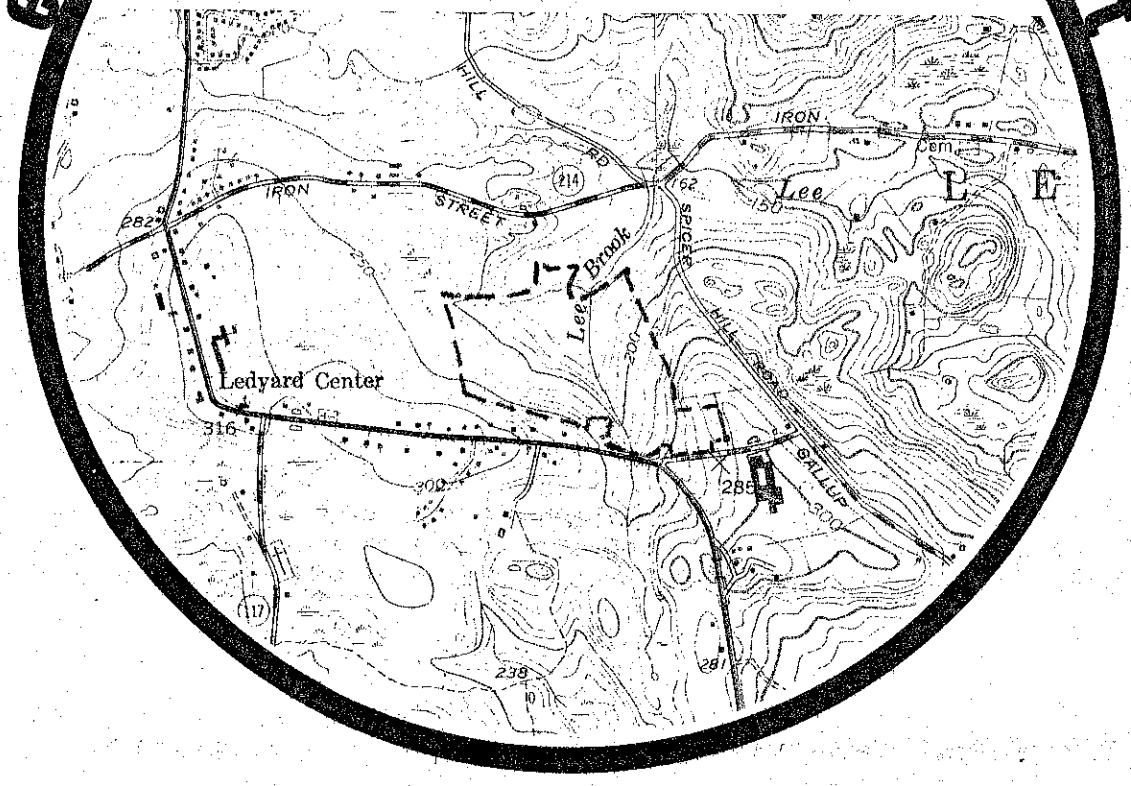
environmental review team report

GRAY FARMS, SECTION IV

LEDYARD, CONNECTICUT



RC&D

EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ASSISTED BY: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND COOPERATING AGENCIES

