayey, orange to yellow
	3-4	Gravel, pebbly (up to 3 cm), mostly quartz, well rounded, in coarse-sand matrix, yellow to light-gray
	4-6	Sand, medium- to coarse-grained, contains sparse small pebbles (up to 0.5 cm), orange
	6-11	Gravel, pebbly (up to 3 cm), in medium- to very coarse-grained sand matrix, yellow; large light-gray clay clast near top
	11-16	Sand, fine- to medium-grained, silty, well sorted, some coarse fraction, yellow; at 14 feet becomes finer and better sorted with horizontal bedding apparent and clay-silt lined sand-filled burrows, light-gray, contains rare smooth, rounded granules
	16-21	Sand, fine-grained, well sorted, scattered coarse grains, orange to brown (16-17 feet) grading rapidly down to white to light-gray; probable <u>Ophiomorpha</u> burrows from 20-21 feet
	21-23	Sand, dominantly fine- to medium-grained, scattered granules to fine pebbles, light-gray to nearly white, sharp basal contact
.....		
EASTOVER FM	23-27	Silt, sandy and clayey, massive, light orangish-brown to tan, grades rapidly to:
	27-28	Silt, clayey, massive, bluish-gray
	28-31	Sand, fine-grained, clayey, dense, includes significant subrounded granule fraction, wood chunk at base; grades rapidly to:
*30		
	31-32	Sand, coarse- to medium-grained with scattered

PE-91-1 (continued)

		very coarse grains, granules, and pebbles up to 1 cm;; sharp basal contact
*33	32-36	Sand, fine-grained, silty and clayey, well sorted, dark-gray, sparse medium to very coarse grains
*39-40	36-40	Sand, fine-grained with some medium- to granular grains, very minor silt and clay, clean, dark-gray, medium-gray, and greenish-gray
	40-41	Gravel, quartz pebbles, semidiscoidal, smooth, and rounded, up to 5 cm, medium-grained sand matrix, light- to medium-gray
*50	41-51	Sand, fine-grained to very fine-grained, silty, abundant large mica flakes, dark-gray, slightly coarser and better sorted downward, small wood fragments at 47 feet, dark-greenish-gray by base

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Base of fill	193 feet above sea level
Base of Yorktown Formation	171 feet above sea level
Bottomed in Eastover Formation	

# SPARTA QUADRANGLE

-----  
SP-91-1: 0.6 mi. E of west quad. border, 0.7 mi. S of north quad.  
border, at junction of VA 640 and VA 721 (77°14'22"W,  
37°59'25"N). Surface elevation 93 feet.  
-----

FILL	0-4	Mixed materials for road base
.....		
ALLUVIUM	4-14	Sand, fine-grained with sparse medium-grained fraction, silty to clayey, greenish-gray (5GY6/1) to olive-gray (5Y4/1), soft
	14-19	Sand, medium- to coarse-grained, pebbly (about 1 cm diameter), greenish-gray (5GY6/1) to olive-gray (5Y4/1); large wood log penetrated at 16-17 feet
.....		
CALVERT FM	19-29	Silt, sandy and clayey, olive-gray (5Y3/2) to grayish-olive-green (5GY3/2), dense
	29-33	Sand, fine-grained, olive-gray (5Y3/2) to grayish-olive-green (5GY3/2), dominantly quartz with some phosphate; phosphate pebbles and quartz granules (about 0.25 cm) scattered throughout, phosphate pebbles (about 0.5 cm) on basal contact
.....		
NANJEMOY FM	33-41	Sand, fine-grained, olive-gray (5Y3/2), very micaceous; burrowed with burrows full of glauconite and quartz sand; somewhat clayey below 35 feet and shelly below 36 feet; drill stopped and spun on very hard object about 33.5 feet (calcareous nodule?)

Base of fill	89 feet above sea level
Base of alluvium	74 feet above sea level
Base of Calvert Formation:	60 feet above sea level
Bottomed in Nanjemoy Formation	

-----  
SP-91-2: 1.25 mi. E of west quad. border, 0.8 mi. S of north  
quad. border, on east side of VA 721 (77°13'39"W,  
37°59'09"N). Surface elevation 125 feet.  
-----

YORKTOWN FM      0-4      Gravel, quartz cobbles up to 4 cm in  
                         diameter, densely packed

.....  
EASTOVER FM      4-6      Sand, fine- to medium-grained, yellowish-  
                         brown

                 6-15      Sand, fine-grained, silty, grading down to  
                         interbedded fine-grained silty sand and  
                         clayey silt, yellowish-brown to 13 feet,  
                         dark-bluish-greenish-gray below 13 feet

-----  
Base of Yorktown Formation: 121 feet above sea level  
Bottomed in Eastover Formation

# SUPPLY QUADRANGLE

SU-91-1: 0.25 mi. E of west quad. border, 0.15 mi. S of north quad. border, on east side of A.P. Hill service road paralleling U.S. Highway 301 (77°14'45"W, 38°07'22"N). Surface elevation 160 feet.

FILL	0-7	Sand, fine- to coarse-grained, mottled orange, brown, yellow, gray, and red; base marked by chunks of wood and a dark brown layer probably representing a buried soil
YORKTOWN FM	7-9	Sand, fine- to medium-grained, dark heavy minerals present, dark-yellowish-brown to brownish-yellow, grading downward to fine-grained clayey and silty sand
	9-11	Sand, fine-grained, very clayey and silty, tan
	11-17	Sand, fine-grained, silty, light-gray (N7)
EASTOVER FM	17-29	Clay, silty, light-gray (N7) (17-18) grading to dark-greenish-gray (5GY4/1); coarsens to sandy silt from 20 to 24 feet
*25		
	29-33	Sand, fine-grained, silty and clayey, shelly, dark-greenish-gray (5GY4/1)
*29-33		
CALVERT FM	33-46	Silt, clayey, very sparse shells, massive, grayish-olive (10Y4/2) to olive-gray (5Y3/2); grades downward to sandy silt by 36 feet, forams and echinoid spines present at 38 feet
*38		
	46-61	Silt, sandy, some phosphate and heavy mineral grains present, sparse shell fragments, echinoid spines and foraminifera, grayish-olive (10Y4/2) to olive-gray (5Y3/2)

Base of fill: 153 feet above sea level  
 Base of Yorktown Formation: 143 feet above sea level  
 Base of Eastover Formation: 127 feet above sea level  
 Bottomed in Calvert Formation

-----  
SU-91-2: 1.3 mi. W of east quad. border, 1.15 mi. S of north  
quad. border, southwest of ford over Portobago  
Creek (77°08'53"W, 38°06'30"N). Surface elevation 53  
feet.  
-----

CALVERT FM	0-5	Sand, very fine-grained, silty, pale-yellowish-brown (10YR6/2) (0-2 feet) grading through light-bluish-gray (5B7/1) (2-4 feet) through moderate-olive-brown (5Y4/4) (4-4.5 feet) to grayish-olive (10Y4/2) (4.5-5 feet); soil profile on Calvert Formation
	5-11	Sand, fine-grained, silty, grayish-olive (10Y4/2); phosphate and quartz granules at base; sparse carbonized wood present
	11-14	Sand, fine-grained, silty, grayish-olive (10Y4/2); lower part contains phosphate pebbles up to 1 cm in diameter
	14-19	Sand, fine-grained, grayish-olive (10Y4/2), micaceous, contains concretions, grades to fine-grained pebbly phosphatic sand at base; basal contact sharp with burrows into the underlying unit
.....		
NANJEMOY FM	19-26	Sand, fine-grained, greenish-black (5GY2/1) to olive-black (5Y2/1), glauconitic, fruit of <u>Wetherellia</u> near top (typical Woodstock Member fossil), micaceous, sparsely shelly
*23		

-----  
Base of Calvert Formation: 34 feet above sea level  
Bottomed in Nanjemoy Formation  
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-----  
SU-91-4 0.35 mi. W of east quad. border, 1.4 mi. S of north  
quad. border, at intersection of VA 699 and VA 625  
(77°07'54"W, 38°06'16"N. Surface elevation 150 feet.  
-----

FILL 0-1 Sand, fine- to coarse-grained, pebbly and  
cobbly, road base  
-----

YORKTOWN FM 0-8 Sand, fine- to medium-grained, silty, with  
some coarse-grained fraction, light-olive-  
brown (2.5Y5/5) to yellowish-brown  
(10YR5/7), grades to coarse-grained near  
base

8-10 Clay, moderate-yellowish-orange (10YR5/4) to  
grayish-orange (10 YR 7/4) and pale-  
yellowish-brown (10YR 6/2), dense, contains  
pebbles up to 1 cm in diameter

10-11 Sand, fine- to coarse-grained, clayey  
matrix, grayish-orange (10YR7/3)

11-12 Clay, pale-red (2.5 YR6/2 to weak red  
(2.5YR5/2), dense

12-21 Sand, coarse-grained, moderate yellowish-  
brown (10YR5/4) to pale-yellowish-brown  
(10YR6/2), grading downward to medium- to  
fine-grained and then back to dominantly  
coarse-grained, light-olive-gray (5Y6/2) to  
greenish-gray (5G6/1), pebbly (rounded, up  
to 1 cm), grades to:

\*20

21-23 Sand, coarse-grained, pebbly (up to 3 cm,  
very rounded, many discoids, mostly quartz  
and some chert)

23-30 Sand, fine-grained, silty, massive,  
glaucous, greenish-gray (5G6/1); 6 inch  
pebble bed at base (up to 2 cm, well rounded  
quartz discoids), sharp basal contact;  
burrows of this material extend into upper 6

\*29 inches of layer below

.....  
EASTOVER FM 30-41 Silt, clayey with fine-grained sand laminae,  
dark-greenish-gray (5GY4/1 to 5G4/1) in  
upper foot grading through greenish-gray  
\*34 (5G5/1) back to 5G4/1 and 5GY4/1 again; more  
sandy downward, sparse shells in basal foot

SU-91-4 (continued)

41-51 Sand, fine-grained, silty, dark-greenish-gray (5GY4/1 to 5G4/1), shelly (Chesapecten and barnacles among others)

51-53 Sand, fine-grained, silty and clayey, greenish-gray (5GY5/1), sharp basal contact; one burrow extends into bed below

.....  
CALVERT FM 53-56 Sand, fine-grained, silty, olive-gray  
(5Y4/2); sparse wood fragments present

-----  
Base of Yorktown Formation: 120 feet above sea level

Base of Eastover Formation: 97 feet above sea level

Bottomed in Calvert Formation

-----  
SU-91-5 0.2 mi. W of east quad. border, 3.95 mi. N of south  
quad. border, on south side of VA 640 east of creek  
(77°07'44"W, 38°03'26"N). Surface elevation 135 feet.  
-----

YORKTOWN FM      0-5      Sand, dominantly medium-grained, brownish-  
red, abundant subrounded but smooth pebbles  
scattered throughout (0.5 to 1.5 cm in  
diameter), grades to

