MLL2 Cranbury 12-June-85

Draft report in Contemplation of Litigation

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Sterns, Herbert Weinroth
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June 12, 1985

Attention: Mr. Michael J. Herbert

RE: Zirinsky VS. Cranbury
"Draft Report in Contemplation of Litigation"

Dear Mr. Herbert,

As you know, my firm is currently responsible for engineering design and construction stake-out for The Hills Development Corporation in Bedminster, New Jersey. The density of this project varies from approximately 6½ units per acre for the Knollcrest units, to 20 units per acre for the Mayfield and Village Green portions of the project. The site of current development within The Hills project lies in what was a farm field behind older structures in Pluckemin Village. This farm field consisted of between 8 and 18 inches of top soil over-lying granular material and has a surface slope of 5 to 7% at low area and increasing in steepness as it approaches the base of the Watchung Mountains.

In reviewing the Middlesex County soils maps for the Zirinsky property in Cranbury, designated as site number 6, the majority of the project would lie in soils designated as the Sassafras Series. These are deep, well drained soils formed in acid, loamy Coastal Plains sediments.
These soils have a good natural drainage are deep, with a ground water table in excess of 6 feet in depth. With regard to building site development, there are only "slight" restrictions for a development of this nature. The soil conservation defines "slight" to mean there are few, or no significant limitations. "Moderate" limitations indicates that there is one limitation or more that can normally be overcome at moderate costs by careful design and construction; whereas "severe" limitations indicates that there is one limitation or more that cannot be overvome without considerable cost. Since the soil site has a "slight" classification it would indicate that it is relatively suitable for residential development. It would of course be prudent to perform an on-site soil investigation including borings and soils analysis, prior to design.

As I stated earlier, The Hills Development is a planned unit development consisting of multi-family housing as well as commercial parcels all bordering the Village of Pluckemin occupying land that was formerly farmed. The average density of the project is 10 units per acre with in excess of 3000 housing units planned. Construction traffic, as well as the residential traffic, generated by this project uses Route 202/206, the main street through the village, for access to and from the site. State Highway 202/206 is the main street of the village and currently has a peak traffic flow in excess of 700 vehicles per hour. This peak is lower than the peak flow experienced prior to the construction of Interstate Highway 287, which removed a major portion of the automobile and truck traffic from the road. I know of no structural damage to any of the historic structures within Pluckemin due to vibration.

As the Hills Development proceeds, a jug -handle and traffic signal will be installed opposite the main entry, and Route 202/206 will be widened in front of the project. Recently a new sewer line was installed through the village to serve the City Federal Corporate Headquaters site and provide connection to the historic buildings as well as the existing commercial area and future area to be developed.

The Zirinsky site in Cranbury is at the Northwest corner of Plainsboro Road and North Main Street. Only four of the sixty-five historic buildings in Cranbury are located North of Plainsboro Road and adjacent to the Zirinsky property. These properties are the Snedeker parcel, the Silvers property, the Snowden and Dye properties. These properties are shown on a pamphlet prepared by the Cranbury Historical and Preservation Society and designated as properties 1, 3, 4, 5, in a list of the 65 historical properties. The Zirinsky property is not visible from the heart of the Historic District and is not visible until you proceed Northward and cross Plainsboro Road. Therefore, its visual impact is less than if it were immediatelty adjacent to the central portion of the Historic District. I feel that with proper buffering, circulation, and architectural treatment, the project could blend into the historic flavor of the district. Furthermore, with control of construction access no trucks would need to travel Main Street to or from the site, thereby precluding any possibility of vibration damage to the historic structures.

Should you have any questions kindly advise.

Very Truly Yours,

FW Hahne

Frank W. Hahne, PE,PLS

colors show the capability of land for farming. The color legend on the front of the m...

Symbols show soil type-slope-erosion. Usually the arrangement is in the form of a fracti... with the soil symbol above the line, and the slope and erosion symbols below.