ENVIRONMENTAL REVIEW TEAM REPORT
ON
GRAY FARMS SUBDIVISION, SECTION IV
LEDYARD, CONNECTICUT

APRIL, 1977

Project CPA-CT-01-00-1045

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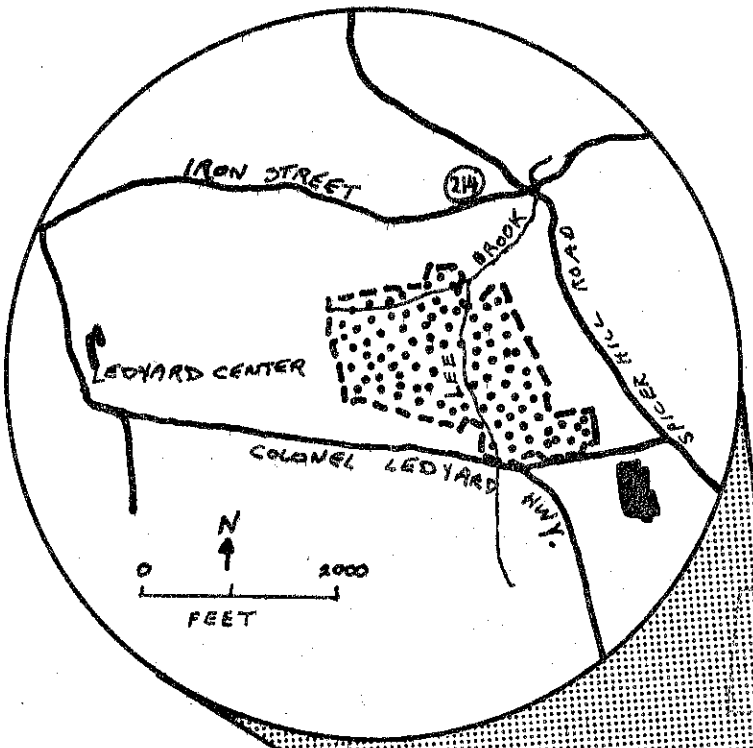
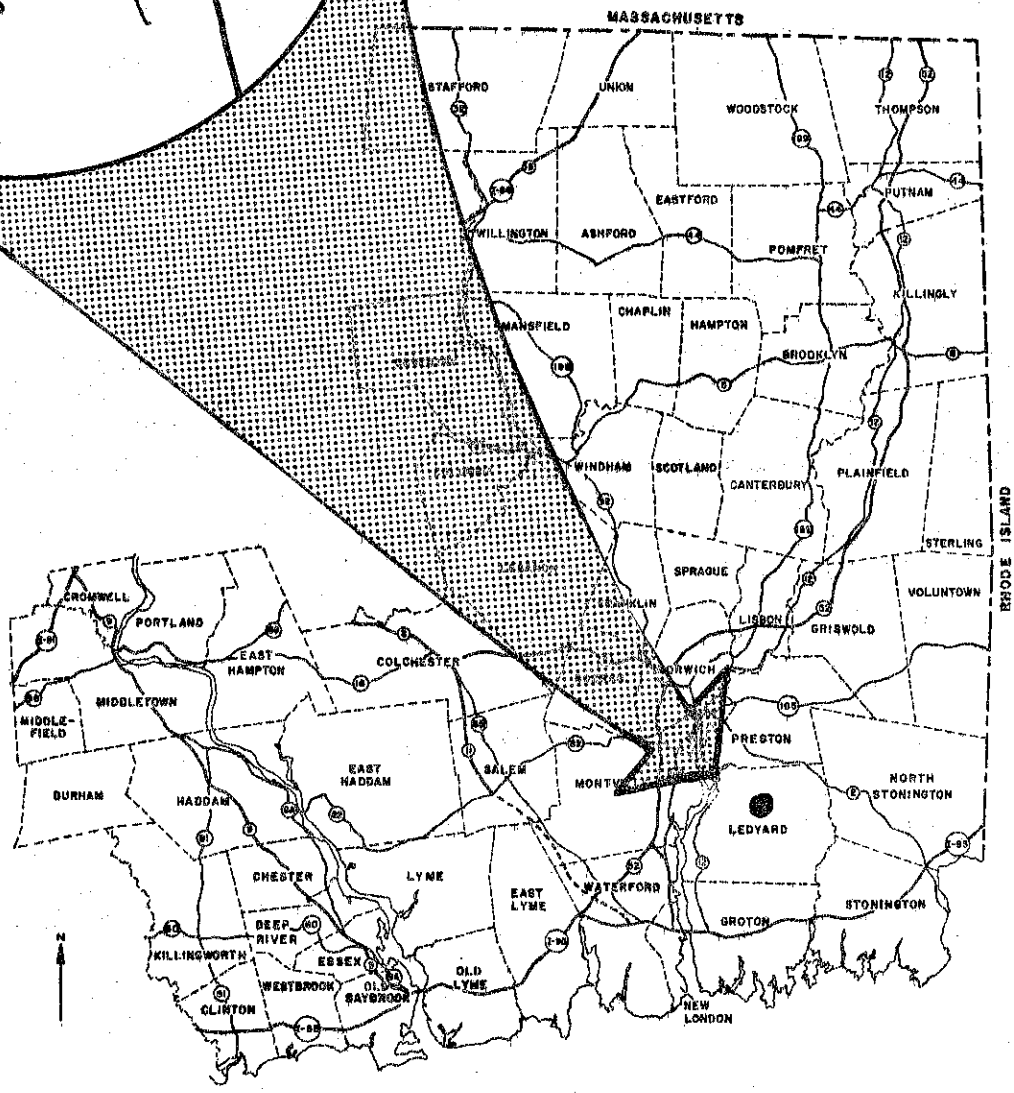
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT PROJECT
Environmental Review Team
139 Boswell Avenue
Norwich, Connecticut 06360