5-15      Sand, coarse-grained, moderate-yellowish-  
brown (10YR5/4) grading down to dark-  
yellowish-orange (10YR6/6) and then by 13  
feet to pale-yellow (5Y7/4 and 5Y8/3), from  
13.5 to 15 feet strong-brown (7.5YR4/6 and  
7.5YR5/8); sparse rounded ovoid pebbles on  
basal contact

.....  
EASTOVER FM      15-32      Sand, fine-grained, silty, well sorted,  
olive (5Y4/3) to greenish-yellow (10Y7/4)  
from 15-17, grading down through strong-  
brown (7.5YR5/8) and yellowish-brown  
(10YR5/8) (17-17.5) to dark-greenish-gray  
(5G4/1)

32-45      Clay, silty, stiff and sticky, dark-  
greenish-gray (5G4/1)

45-47      Silt, fine-grained sandy, sparsely shelly,  
interbedded with fine-grained silty sand,  
dark-greenish-gray (5G4/1), phosphate grains  
and angular coarse quartz sand grains  
present

47-48      Silt, clayey, dark-greenish-gray (5G4/1);  
sparse phosphate pebbles present

.....  
CALVERT FM      48-53      Silt, clayey, olive-gray (5Y4/1),  
dense, massive  
-----

Base of Yorktown Formation: 120 feet above sea level

Base of Eastover Formation: 87 feet above sea level

Bottomed in Calvert Formation

-----  
SU-91-6 3.2 mi. W of east quad. border, 2.8 mi. N of south  
quad. border, on east side of White Lake just north of  
VA 618 (77°10'59"W, 38°02'25"N). Surface elevation 124  
feet.  
-----

FILL	0-2	Sand, coarse-grained, pebbly
.....		
EASTOVER FM	2-13	Sand, fine-grained, silty, dark-yellowish- orange (10YR6/6), reddish-yellow (7.5YR6/8), and pale-yellow (5Y7/3) (2-5 feet) grading to light-yellowish-brown (2.5Y6/4) (5-13 feet), grades rapidly to:
	13-17	Sand, fine-grained, clayey and silty, dark- greenish-gray (5GY4/1), grades rapidly to:
	17-27	Sand, fine-grained, slightly silty, dark- greenish-gray (5GY4/1)
	27-28	Silt, clayey, dark-greenish-gray (5GY4/1), dense, scattered lumpy but rounded phosphate pebbles up to 2 cm in diameter
.....		
CALVERT FM	28-38	Sand, fine-grained, silty, to fine-grained sandy silt, olive-gray (5Y4/2), finely micaceous; at 31 feet a subrounded quartz pebble, a subangular quartz pebble, and a ray tooth ( <u>Myliobatis</u> ) are present; more silty below 31 feet but then grades back to more sandy

-----  
Base of Eastover Formation: 96 feet above sea level  
Bottomed in Calvert Formation  
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-----  
SU-91-7 1.05 mi. E of west quad. border, 0.95 mi. N of south  
quad. border, just east of pond spillway (77°13'53"W,  
38°01'02"N). Surface elevation 157 feet.  
-----

YORKTOWN FM      0-8      Sand, medium-grained, light-yellowish-brown  
(10YR6/4) to dark-yellowish-orange  
(10YR6/6), scattered quartz pebbles  
throughout and very pebbly in basal foot  
(0.5-1.0 cm)

.....  
EASTOVER FM      8-16      Silt, clayey, light-yellowish-brown  
(10YR6/4) to dark-yellowish-orange  
(10YR6/6), massive, micaceous, sandy, grades  
rapidly to:

16-21      Silt, clayey, light-bluish-gray (5B7/1),  
massive, woody material present from 18 to  
19 feet

21-32      Sand, fine-grained, silty, light-yellowish-  
brown (10YR6/4) to dark-yellowish-orange  
(10YR6/6)

32-45      Sand, fine-grained, clayey and silty, dusky-  
blue-green (5BG3/2) to greenish-black  
(5GY2/1), very clayey from 38 to 39

45-64      Silt, clayey, dark-greenish-gray (5GY4/1)  
stiff, shelly, carbonized log about 3 inches  
above basal contact

.....  
CALVERT FM      64-66      Silt, clayey, grayish-olive-green (5GY3/2),  
unfossiliferous

-----  
Base of Yorktown Formation: 149 feet above sea level

Base of Eastover Formation: 93 feet above sea level

Bottomed in Calvert Formation

-----  
SU-91-8 1.95 mi. E of west quad. border, 0.2 mi. N of south  
quad. border, on south side of road south of pond  
(77°12'54"W, 38°00'12"N). Surface elevation 134 feet.  
-----

FILL	0-3	Road materials, wood, and leaves
ALLUVIUM	3-5	Sand, medium- to coarse-grained, pebbly
YORKTOWN FM	5-25	Sand, coarse-grained grading down to medium-grained, dark-yellowish-orange (10YR6/6), pebbly, well sorted below 7 feet, sharp basal contact
EASTOVER FM	25-41	Clay, silty, mottled dark-yellowish-orange (10YR6/6), moderate-yellowish-brown (10YR5/4) and light-bluish-gray (5B7/1), grading down by 30 feet to dark-greenish-gray (5G4/1) and greenish-black (5G2/1); from 38-41 feet goes to a silty and clayey fine-grained sand and then back to a clayey silt; burrows filled with this material in upper foot of unit below
CALVERT FM	41-45	Sand, fine-grained, silty, grayish-olive-green (5GY3/2) to olive-gray (5Y3/2), micaceous

-----  
Base of fill: 131 feet above sea level  
Base of alluvium: 129 feet above sea level  
Base of Yorktown Formation: 109 feet above sea level  
Base of Eastover Formation: 93 feet above sea level  
Bottomed in Calvert Formation

-----  
SU-91-9 3.2 mi. E of west quad. border, 1.6 mi. N of south  
quad. border, in old borrow pit on west side of VA  
Route 618 on north side of branch of Beverly Run  
(77°11'30"W, 38°01'45"N). Surface elevation 153 feet.  
-----

FILL	0-2	Sand, fine- to medium-grained, pebbly, humic
.....		.....
YORKTOWN FM	2-10	Sand, fine- to medium-grained, dark- yellowish-orange (10YR6/6) to 5 feet, yellowish-gray (5Y8/1) from 5 to 7 feet, and dark-yellowish-orange (10YR6/6) from 7 to 10 feet, well sorted
	10-20	Sand, coarse-grained, dark-yellowish-orange (10YR6/6), very pebbly from 10 to 12 feet
.....		.....
EASTOVER FM	20-36	Silt, sandy and clayey, moderate-yellowish- brown (10YR5/4) to dark-yellowish- orange(10YR6/6) down to 30 feet, then grades rapidly to medium-bluish-gray (5B5/1)
	36-51	Spun down without recovery; all appears to be as above but coarsens to a silty sand
	51-58	Sand, fine-grained, silty, with interlayers of clayey sand, dark-greenish-gray (5G4/1)
	58-64	Silt, clayey, dusky-yellowish-green (10GY3/2), shelly including <u>Chesapecten</u> and other thick-shelled molluscs
.....		.....
CALVERT FM	64-66	Sand, fine-grained, silty, dense, olive-gray  (5Y3/2), appears to have burrows filled with above lithology from 64-65 feet

-----  
Base of fill: 151 feet above sea level  
Base of Yorktown Formation: 133 feet above sea level  
Base of Eastover Formation: 89 feet above sea level  
Bottomed in Calvert Formation



-----  
SU-91-10 1.1 mi. W of east quad. border, 1.9 mi. N of south  
quad. border, by road on pond spillway (77°08'39"W,  
38°02'02"N). Surface elevation 121 feet.  
-----

FILL	0-4	Sand and silt, road and dam material
.....		
ALLUVIUM	4-10	Sand, medium-grained, light-olive-gray (5Y6/1), soft, pebbly (about 1 cm diameter)
	10-11	Sand, fine-grained, very dark-grayish-brown (10YR3/2), wood fragments present
	11-16	Sand, medium- to coarse-grained, reddish- brown (5YR4/3), very quartz pebbly (up to 5 cm)
.....		
EASTOVER FM	16-42	Sand, fine-grained, silty, dark-greenish- gray (5GY4/1), shells abundant to base, sharp basal contact without pebbles
.....		
CALVERT FM	42-44	Silt, grayish-olive-green (5GY3/2), dense, massive, clayey, unfossiliferous
	44-46	Sand, fine-grained, silty, grayish-olive- green (5GY3/2)

-----  
Base of fill: 117 feet above sea level  
Base of alluvium: 105 feet above sea level  
Base of Eastover Formation: 79 feet above sea level  
Bottomed in Calvert Formation

-----  
SU-91-11 2.5 mi. W of east quad. border, 1.1 mi. N of south  
quad. border, on east side of VA Route 665 on road fill  
across Beverly Run swamp (77°10'11"W, 38°01'10"N).  
Surface elevation 101 feet.  
-----

FILL	0-3	Sand and silt, road base
.....		
ALLUVIUM	3-23	Sand, medium- to coarse-grained, olive-gray (5Y4/1), soft, very pebbly in basal 3 feet, pebbles up to 4 cm in diameter
.....		
CALVERT FM	23-31	Silt, clayey, grayish-olive-green (5GY3/2), dense
	31-60	Spun down, poor recovery, parts seen were typically Calvert
	60-68	Sand, fine-grained, silty, grayish-olive- green (5GY3/2), dense, phosphatic, phosphate pebbles (less than 0.5 cm) scattered through basal 3 feet
.....		
NANJEMOY FM	68-75	Sand, fine-grained, silty, olive-gray (5Y3/2) with bluish tint, glauconitic, very micaceous, shelly from 65 to 75

-----  
Base of fill: 98 feet above sea level  
Base of alluvium: 78 feet above sea level  
Base of Calvert Formation: 33 feet above sea level  
Bottomed in Nanjemoy Formation

-----  
SU-91-12 0.15 mi. W of east quad. border, 0.3 mi. N of south  
quad. border, on west side of VA Route 625 (77°07'39"W,  
38°00'16"N). Surface elevation 170 feet.  
-----

YORKTOWN FM      0-9      Sand, fine- to medium-grained, rather  
   angular, dark-yellowish-orange (10YR6/6)

                         9-11      Clay, sandy, dark-yellowish-orange (10YR6/6)

                         11-12      Sand, medium- to coarse grained, dark-  
   yellowish-orange (10YR6/6), pebbly (about 1  
   cm in diameter)

                         12-17      Sand, medium- to coarse-grained, dark-  
   yellowish-orange (10YR6/6)

                         17-20      Sand, medium- to coarse-grained, dark-  
   yellowish-orange (10YR6/6), pebbly (1-2 cm)

                         20-21      Clay, silty, dark-yellowish-orange (10YR6/6)

                         21-22      Sand, fine- to medium-grained, dark-  
   yellowish-orange (10YR6/6)

                         22-23      Sand, coarse-grained, dark-yellowish-orange  
   (10YR6/6), pebbly (1-2 cm)

                         23-29      Sand, fine- to medium-grained, dark-  
   yellowish-orange (10YR6/6), granules of  
   quartz concentrated at base

.....  
EASTOVER FM      29-31      Silt, fine-grained sandy, dark-yellowish-  
   orange (10YR6/6)  
-----