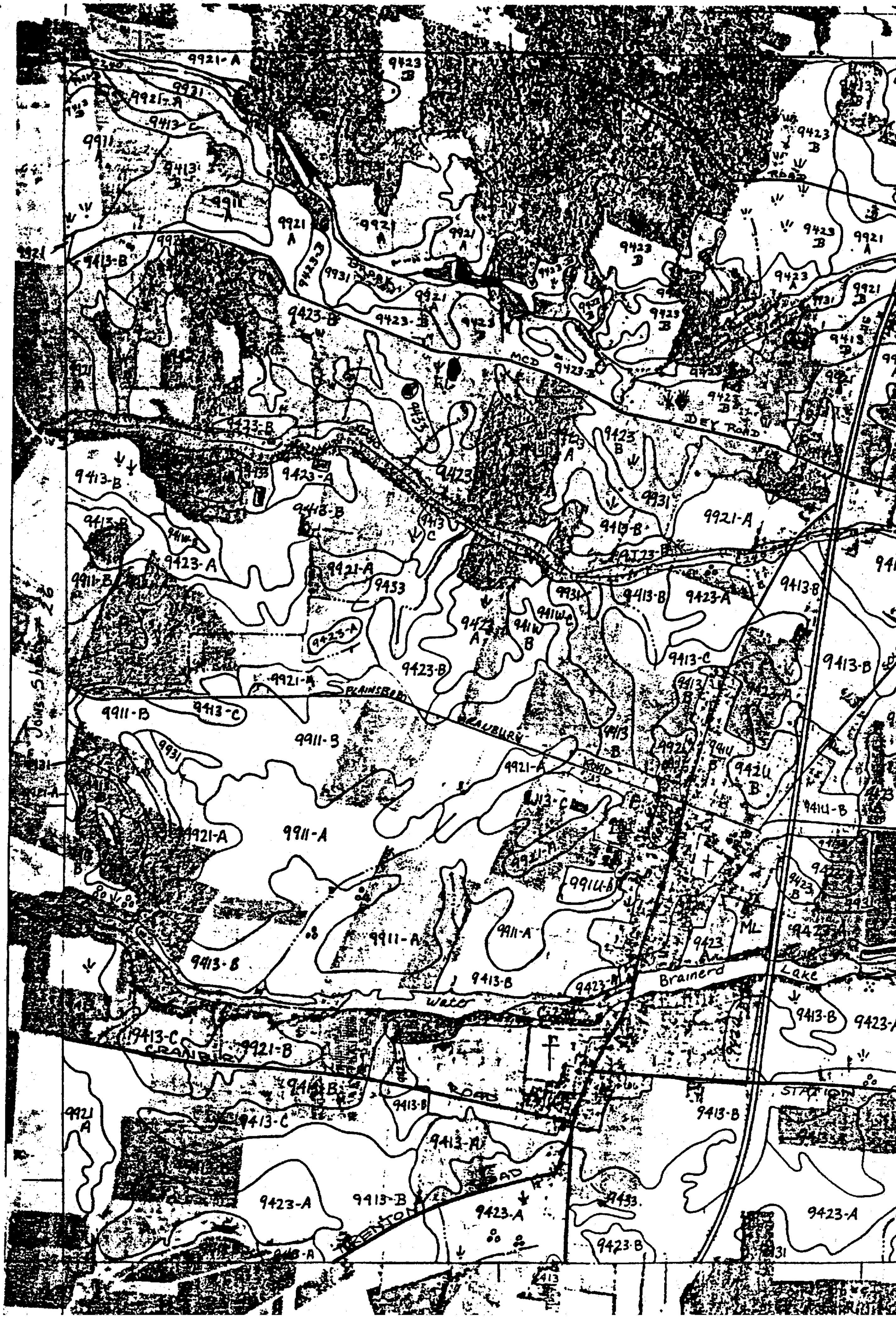
SOILS

Most soil symbols consist of four numbers or letters. The first three identify the soil series; the fourth shows the texture of surface soil which completes the name of the soil type. The texture classes and symbols are:

0 - Silt loam	3 - Sandy loam	C - Clay loam	J - Sandy clay loam
1 - Loam	5 - Loamy sand	E - Loamy fine sand	W - Gravelly sandy loam
2 - Fine sandy loam	6 - Sand	F - Fine sand	