LOCATION OF STUDY SITE

GRAY FARMS, SECTION IV
LEDYARD, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
GRAY FARMS SUBDIVISION, SECTION IV
LEDYARD, CONNECTICUT

This report is an outgrowth of a request from the Ledyard Inland Wetlands and Watercourses Commission, with permission of the landowners, to the New London County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource, Conservation and Development (RC&D) Area Executive Committee for their consideration and approval as a project measure. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

The ERT that field-checked the site consisted of the following personnel: Barry Cavanna, District Conservationist, SCS; Steve Elmer and Charlie Reynolds, Soil Scientists, SCS; Tim Dodge, Wildlife Biologist, SCS; Bill Lucas, RC&D Area Coordinator, SCS; Richard Hyde, Geologist, Connecticut Department of Environmental Protection (DEP); George Cloutier, Forester, DEP; Joe Piza, Fisheries Biologist, DEP; David Miller, Climatologist, UConn Cooperative Extension; Donald Capellaro, Sanitarian, Connecticut Department of Health; Thomas Seidel, Regional Planner, Southeastern Connecticut Regional Planning Agency; and Linda Simkanin, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field-checked the site on Thursday, April 7, 1977. Reports from each Team member were sent to the ERT Coordinator for review and summarization for this final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Ledyard. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Area Committee hopes you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: Miss Linda M. Simkanin, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to review approximately 80 acres of land proposed as Section IV of a single-family home subdivision. The engineer's site plan shows 23 acres designated for open space to be deeded to the Town of Ledyard. The remaining acreage is subdivided into individual house lots-the majority comprising roughly 30,000 square feet, with some larger lots prevailing.

At the time of the ERT review, the landowners' subdivision application called for approval of 30 house lots. Due to the high water table which prevails over most of the site, it is the engineer's intention to place underdrains beneath the proposed roads of the subdivision in an effort to lower the water table. If the underdrains are successful in sufficiently lowering the water table, the landowners will seek approval for 21 additional house lots. It is the intention of the landowners' and the engineer to designate approved house lots and to construct the roadway and attendant drainage features. Actual house construction will not be undertaken by these parties.

The site is presently undeveloped and forested. Lee Brook bisects the site, and an unnamed tributary feeds into Lee Brook along the northern border of the site. The entire subdivision drains into the Williams Brook/Whitford Brook system. The site is presently zoned for residential use on one acre lots. A reduced lot size is permitted with the provision of open space. As there are no public water or sewers available to serve the site, water retrieval and sewage disposal will have to be developed on-site. A community water system is planned and would be owned and managed by the Southeastern Connecticut Water Authority.

This report will describe the natural characteristics of the site including topography, geology, soils,forest cover, wildlife habitat, and the climate. Consideration will be given to the compatibility and suitability of the proposal relative to the natural resource base. Comments or recommendations made within the report are presented for consideration by the developer and the town in the preparation and review of the development plans, and should not be construed as mandatory or regulatory in nature.

TOPOGRAPHY AND GEOLOGY

The Gray Farms site falls along the contact of the Uncasville Quadrangle and the Old Mystic Quadrangle just east of Ledyard Center and south of Iron Street.

Land elevation is highest in the southeast corner, approximately 285 feet above mean sea level and decreases toward the north to just under 150 feet above mean sea level where Lee Brook leaves the property in the northeast corner.

Slope of the land is steepest along the southwest and southern boundary west of Lee Brook where a 15% or slightly greater slope is not uncommon. In the southeast and eastern section land slope is generally about 10% with the central to north central area being lowlying and nearly flat. (Refer to Topography Map.)