Base of Yorktown Formation: 141 feet above sea level  
Bottomed in Eastover Formation

-----  
SU-91-13 2.3 mi. W of east quad. border, 2.95 mi. S of north  
quad. border, on west side of Va Route 625 (77°09'58"W,  
38°04'58"N). Surface elevation 173 feet.  
-----

YORKTOWN FM      0-21    Sand, medium- to coarse-grained, subangular,  
                         moderate-yellowish-brown, pebbly (up to 1  
                         cm), grading down to:  
  
                         21-34    Sand, medium- to coarse-grained, subangular,  
                         dark-yellowish-orange (10YR6/6), pebbly (up  
                         to 1 cm)  
  
                         34-35    Gravel, quartz pebbles up to 4 cm in  
                         diameter, dark-yellowish-orange (10YR6/6),  
                         dense  
  
                         35-45    Sand, medium- to coarse-grained, subangular,  
                         dark-yellowish-orange (10YR6/6), pebbly (up  
                         to 1 cm)

.....  
EASTOVER FM      45-46    Sand, fine-grained, moderate-orange-pink  
                         (5YR8/4), well sorted, slightly silty but  
                         not clayey, soft  
-----

Base of Yorktown Formation: 128 feet above sea level  
Bottomed in Eastover Formation  
-----

-----  
SU-91-14 0.9 mi. W of east quad. border, 2.7 mi. S of north  
quad. border, on east side of Va Route 639 (77°08'29"W,  
38°05'10"N). Surface elevation 156 feet.  
-----

YORKTOWN FM      0-22    Sand, medium- to coarse-grained, pebbly,  
                         pebble bed at base  
-----

.....  
EASTOVER FM      22-36    Sand, fine-grained, silty, brownish down to  
                         32 feet and dark-bluish-greenish-gray below  
-----

Base of Yorktown Formation: 134 feet above sea level  
Bottomed in Eastover Formation

-----  
SU-91-15 0.3 mi. E of west quad. border, 0.2 mi. N of south  
quad. border, across from VA Route 747 on west side of  
VA Route 640 (77°14'41"W, 38°00'09"N). Surface  
elevation 168 feet.  
-----

YORKTOWN FM	0-5	Sand, medium- to coarse-grained, moderate- reddish-brown (10R4/6) to light-brown (5YR5/6), pebbly (up to 0.5 cm)
	5-12	Sand, fine-grained, dark-yellowish-orange (10YR6/6)
	12-33	Sand, medium-grained, dark-yellowish-orange (10YR6/6) grading down to light-brown (5YR5/6), pebbly except for 16-31 feet which contains coarse quartz granules
	33-34	Clay, silty, greenish-yellow (10Y7/2)
	34-37	Sand, medium-grained, greenish-yellow (10Y7/2), contains coarse quartz granules
.....		
EASTOVER FM	37-47	Silt, sandy, light-bluish-gray (5B7/1), grades down to:
	47-61	Silt, clayey, micaceous, medium-bluish-gray (5B4/1)

-----  
Base of Yorktown Formation: 131 feet above sea level  
Bottomed in Eastover Formation

-----  
SU-91-16 0.45 mi. E of west quad. border, 2.85 mi. N of south  
quad. border, on south side of VA Route 641 (77°14'32"W,  
38°02'26"N). Surface elevation 211 feet.  
-----

YORKTOWN FM	0-6	Sand, medium-grained, moderate-brown (5YR4/4) grading down to grayish-orange (10YR7/4), pebbly (up to 0.5 cm)
	6-17	Sand, fine- to medium-grained, very-pale- orange (10YR8/2), well sorted, grades to:
	17-22	Sand, medium- to coarse-grained, slightly lighter than dark-yellowish-orange (10YR6/6), pebbly (up to 0.5 cm), grades to:
	22-26	Sand, fine- to medium-grained, slightly lighter than dark-yellowish-orange (10YR6/6)
	26-52	Sand, medium- to coarse-grained, moderate- reddish-brown (10R4/6) grading through moderate-red (5R4/6) to light-brown (5YR5/6) by 40 feet, pebbly (up to 0.5 cm), grades to:
	52-56	Sand, coarse-grained, slightly darker than dark-yellowish-orange (10YR6/6), angular to subangular
	56-70	Sand, medium- to coarse-grained, slightly darker than dark-yellowish-orange (10YR6/6), silty and clayey
	70-81	Sand, coarse-grained, dark-yellowish-orange (10YR6/6), pebbly, very minor clay and silt

-----  
Base of Yorktown Formation: less than 130 feet above sea level  
Bottomed in Yorktown Formation  
-----



-----  
SU-91-18 3.55 mi. E of west quad. border, on south quad. border,  
 on south side of driveway (77°11'08"W, 38°00'00"N).  
 Surface elevation 165 feet.  
 -----

COLLUVIUM	0-2	Silt, dark-yellowish-brown (10YR4/6), dense
YORKTOWN FM	2-6	Sand, medium-grained with some fine- and coarse-grained fraction, in dense clay matrix, medium-gray (N5) mottled light-brown (5YR5/6), grades to:
	6-9	Gravel, light-gray (N7), 1-2 cm pebbles, quartz, rounded, in sandy and clayey silt matrix
	9-14	Sand, fine-grained with scattered medium-grains, silty, very pale-brown (10YR8/3), massive, grades to:
	14-27	Sand, medium- to coarse-grained, slightly darker than dark-yellowish-orange (10YR6/6), with subrounded pebbles up to 1 cm in diameter
	27-28	Gravel, dense, drill spun awhile then punched through with no clast recovery; coarse sand matrix includes blue quartz and feldspar grains
EASTOVER FM	28-45	Silt, sandy, to sand, fine-grained, silty, dark-yellowish-orange (10YR6/6) in upper foot but grading rapidly to greenish-black (5GY2/1), clayey in basal foot

-----  
 Base of Yorktown Formation: 137 feet above sea level  
 Bottomed in Eastover Formation



-----  
SU-91-19 2.3 mi. E of west quad. border, 0.4 mi. N of south  
quad. border, 0.05 mile south of end of VA Route 751  
(77°12'31"W, 38°00'21"N). Surface elevation about 179  
feet.  
-----

YORKTOWN FM      0-1      Soil, pebbly sand, brown

1-5      Sand, fine- to coarse-grained, clayey and  
         silty, poorly sorted, strong-brown (7.5  
         YR5/6, 7.5YR5/8, 7.5YR4/6) to slightly red,  
         with pebbles up to 1.5 cm, very stiff

5-17      Sand, fine- to coarse-grained, silty, poorly  
         sorted, yellow (10YR7/8) to slightly darker  
         than dark-yellowish-orange (10YR6/6) from 5-  
         10 then grades through yellow (2.5Y7/6) to  
         olive-yellow (2.5Y6/6) to brownish-yellow  
         (10YR6/8), with pebbles up to 1.5 cm, heavy  
         minerals scattered throughout as black  
         grains, black band of heavy minerals at 11-  
         12 feet, loose; includes a few coarser and  
         finer layers

17-21      Sand, fine- to coarse-grained, silty poorly  
         sorted, brownish-yellow (10YR6/8), heavy  
         mineral grains scattered throughout, quartz  
         pebbles very abundant and up to 6 cm in  
         diameter, subangular, subrounded, and  
         rounded

21-23      Sand, medium- to coarse grained, brownish-  
         yellow (10YR6/8) to yellow (10YR8/6); pebbly  
         with pebbles up to 3 cm, sparser than above

23-25      Sand, coarse-grained, poorly sorted,  
         angular, brownish-yellow (10YR6/8)

25-28      Sand, medium-grained, brownish-yellow  
         (10YR6/8), moderately well sorted, with  
         laminae of black heavy mineral sand  
         concentrated and slightly inclined at 25-26  
         feet

28-30      Sand, medium- to very coarse-grained, silty,  
         pebbly, dark-yellowish-orange (10YR6/6) to  
         brownish-yellow (10YR7/8), angular, poorly  
         sorted

SU-91-19 (continued)

- 30-41 Sand, fine- to very coarse-grained, silty, yellowish-brown (10YR5/8), poorly sorted, angular, pebble bed at base with subrounded to rounded quartz clasts up to 4 cm in diameter
- 41-42 Sand, medium- to coarse-grained, silty, yellowish-brown (10YR5/8), grades to:
- 42-45 Sand, coarse-grained, silty, grading down to fine- to medium-grained sand, silty, to silt, fine- to medium-grained sandy, with scattered granules, brown (10YR5/3), poorly sorted, dense
- 45-50 Sand, fine- to coarse-grained, yellow (2.5Y8/6 to 2.5Y7/6), poorly sorted, sparse granules and heavy mineral grains present
- 50-69 Sand, dominantly medium-grained but with fine- to coarse-grained fractions, silty, poorly sorted, fining downward to fine- to medium-grained and better sorted, yellow (2.5Y8/6 to 2.5Y7/6) grades down to:
- 69-75 Sand, fine-grained, massive, soft, yellow (2.5Y8/6 to 2.5Y7/6) in upper foot, grading down rapidly to white (10YR8/1); abundant lenses of very fine-grained heavy minerals present from 69-71 feet, thinly bedded stringers of very fine-grained heavy minerals present from 71-75 feet
- 75-78 Sand, fine-grained, silty, well sorted, white (10YR8/1)

- .....
- EASTOVER FM 78-79 Clay, silty, strong-brown (7.5YR4/6 to 7.5YR5/6) and yellow (10YR7/8) to yellowish-brown (10YR5/8), carbonized roots abundant, oxidized plinthitic lumps present (B paleosol horizon?), grades down to:
- 79-81 Clay, silty, greenish-gray (5GY6/1 to 5GY7/1), plinthitic lumps present (B paleosol horizon?), grades down to:

SU-91-19 (continued)

81-90 Clay, silty, dark-greenish-gray (5GY4/1),  
small shell molds and casts present below 82  
feet, more silty downward with some fine-  
grained sand lenses in basal 4 feet (C  
paleosol horizon?)

-----  
Base of Yorktown Formation: 101 feet above sea level  
Bottomed in Eastover Formation

SU-91-20 2.75 mi. E of west quad. border, 2.85 mi. S of north quad. border, on north side of crossroad with "210" spot elevation between Martins Corner and Daniel Corner (77°11'58"W, 38°05'01"N). Surface elevation 211 feet.