LEGEND AND DESCRIPTION OF SOIL SERIES

Symbol	Series Name	Types Mapped	Parent Material	Profile Development	Natural Drainage	Reaction	Depth	Color: Surface Soil	Color: Subsoil
801	Marlton	0, 1, 3, 5, J	Sands, much glauconite	Fair	Good	Acid	Deep	Brown	Olive
802	Kresson	0, C	"	"	Imperfect	"	"	Gray-brown	Olive-mottled
811	Monmouth	1, 3, 5	Sands, med. glauconite	Good	Good	"	"	Yellow-brown	Olive-brown
812	Donlonton	1, 2, 3, 5	"	"	Imperfect	"	"	Gray-brown	Brown-mottled
813	Colemantown	0, 3	Sands, much glauconite	Fair	Poor	"	"	Gray	Gray-mottled
814	Matlock	0, 3	"	"	Very poor	"	"	Black	"
821	Collington	1, 2, 3, 5	Sands, med. glauconite	Good	Good	"	"	Brown	Red-brown
822	Adelphia	1, 3	"	"	Imperfect	"	"	Gray-brown	Yellow-mottled
823	Shrewsbury	0, 3, 5	"	"	Poor	"	"	Gray	Gray-mottled
824	Keansburg	0, 3	"	"	Very poor	"	"	Black	"
841	Lincroft	3, 5	Sands, low glauconite	"	Excessive	"	"	Brown	Brown
861	Freehold	1, 2, 3, 5	Sands, little glauconite	"	Good	"	"	Yellow-brown	Yellow-brown
862	Holmdel	1, 2, 3, 5	"	"	Imperfect	"	"	Gray-brown	Yellow-mottled
871	Freehold (thick surface soil phase)	3, 5	"	"	Good	"	"	Yellow-brown	Yellow-brown
890	Colts Neck	1, 3	Sands, med. glauconite	"	"	"	"	Red-brown	Red
8C1	Freehold (light textured subsoil phase)	5	Sands, little glauconite	"	"	"	"	Yellow-brown	Yellow-brown
8C2	Holmdel (light textured subsoil phase)	3, 5	"	"	Imperfect	"	"	Gray-brown	Yellow-mottled
8J1	Howell	1, 3, 5	Silt on sand	Fair	"	Very acid	Shallow	"	"
930	Evesboro	6	Brown sand	"	Excessive	"	Deep	Brown	Yellow-brown
931	Evesboro	3, 5, E	"	"	"	"	"	"	"
932	Klej	3, 5, 6	"	"	Imperfect	"	"	Gray-brown	Gray-mottled
933	Plummer	3, 5	"	"	Poor	"	"	Gray	Gray
934	Rutledge	1, 3, 5	"	"	Very poor	"	"	Black	"
941	Sassafras	1, 2, 3, 4, 5, W	Sand-gravel	Good	Good	"	"	Yellow-brown	Yellow-brown
942	Woodstown	0, 2, 3, 5	"	"	Imperfect	"	"	"	Gray-mottled
943	Fallsington	0, 3, 5	"	"	Poor	"	"	Gray	"
944	Pocomoke	0, 3	"	"	Very poor	"	"	Black	Gray
970	Lakewood	6, F	Gray sand	"	Excessive	"	"	Light gray	Yellow



9921-A
9423-B
9413-C
9911
9921-A
9423-B
MCD
DEY ROAD
9413-B
9423-A
9921-A
9413-B
9423-A
9421-A
9433
9423-B
9921-A
PLAINSBORO
CRANBURY
ROAD
9911-B
9413-C
9911-B
9931
9921-A
9911-A
9911-A
9911-A
9413-B
9413-B
Brainerd
Lake
9413-B
9423-A
9413-C
CRANBURY
9921-B
ROAD
STATION
9413-B
9921
A
9413-C
9423-A
9413-B
9423-A
9423-B
9423-A

Engineering test data

All engineering soil test data in this survey are based on sampling and testing done by Rutgers University, College of Engineering (*4, 8*). Soils were sampled at 29 sites. The soils sampled were classified according to the current system of classification.