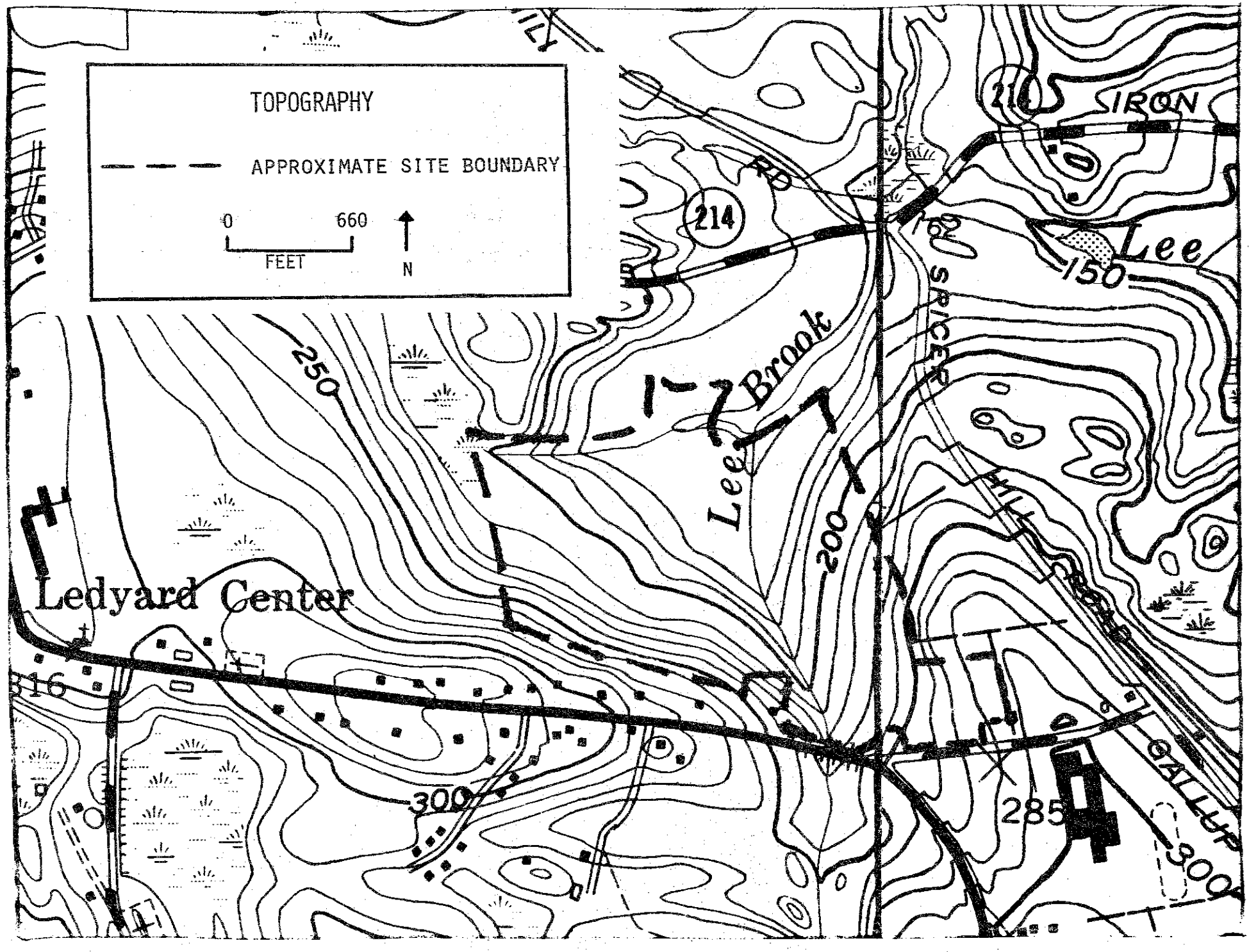
Surficial Geology

The published surficial geology map, GQ-138 by Richard Goldsmith of the U.S. Geological Survey indicates all but a small area along the north central boundary is classified as glacial till. From the field inspection it is evident in some places the till overburden is thin above the bedrock although pockets of deeper material may be found with backhoe exploration. It was also evident that the drainage area has undergone extensive erosion and loss of soil materials in the past as is evidenced by the numerous large boulders particularly in the proximity of Lee Brook.

In terms of the overburden materials, those primary unconsolidated deposits that lie on top of the bedrock surface, the property is covered with what is termed glacial "till." The geologist is principally concerned with those parent deposits below the soil zone. The soil zone is the upper 3 to 5 feet of weathered parent material that is altered through chemical, mechanical and biologic processes of the land surface and mapped by the soil scientist. Glacial till is the predominant primary overburden found in Connecticut and resulted from the melting of glacial ice. These materials were carried, on, in, and pushed along under the active glacial ice and once the ice melted they remained where they were. While it is true that the melting ice waters carried much of these materials away to be deposited as stratified sands and gravels in stream valleys and clay beds in lake bottoms, many of the particles trapped in the ice were dropped in place once glacial activity ceased. By definition, till, or "hardpan" or "boulder clay" terms more commonly used by non-geologists, is a heterogeneous material compsed of various mixtures of boulders, gravel, sand, silt, and clay, none of which are significantly sorted or stratified according to particle grain sizes as is the case with waterlain and windblown deposits. To restate, till is simply the mass of various sized materials that remained after all glacial ice melted.