-----

YORKTOWN FM	0-1	Sand, very fine- to fine-grained, silty, poorly sorted with scattered granules of quartz, light-olive-brown (2.5Y5/6) to pale-yellow (2.5Y7/4)
	1-2	Sand, very fine- to fine-grained, clayey, poorly sorted with scattered granules of quartz, dark-brown (7.5YR4/4) to strong-brown (7.5YR4/6)
	2-10	Sand, very fine- to fine-grained, silty and clayey, poorly sorted with scattered granules of quartz including blue quartz, strong-brown (7.5YR5/8) to brownish-yellow (10YR6/8); 1 in. layer of quartz pebbles at base, pebbles up to 2 cm and rounded to discoidal
	10-14	Clay, silty and sandy, including some blue quartz granules, olive-brown (2.5Y4/4), moderate-yellowish-brown (10YR5/4) and dark-yellowish-orange (10YR6/6)
	14-16	Gravel, granitic quartz-feldspar pebbles mostly 0.5-1.0 cm but up to 4 cm, subrounded to rounded, very rotten and kaolinitic, in clay matrix, medium-gray (N5) to light-brownish-gray (5YR6/1) and pale-yellowish-brown (10YR6/2), grades rapidly to:
	16-18	Gravel, mostly quartz pebbles up to 3 cm, rounded to subrounded, smooth, in sand matrix, light-yellowish-brown (10YR6/4, 10YR6/6, 10YR7/3)
	18-27	Sand, very fine- to fine-grained, silty and clayey, poorly sorted with a medium-grained to granule fraction and clay laminae (burrow linings?), dark-yellowish-orange (10YR6/6) to 10YR7/6 and 10YR7/8

SU-91-20 (continued)

- 27-33 Sand, very fine- to fine-grained, silty, poorly sorted with medium-grained to granule fraction, 10YR8/8 to 10YR7/8 and 2.5Y8/8 except for a lense from 28-29 ft of very-pale-orange (10YR8/2), grades to:
- 33-42 Sand, fine- to medium-grained, silty, poorly sorted with some coarse-grained and granular fraction, up to 0.5 cm quartz pebbles present, sparse at top but more abundant downward, subangular to subrounded, 10YR8/8 to 10YR7/8 and 2.5Y8/8
- 42-48 Sand, fine- to medium-grained, poorly sorted with some coarse-grained and granular fraction, 10YR8/8 to 10YR7/8 and 2.5Y8/8, interlayered with medium-gray (N5) clay-silt laminae, grades to
- 48-50 Sand, medium- to coarse-grained, poorly sorted, granular, silty, sparse pebbles up to 1 cm, subrounded to subangular, 10YR8/8 to 10YR7/8 and 2.5YR8/8
- 50-53 Sand, very fine- to fine-grained, poorly sorted, medium-grained to granule fractions present, 10YR8/8 to 10YR7/8 and 2.5YR8/8
- 53-60 Clay, slightly greasy, sandy and silty, red (10R5/8) to light-red (10R6/8), interbedded with very fine- to fine-grained sand, silty and clayey, reddish-yellow (7.5YR6/8), 3 in. layer of medium- to coarse-grained sand present at 56 ft, small 0.25-0.5 cm pebbles scattered through basal foot
- 60-68 Sand, very fine-grained, clayey and silty, poorly sorted, sparse granules and pebbles of quartz present, brownish-yellow (10YR6/8)
- .....
- EASTOVER FM 68-79 Sand, very fine- to fine-grained, very silty and clayey, sparse granules of quartz present, micaceous, bluish-gray (5B5/1)
- 79-82 Sand, very fine-grained, more clayey and dense than above, shelly (especially Isoqnomon and a few barnacles), bluish-gray (5B5/1)

SU-91-20 (continued)

82-90 Sand, very fine-grained, clayey, dense, shelly  
with more diverse fauna than above, coarser and  
finer laminae interbedded, bluish-gray (5B5/1)

90-102 Sand, very fine-grained, clayey to silty, very  
sparsely shelly, dense and sticky, tough drilling,  
bluish-gray (5B5/1)

-----  
Base of Yorktown: 143 feet above sea level

Bottomed in Eastover Formation at 109 feet above sea level

SU-91-21 1.45 mi. E of west quad. border, 2.45 mi. N of south quad. border, on west side of Va Route 608, 0.375 mi. south of Christopher Fork (77°13'25"W, 38°02'07"N). Surface elevation 241 feet.

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- YORKTOWN FM      0-6      Sand, dominantly medium-grained, poorly sorted, silty, dark-yellowish-brown (10YR4/5) grading through yellowish-brown (10YR5/8) and dark-yellowish-brown (10YR4/6) to brownish-yellow (10YR6/8)
- 6-18      Sand, dominantly medium-grained, poorly sorted, denser and more silty than above, plinthite lumps abundant, strong-brown (7.5YR5/6) grading through yellowish-red (5YR5/8 and 5YR4/6) to dark-red (10R3/6) and moderate-reddish-brown (10R4/6) with blebs of very-pale-brown (10YR8/3), grades rapidly to:
- 18-20      Sand, dominantly coarse-grained, poorly sorted, angular, pebbly (up to 1 cm), dark-red (10R3/6) and moderate-reddish-brown (10R4/6) grading down to yellow (10YR7/8)
- 20-24      Sand, dominantly medium-grained, poorly sorted, silty from 20-21 feet, dark-red (10R3/6) interlayered with very-pale-brown (10YR8/3), grades to:
- 24-26      Sand, medium- to coarse-grained, poorly sorted, pebbles up to 1 cm scattered throughout, brownish-yellow (10YR6/8) to red (2.5YR4/8)
- 26-28      Sand, fine- to coarse-grained, poorly sorted, pebbles up to 0.5 cm scattered throughout, pale-yellow (2.5Y8/4) to yellow (2.5Y8/6)
- 28-30      Sand, fine- to coarse-grained, poorly sorted, contains quartz granule fraction, pale-red (10R6/3) to 10R8/1

SU-91-21 (continued)

30-37 Sand, dominantly fine-grained but with very fine- to coarse-grained and granule fractions, very poorly sorted, very fine-grained black heavy minerals abundant; grades down to sand, medium- to coarse-grained, poorly sorted, 0.25 cm pebbles present, pale-red (10R6/3) and 10R8/1 grading down to brownish-yellow (10YR6/8) and yellow (10YR7/8); 1 inch thick pinkish-gray (5YR7/2) clay lense at 35 feet

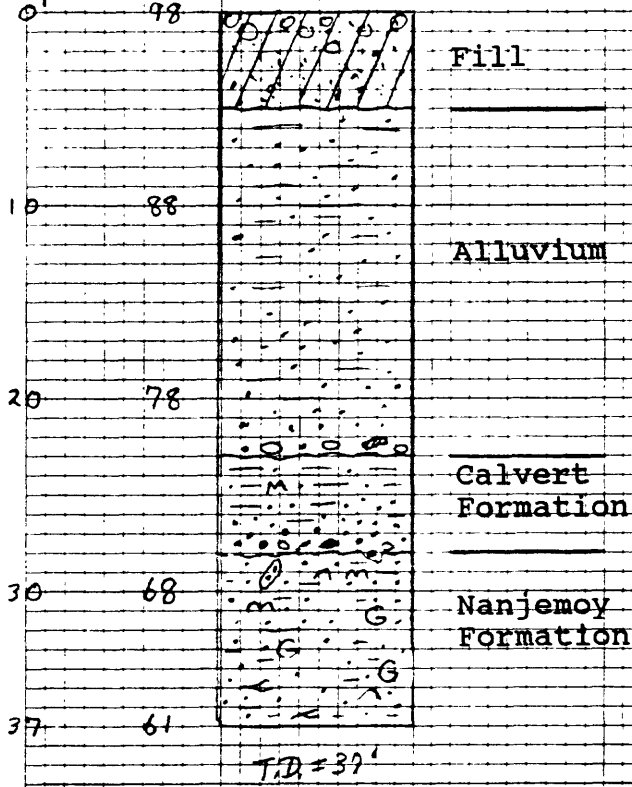
-----  
Bottomed in Yorktown Formation at 204 feet above sea level



(Scale in feet) BG-91-1

borehole  
depth

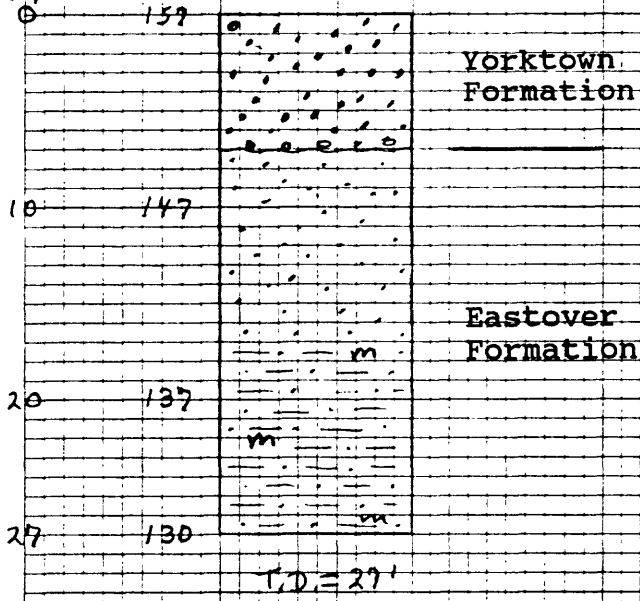
Elevation AH = 98'



(Scale in feet) BG-92-2

borehole  
depth

Elevation AH = 157'