The results of the tests are given in table 5. Also in table 5, the soil materials are classified according to the Unified and the AASHO systems and the textural classification of the U. S. Department of Agriculture. Names of some of the soils that were sampled in the original engineering study of 1954 were changed to conform with the current soil classification.

Test data in table 5 were used as a basis for interpretations of the soils shown in table 6. That table gives estimates of the classification and the properties of important layers in each kind of soil. Estimates for the soils not tested were made after study of their descriptions and comparison with the tested soils.

Soil properties significant to engineering

Table 6 gives estimates of several properties of the soils that are significant to engineering. The table lists the soils alphabetically and gives the symbol by which each is shown on the detailed soil map at the back of this publication. The information in this table is based on the test data in table 5 and other available data. Not listed in table 6, because their properties are too variable to be rated in this way, are Alluvial land (Ad and Ae); Cut and fill land (Cf, Cg, Ct, Cu); Fresh water marsh (Fm); Made land, dredged river materials (Mf); Pits (Pg); Sandy and silty land (SdD and SdE); Urban land (Ug and Us); and Very stony land (VmC, VnE, and Vw).

Depth to seasonal high water table indicates the depth to which free water will rise at least once a year, measured in feet from the surface.

Permeability is given for the soil as the soil material occurs in place. The estimates were based on soil structure and porosity and were compared with the results of permeability tests on undisturbed cores of similar soil material.

The available water capacity is expressed in this table in inches per inch of soil depth. It is the approximate amount of water held in a 1-inch layer of soil when wet to field capacity. When the soil is air dry, this amount of water will wet the material described to a depth of 1 inch without deeper penetration.

The reaction, or pH value, given in table 6 is that of a soil in its natural, or untreated, state. Heavy applications of lime, however, have raised the pH value of the surface soil in most fields that have been farmed.

The shrink-swell potential indicates the change in volume to be expected when the content of moisture in the soil is changed. The shrink-swell potential is estimated primarily on the basis of the amount and type of clay. Ratings are low, moderate, or high. For example, the soil material in the subsoil of Lenoir silt loam and Keyport silt loam is slightly sticky to sticky when wet and develops shrinkage cracks when the material becomes dry. Therefore, it has moderate shrink-swell potential. In contrast, the material in the subsoil of Galestown loamy sand contains little or no plastic fines and has a low shrink-swell potential.

The plasticity index and liquid limit are not shown in table 6. Not enough test data were available to permit good estimates.

Engineering interpretations of the soils

In table 7 are given suitability ratings of the soils in the county as a source of topsoil, sand or gravel, and road fill. Also listed are the features of the soil that affect stated engineering practices. These interpretations are based on the test data shown in table 5, the estimated soil properties in table 6, and experience in using the soils in this county and in other parts of the State. Not listed in table 7 are Urban land, Galestown material, and Urban land, Sassafras material.

As a rule, interpretations in table 7 are given by soil series unless there are members of the series that have different properties of engineering significance. For example, interpretations are given for the normal Birdsboro soils and also for the Birdsboro soils, sandy subsoil variants, and the Birdsboro soils, gravelly solum variants. These soils are sufficiently different to require separate interpretations.

The suitability of soils as a source of topsoil, sand or gravel, and road fill is indicated by a rating of good, fair, poor, or not suitable. In some places, a high water table or other soil characteristics make excavation of sand or gravel difficult or impossible.

The soil features mentioned in table 7 are mainly those that limit use for the stated engineering practices. Favorable features are noted, however, in some places.

Soils in Community Developments

This section is mainly for planners, developers, zoning officials, landowners, and prospective landowners. It indicates the relative suitability of each soil in the county for various community developments. Planners and zoning officials who are interested in comparing the suitability of soils for town and country planning with their capability for use in farming will be interested in the section "Capability grouping". Readers needing more information about the soil mapping units should refer to the section "Descriptions of the Soils."

The name and map symbol of each soil and land type are shown alphabetically in table 8. The soils are rated according to their degree of limitations for the various uses. For moderate and severe ratings in the table, the main cause of the limitation is listed.

The uses rated in table 8 are disposal of sewage effluent, development of homesites and lawns (including landscaping), streets, parking lots, athletic fields, parks and play areas, sanitary land fills, and cemeteries. The table also gives briefly the soil properties that affect foundations for dwellings with a basement.