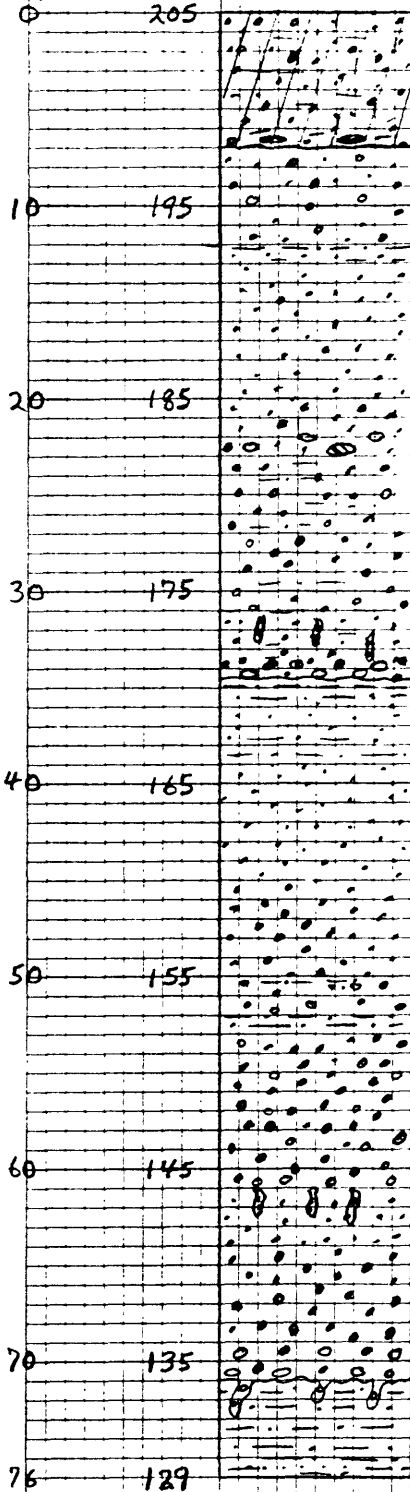


(Scale in feet) BG-91-3

borehole  
depth

Elevation

A.H. = 205

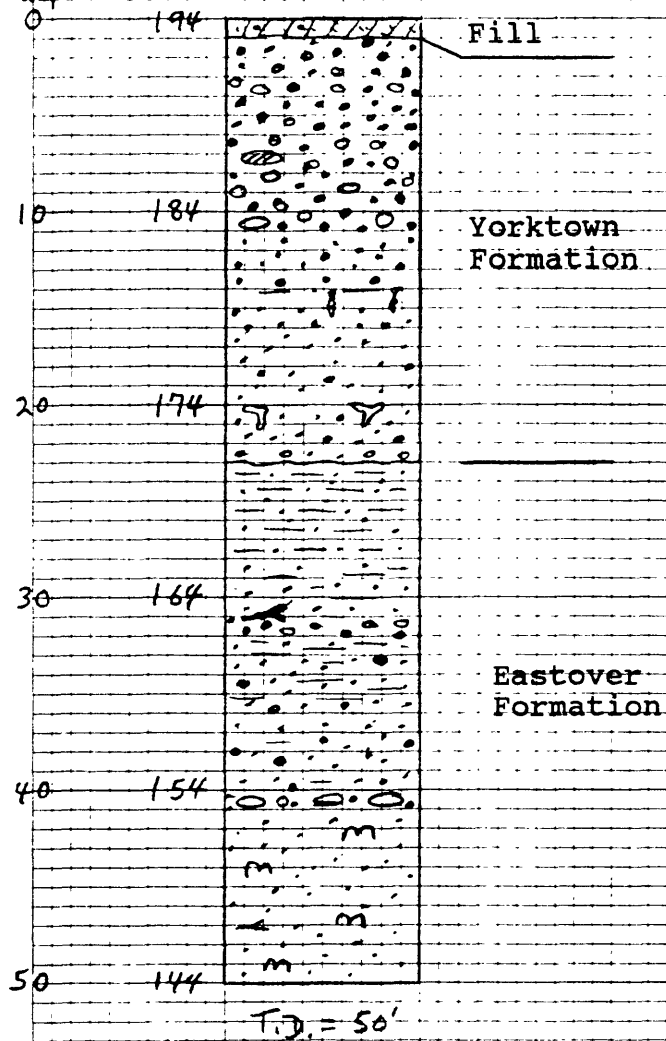


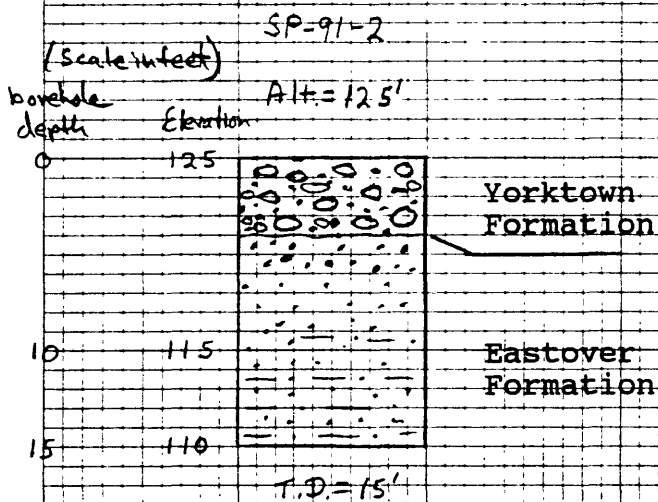
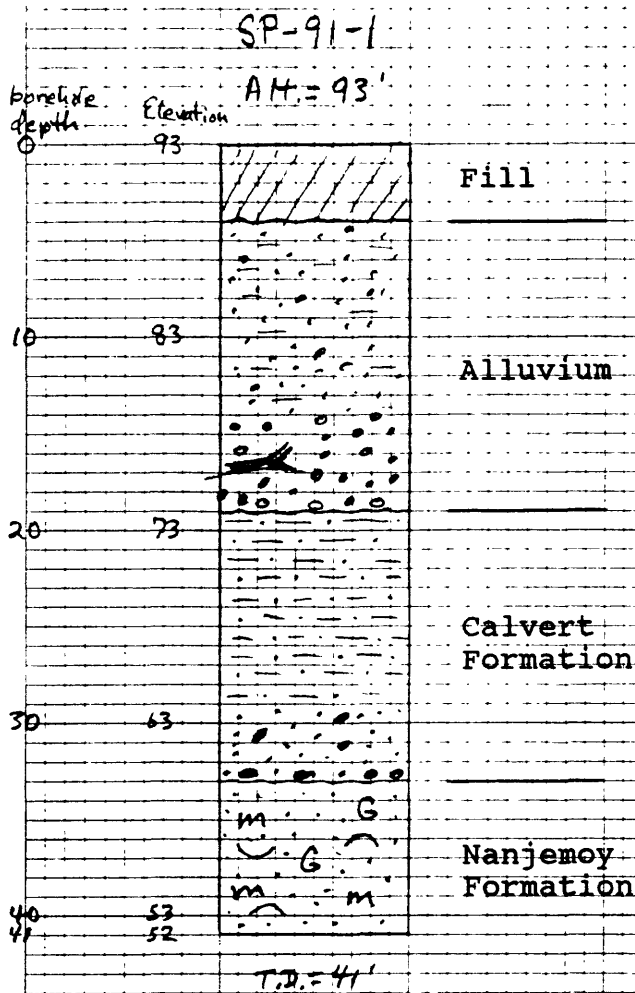
T.D. = 76'

(Scale intact) PE-91-1

borehole  
depth

Elevation Alt. = 194'



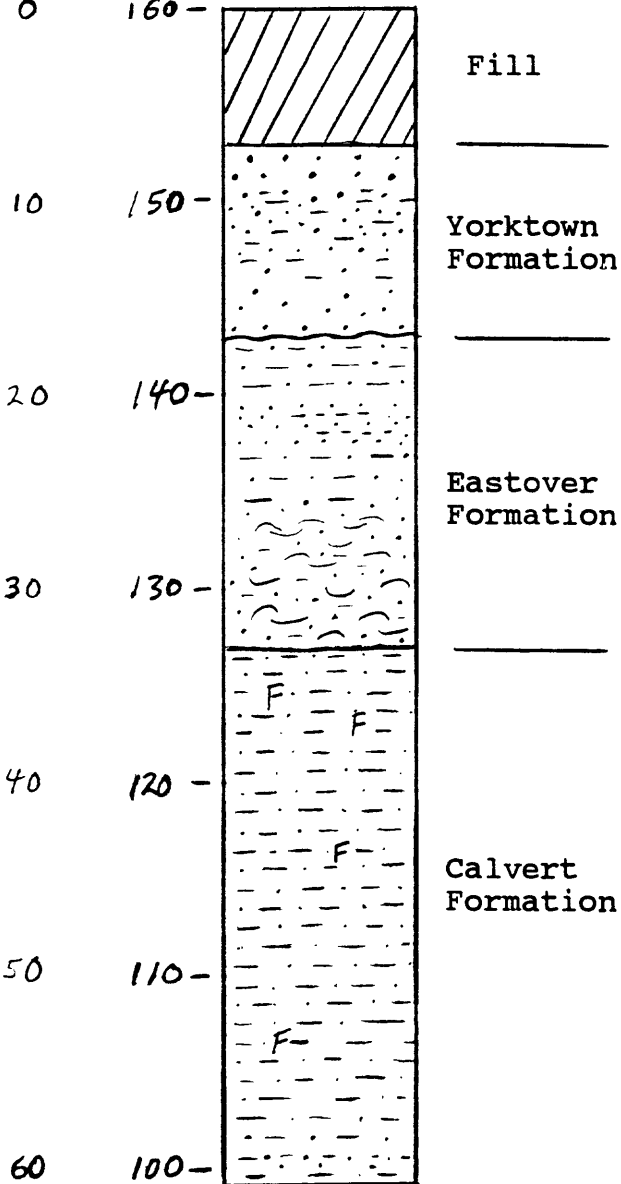


SU-91-1

(Scale in feet)

Alt. = 160

borehole  
depth Elevation



T.D. = 61

(Scale in feet) Su-91-2

Alt. = 53'

borehole  
depth

Elevation  
53 -

10

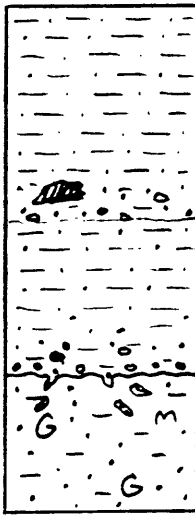
43 -

20

33 -

26

27 -



Calvert  
Formation

Nanjemoy  
Formation

T.D. = 26

Su-91-3

Alt. = 146

borehole  
depth  
0

Elevation  
146 -

10

136 -

20

126 -

30

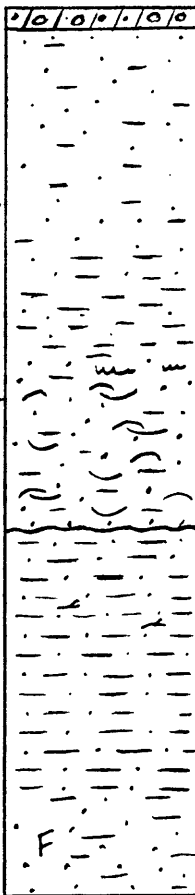
116 -

40

106 -

46

100



Fill

Eastover  
Formation

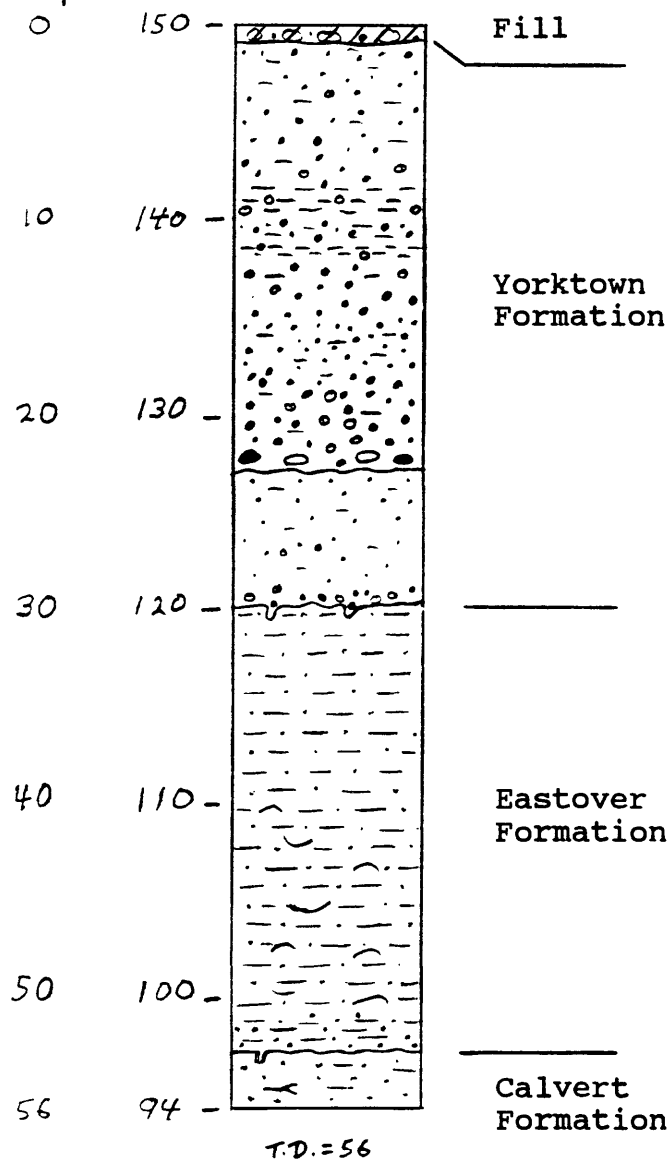
Calvert  
Formation

T.D. = 46

(Scale in feet) SU-91-4

borehole  
depth

Elevation Alt.  $\approx 150$



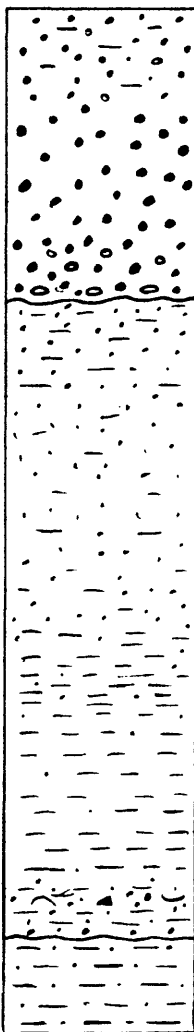