Limitations that affect community developments are rated *slight*, *moderate*, or *severe*. A rating of *slight* means there are few or no significant limitations. *Moderate* means there is one limitation or more that can normally be overcome at moderate cost by careful design and construction. *Severe* means that there is one limitation or more that cannot be overcome without considerable cost. A severe limitation does not imply that the soil is unsuitable, but rather that development costs are abnormally high.

TABLE 7.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosio	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concret
					Ft					
PeA---------- Pemberton	A	None--------	---	---	1.0-4.0	Apparent	Dec-May	Moderate	Low------	Low.
PhB, PhC---------- Phalanx	B	None--------	---	---	>6.0	---	---	Low------	Low------	Moderat
Pm*. Pits, sand and gravel										
PN*, PO*, PW*. Psamments										
SaB---------- Sassafras	B	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
Sh---------- Shrewsbury	D	None--------	---	---	0-1.0	Apparent	Oct-Jun	High-----	High-----	High.
SS*: Sulfaquents.										
Sulfihemists.										
TnB---------- Tinton	A	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
UL*. Urban land										
UP*: Urban land.										
Fripp----------	A	Rare--------	---	---	>6.0	---	---	---	Low------	Low.
WoB, WoC---------- Woodmansie	B	None--------	---	---	>6.0	---	---	Low------	Low------	High.

* See the description of the map unit for composition and behavior characteristics of the map unit.

fractured layers of iron-cemented sandstone fragments up to 6 inches long and less than 1 inch thick; weakly cemented; very strongly acid; gradual wavy boundary.

C—46 to 72 inches; yellowish red (5YR 5/6) sand; single grain; loose; very strongly acid.

The solum thickness ranges from 30 to 60 inches. Depth to the first petroferric contact consisting of an indurated iron-cemented sandstone layer ranges from 12 to 30 inches. Alternating layers of friable or firm soil and thin to thick (1/8 inch to several feet) continuous sheets of fractured iron-cemented sandstone are in the B horizon. Thick massive beds with fragments larger than small stones are in the C horizon of some pedons at depths greater than 4 feet in places. Coarse fragments consisting primarily of ironstone fragments but including some quartzose pebbles make up 0 to 15 percent of the A horizon and upper part of the B horizon and 20 to 75 percent of layers within the C horizon. Unless the soils have been limed, reaction is extremely acid in the A1 horizon and strongly acid to very strongly acid in the B and C horizons.

All parts of the A horizon have hue of 2.5YR to 7.5YR. The A1 horizon has value of 2 to 4 and chroma of 2 or 3. The Ap horizon, where present, has value of 3 or 4 and chroma of 2 or 3. The A2 horizon has value of 4 to 6 and chroma of 2 to 4.

The B horizon has hue of 10R, 2.5YR, or 5YR, value of 4 to 6, and chroma of 4, 6, or 8. The upper part of the B horizon is loamy sand, sandy loam, channery loamy sand, or channery sandy loam. The lower part is flaggy or channery loamy sand and channery or flaggy sandy loam.

The C horizon has hue of 2.5YR, 5YR, or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It is dominantly sand or loamy sand but in places has thin strata of sandy loam or sandy clay loam below a depth of 40 inches.

Psamments

Psamments in Ocean County consist of moderately deep to deep, excessively drained to very poorly drained soils with no horizonation. They formed in stratified or smoothed sandy fill. Slope is 0 to 5 percent.

Because of the variability of these soils, a typical pedon is not given. The soils are 20 to 60 inches deep or more to the original soil or waste fill. They are extremely acid or very strongly acid.

Since all Psamments in Ocean County are composed of fill material, they do not have designated A, B, and C horizons.

Sassafras series

The soils of the Sassafras series are fine-loamy, siliceous, mesic Typic Hapludults. These deep, well drained soils formed in acid, loamy Coastal Plain sediments. Sassafras soils are on divides and side slopes. Slope ranges from 2 to 5 percent. The natural vegetation includes white oak, black oak, scarlet oak, hickories, and a few pitch pines, shortleaf pines, and Virginia pines. The understory is laurel, scrub oak, and lowbush blueberry.