(Scale in feet) Su-91-5

hole  
depth  
0

Elevation

AH. = 135

135-



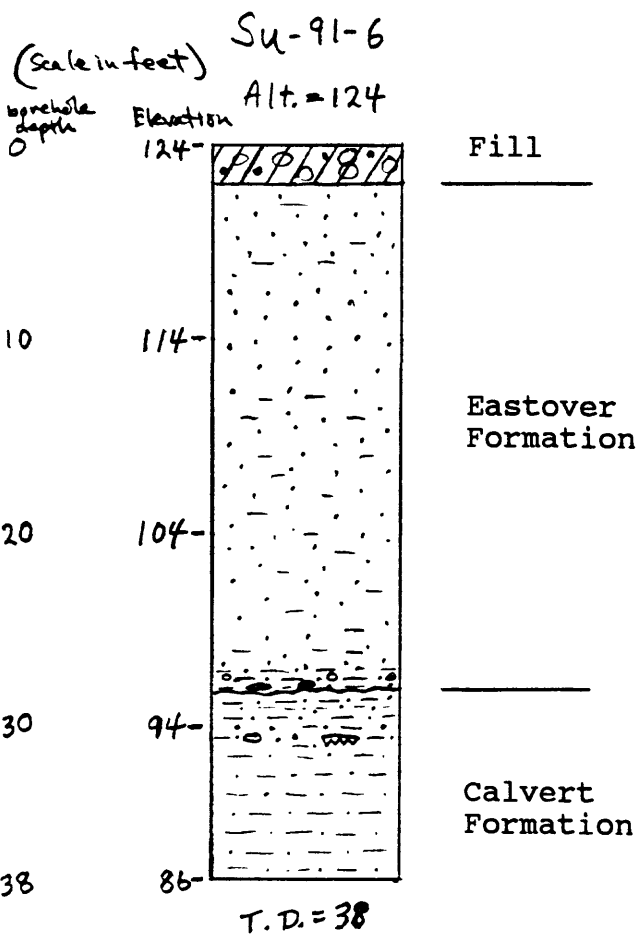
Yorktown  
Formation

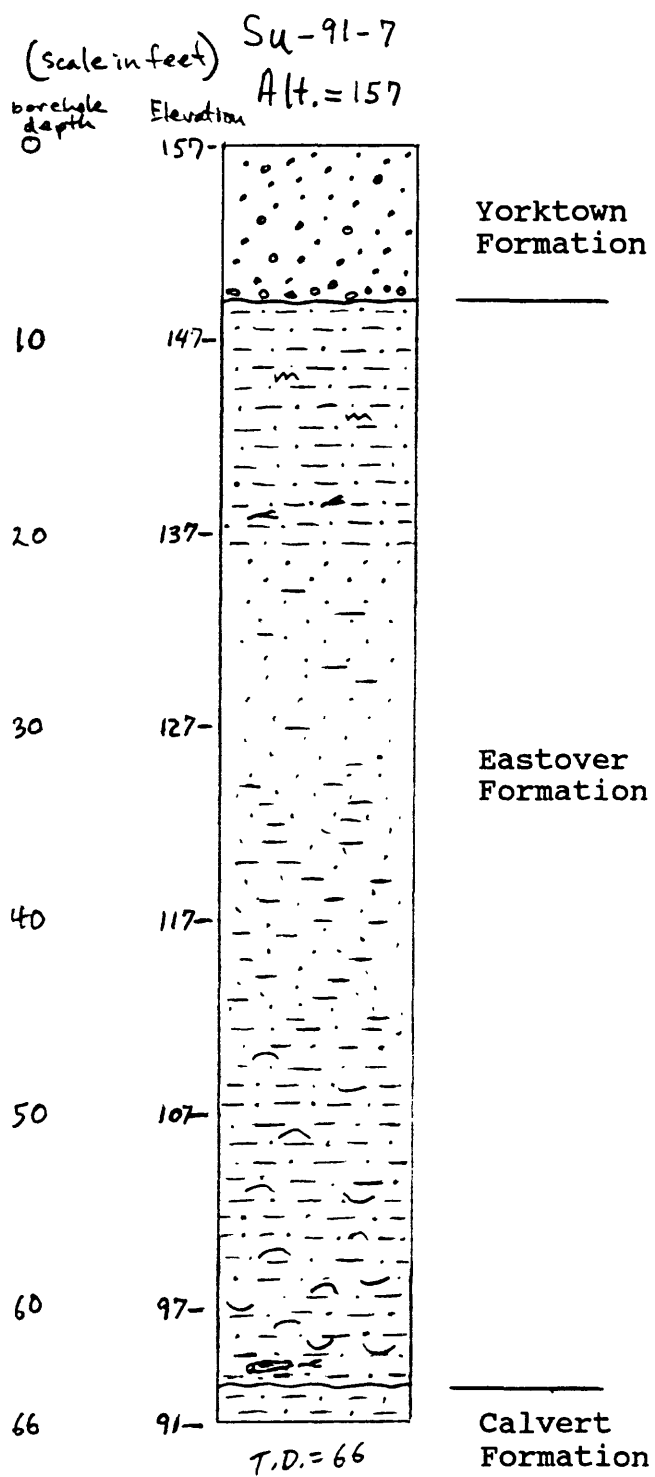
Eastover  
Formation

Calvert  
Formation

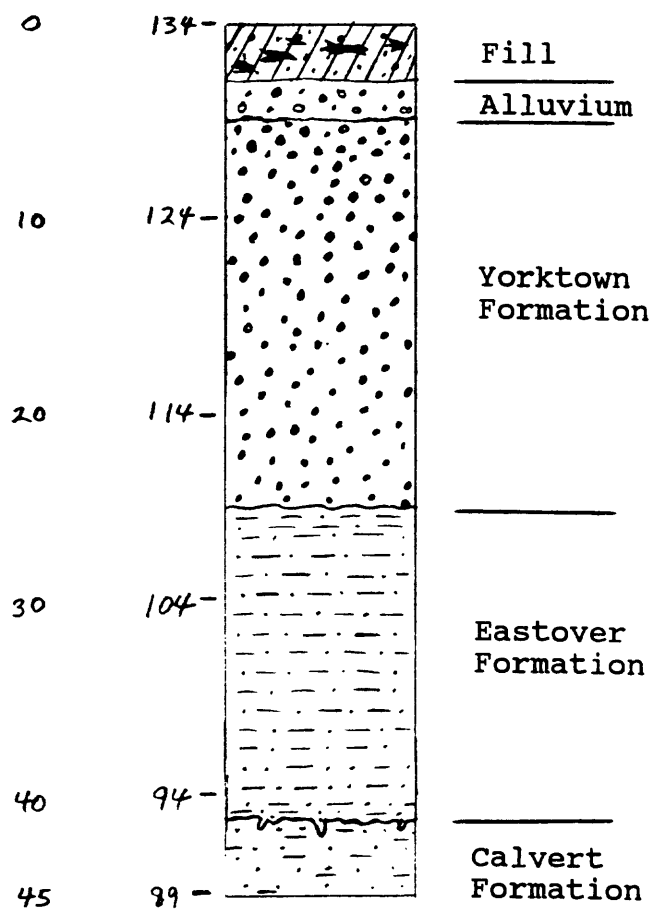
T.D. = 53

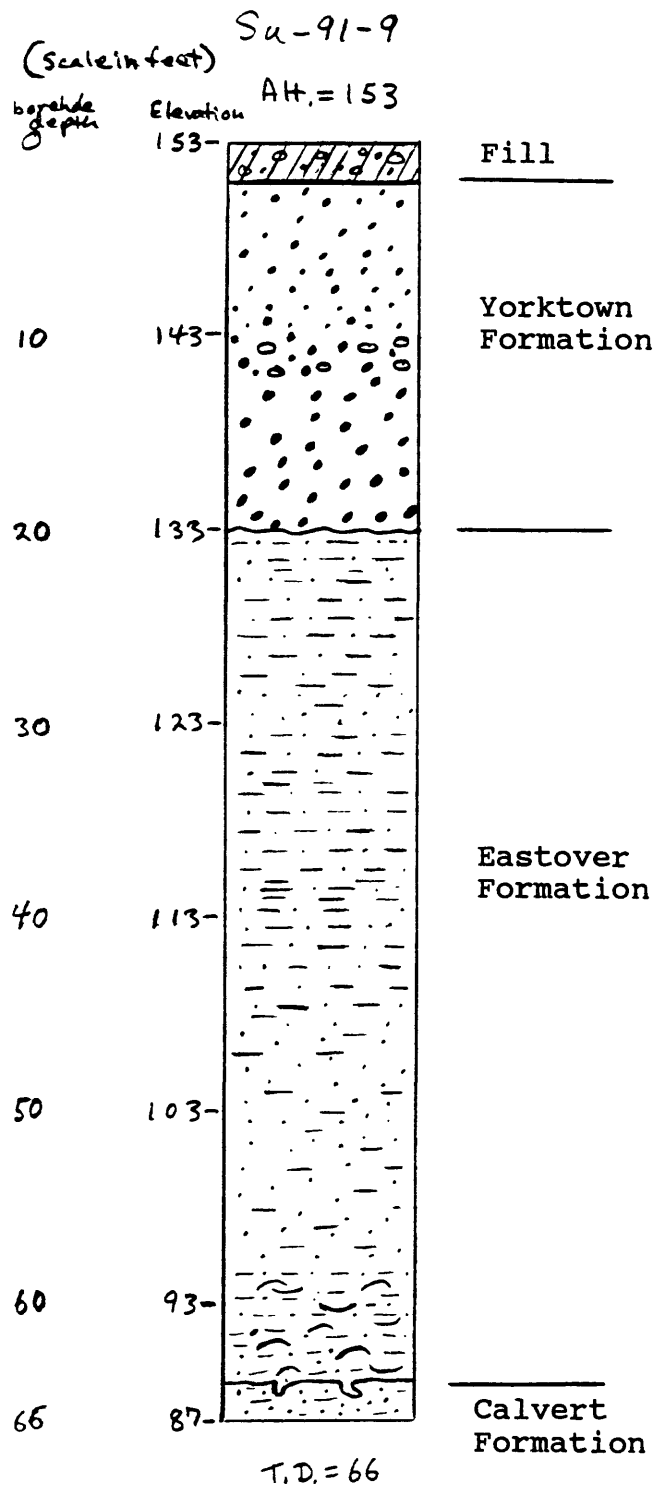


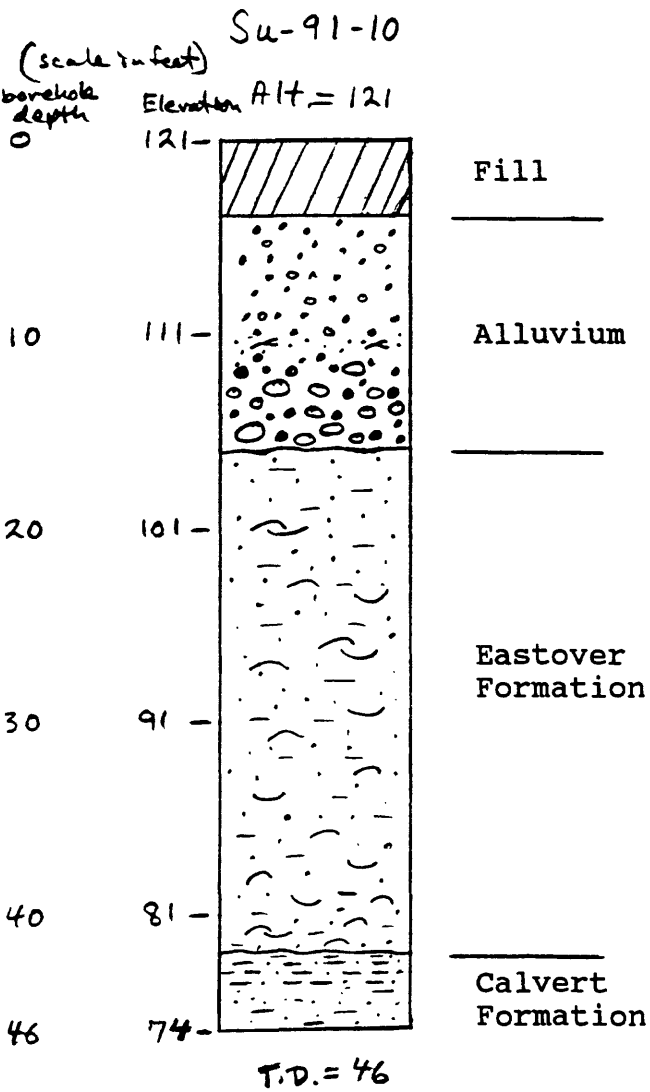




Su-91-8  
Alt. = 134

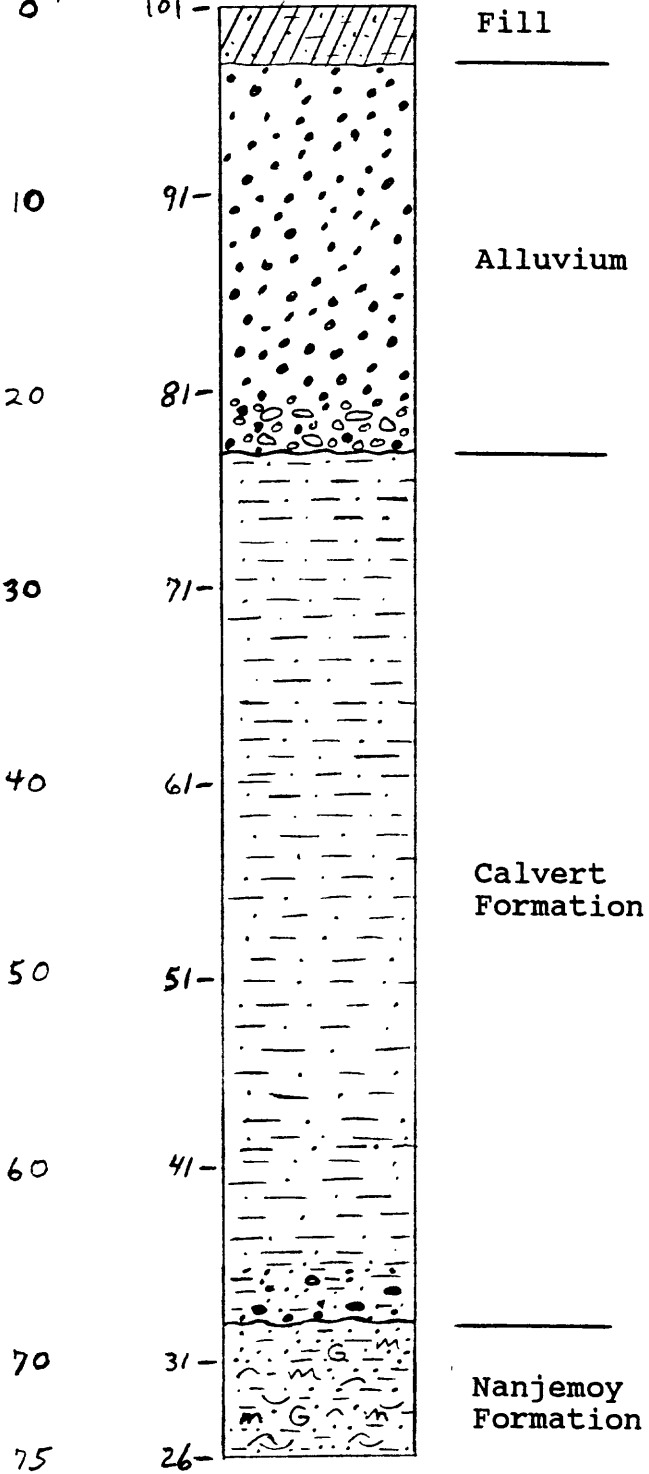


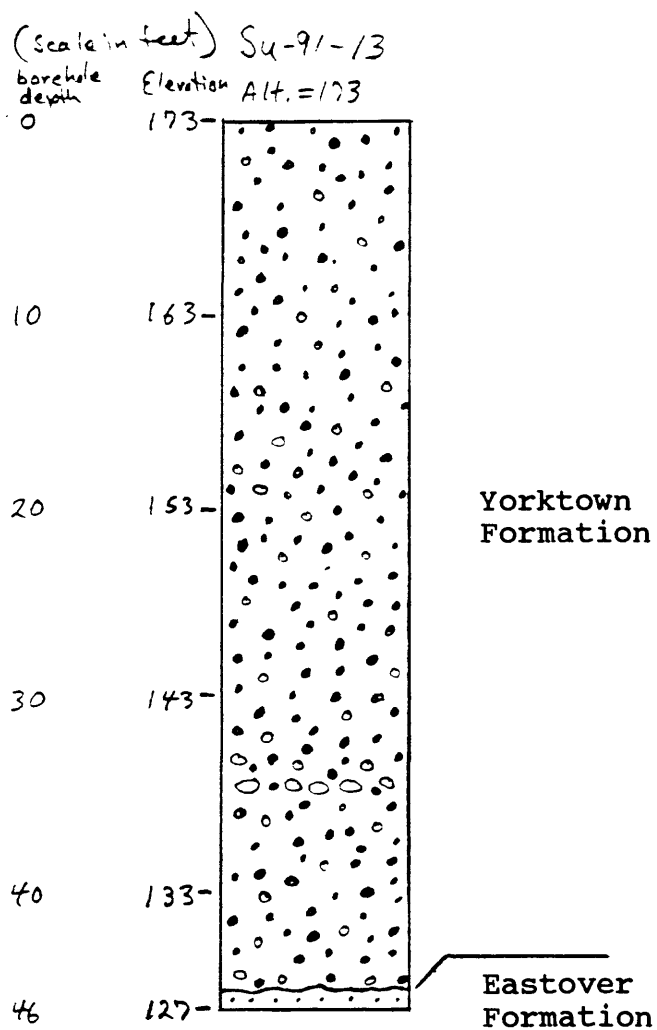
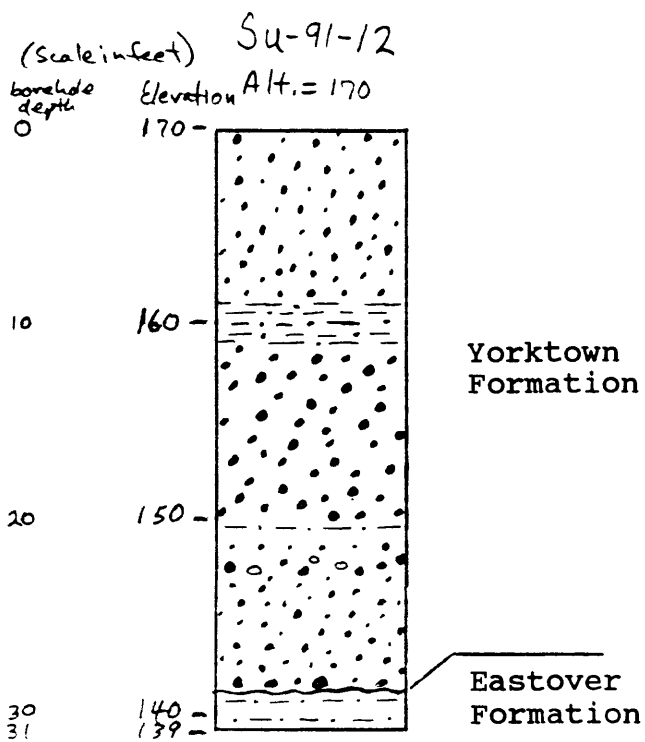


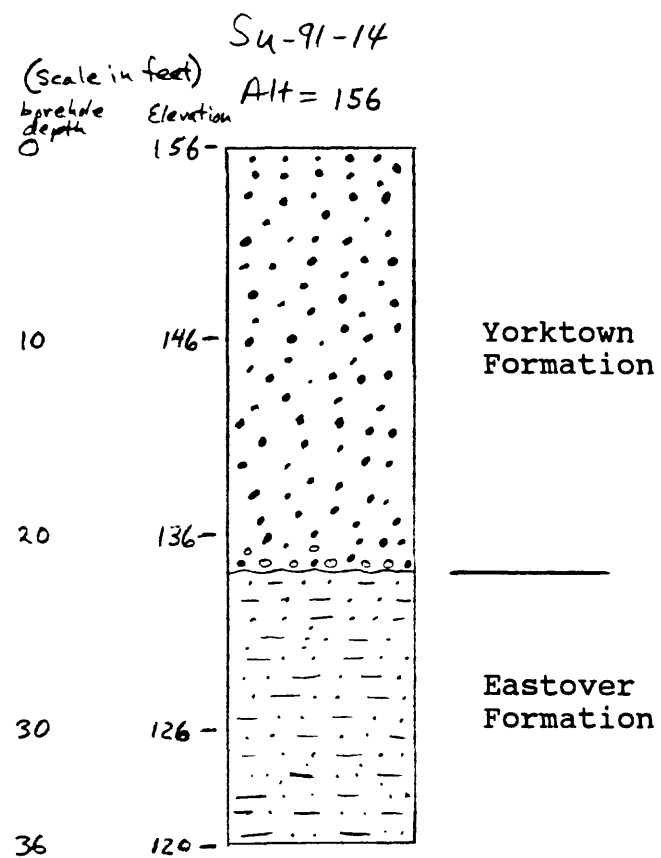


(scale in feet) SU-91-11

borehole  
depth 0  
Elevation Alt. = 101  
101 -









Su-91-15

borehole  
depth

Alt. = 168  
Elevation  
168

10

158

20

148

30

138

40

128

50

118

60

108

67

107

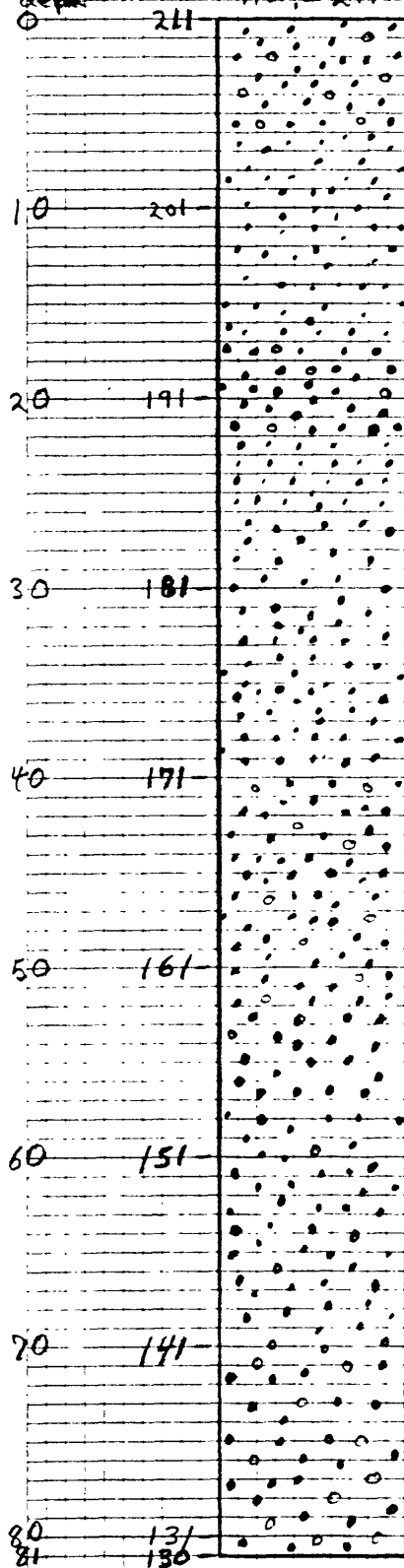
Yorktown  
Formation

Eastover  
Formation

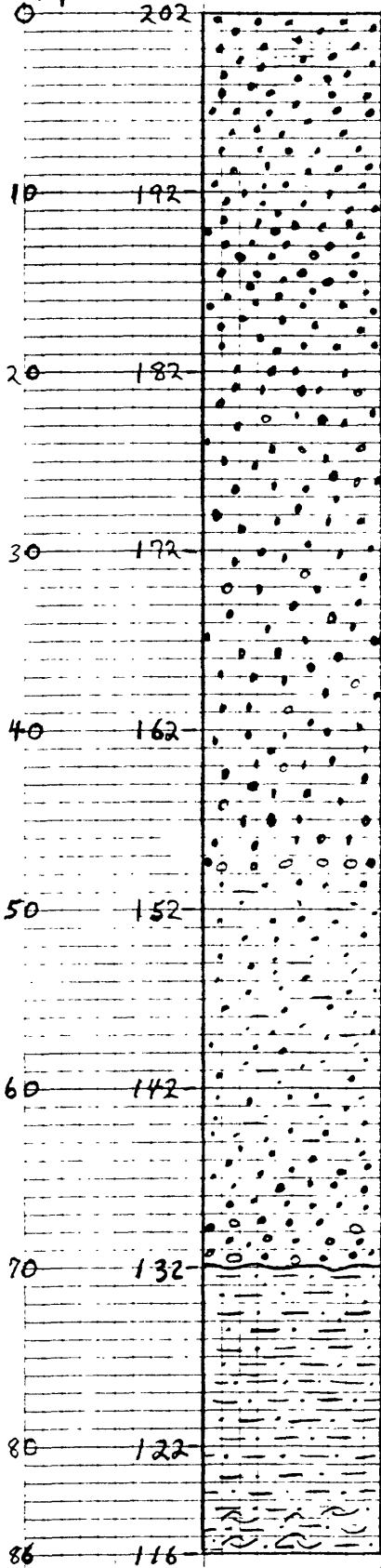
(Scale in feet) SU-91-16

borehole  
depth

Elevation ALT. = 211

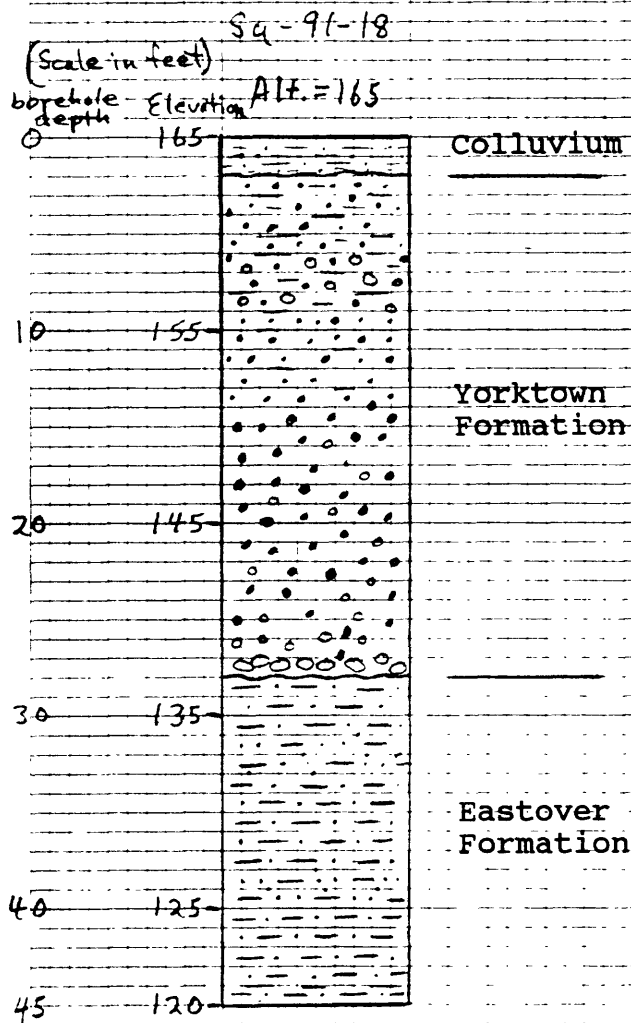


(Scale in feet) Su-91-17  
borehole  
depth  
0 Elevation Alt. = 202



Yorktown  
Formation

Eastover  
Formation



SU-91-19

(Scale in feet)

log hole  
depth  
0

Elevation  
179 -

Alt = 179

10 169 -

20 159 -

30 149 -

40 139 -

50 129 -

60 119 -

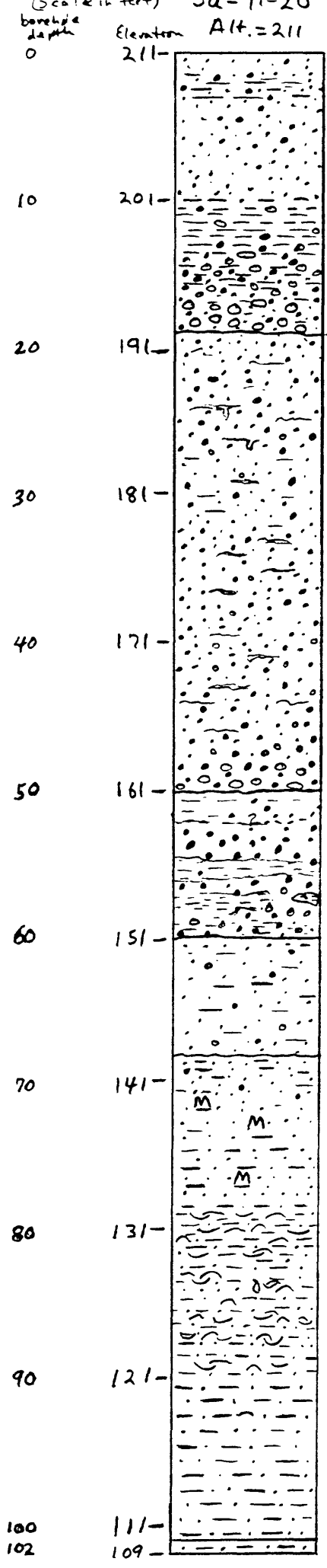
70 109 -

80 99 -

90 89 -

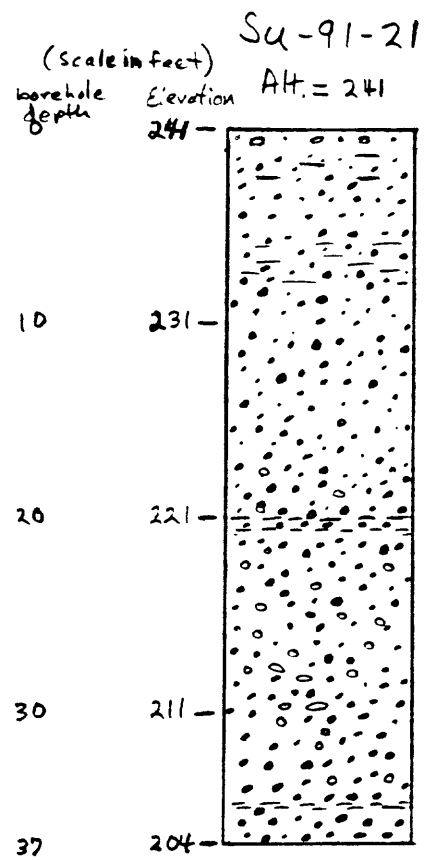
Yorktown  
Formation

Eastover  
Formation



Yorktown  
Formation

Eastover  
Formation



Symbols used in columnar sections for  
the Supply and surrounding quadrangles

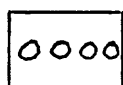
Legend



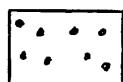
Fill



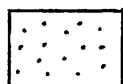
Phosphate pebbles



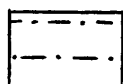
Quartz pebbles



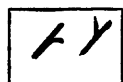
Sand, medium-coarse



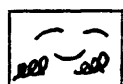
Sand, fine



Clay, sandy to silty



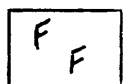
Carbonized wood



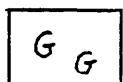
Clam shells, snail shells



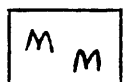
Ray tooth



Forams



Glauconite



Mica