Typical pedon of Sassafras sandy loam, 2 to 5 percent slopes, in Union Township, 1.6 miles north of the intersection of N.J. highway 72 and County road 539, 100 feet west of 539:

A1—0 to 3 inches, very dark grayish brown (10YR 3/1) sandy loam; weak fine granular structure; very friable; many fine and medium roots; extremely acid; abrupt smooth boundary.

A2—3 to 6 inches, yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; 5 percent quartzose pebbles; many fine and medium roots; extremely acid; clear smooth boundary.

B1—6 to 12 inches, brown (10YR 5/3) sandy loam; weak fine subangular blocky structure; 5 percent quartzose pebbles; common medium roots; very strongly acid; clear smooth boundary.

B21t—12 to 17 inches, brown (10YR 5/6) heavy loam; moderate medium subangular blocky structure; friable; 5 percent quartzose pebbles; common medium roots; clay bridging between sand grains; very strongly acid; clear smooth boundary.

B22t—17 to 41 inches, yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm; 5 percent rounded quartzose pebbles; few medium roots; clay bridging between sand grains; very strongly acid; abrupt wavy boundary.

IIC1—41 to 54 inches, reddish yellow (7.5YR 5/8) loamy coarse sand; massive; very friable; 10 percent fine quartzose pebbles; very strongly acid; abrupt wavy boundary.

IIIC2—54 to 72 inches, brownish yellow (10YR 6/8) sand; single grain; loose; very strongly acid.

The solum thickness ranges from 30 to 45 inches but is dominantly 30 to 40 inches. Coarse fragments of rounded quartzose gravel make up 5 to 20 percent of the solum and up to 30 percent of the C horizon. Unless this soil has been limed, reaction is extremely acid in the A horizon and strongly acid to very strongly acid in the B and C horizons.

All parts of the A horizon have hue of 10YR or 7.5YR. The A1 horizon has value of 3 or 4 and chroma of 1 to 3. The A2 horizon has value of 5 and chroma of 3 or 4. In cultivated areas, the Ap horizon has value of 4 or 5 and chroma of 2 or 3.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It is dominantly sandy clay loam, loam, and heavy sandy loam but is gravelly sandy

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscapin
KlA---- Klej	Severe: wetness, cutbanks cave.	Moderate: frost action, wetness.	Severe: wetness.	Moderate: frost action, wetness.	Moderate: frost action, wetness.	Severe: too sandy.
KrA---- Kresson	Severe: wetness.	Severe: wetness, low strength, frost action.	Severe: wetness.	Severe: wetness, low strength, frost action.	Severe: wetness, low strength, frost action.	Severe: wetness.
LhA, LmA---- Lakehurst	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty, too sandy.
LwB---- Lakewood	Severe: cutbanks cave.	Slight----	Slight----	Slight----	Slight----	Severe: too sandy.
LwC---- Lakewood	Severe: cutbanks cave.	Slight----	Slight----	Moderate: slope.	Slight----	Severe: too sandy.
Ma---- Manahawkin	Severe: floods, cutbanks cave, wetness.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, low strength, floods.	Severe: wetness, floods, low strengt
Mr, Mu---- Mullica	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
PeA---- Pemberton	Severe: cutbanks cave, wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, frost action.	Severe: too sandy.
PhB---- Phalanx	Severe: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: too sandy.
PhC---- Phalanx	Severe: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.	Moderate: too sandy.
Pm*. Pits, sand and gravel						
PN*, PO*, PW*. Psamments						
SaB---- Sassafras	Slight----	Slight----	Slight----	Slight----	Moderate: frost action.	Slight.
Sh---- Shrewsbury	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
SS*: Sulfaquents.						
Sulfihemists.						
TnB---- Tinton	Severe: cutbanks cave.	Slight----	Slight----	Slight----	Slight----	Severe: too sandy.
UL*. Urban land						
UP*: Urban land.						
Fripp----	Severe: cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.	Severe: too sandy.
WoB---- Woodmansie	Slight----	Slight----	Slight----	Slight----	Slight----	Severe: too sandy, droughty.

See footnote at end of table.