Because of the mixed nature of the particles comprising till, the pore spaces between the particles are very small and consequently do not give up water readily. This is a principal reason why many till soils exhibiting a hardpan layer, a shallow to bedrock condition, as well as those which occupy relatively flat, low-lying areas which have seasonal or longer high water table can substantially interfere with the successful operation of on-site sewage disposal systems. As observed and recorded during the detailed soil mapping, most of the Gray Farms site exhibits at least a seasonal high water table.

The other type of surficial material found in the north central section is a


TOPOGRAPHY
APPROXIMATE SITE BOUNDARY
0
660
FEET
N
Ledyard Center
Lee Brook
214
250
200
300
285
150
SIRON
Lee
GALLUP

stratified sand and gravel deposited from glacial meltwater flowing away from the ice. As sediment-ladened waters moved off the ice, its velocity quickly diminished causing the larger particles to settle out into stratified layers of various sand and gravel sizes. This type of deposit found below the water table, if thick enough and if coarse-grained enough, can be an excellent source of water.

DRAINAGE

The total drainage area for Lee Brook plus the adjacent stream joining Lee Brook in the northeast corner of the property is 408 acres at the point where Lee Brook crosses Route 214 flowing northerly. Lee Brook itself, from where it exits the Gray Farms site has a total drainage area of approximately 185 acres including most of the subdivision property. All of the Lee Brook overland drainage from south of the boundary is funneled through the relatively narrow and steep sections of the property. During periods of heavy rain, periods of snow and ice cover or ground saturation, surface water flow accumulates rapidly and is funneled directly into Lee Brook through the property from upland areas. In such cases, it is probably not uncommon for sudden and large volumes of water to flow into the property and accumulate within the Lee Brook boulder constricted area. Any lots placed within this zone could have seasonally flooded cellars and lawns.

SOILS

A detailed soils map of the site is given in the Appendix of this report. The soil boundary lines shown should not be viewed as absolute boundaries, but rather as guidelines to the distribution of soil types on the property. Since the time of the detailed soil mapping (April 5), and the full ERT site review (April 7), another soil mapping and revision has been made. As the April 5 mapping was done during periods of extremely heavy rain, another examination of the site was felt to be desirable by the soil scientist. As illness prevented him from completing his mapping at the full ERT review on April 7, he completed the mapping with the SCS senior soil scientist on April 19. His updated soil map revision is what is given in the Appendix. This map supercedes any previous soil maps for the site. The soils map, along with the Special Soils Report, Southeastern Connecticut Region (USDA, SCS, 1969), can serve as an educational tool regarding the identification and interpretation of soils.

The soils limitations chart for certain land uses which is found in the Appendix of this report, provides useful information concerning each soil type found on the site. An explanation of the numbered ratings for particular land uses is provided on the last page of the Appendix. In general, the greatest limiting factor to the proposed subdivision appears to be the high water table which can be considered seasonal in some of the soils (53XB and 31MA) and fairly year-round in others (43M and 825, which are also inland wetland soils regulated under Public Act 155). Approximately one half of the total site acreage is composed of soils exhibiting a high water table condition. This is a severe limiting factor in terms of the operation of a subsurface sewage disposal system.

Regarding the inland wetland soils on-site, 825 is a Birdsall unit, which is a soil that has developed in deep silts and very fine sands . These soils are very poorly drained and have a dark colored surface horizon high in organic matter over gray mottled subsoils. The groundwater table is at or near the surface from late fall through late spring, but may drop below three to four feet from the sur-

face in summer and fall. The 43M is a Ridgebury/ Whitman/ Leicester complex meaning that the soils occur in an intricate and complex pattern and separation of each of the three individual soils is not practical on the scale surveyed. In general, 43M is an extremely stony unit made up of poorly and very poorly drained soils. These soils are characterized by a relatively thin, dark-colored surface horizon over a gray mottled subsurface horizon. They occupy low-lying to gently sloping areas exhibiting an extremely stony or completely stone-covered surface. As these soils have developed in very firm glacial till, a hardpan at about two feet in depth is not uncommon. The groundwater table is on or near the surface from late fall through early spring, but may drop below six feet in late summer and fall.

Regarding the other soils on-site exhibiting a seasonal high water table, both the Woodbridge 31MA and the Rainbow 53XB soils are moderately well-drained soils with a slowly to very slowly permeable hardpan at about two feet in depth. The lower subsoil is mottled, indicating a waterlogged condition from late fall until early spring and after heavy rains in the summer. As these soils are only moderately permeable above the hardpan, water will move laterally down-slope over the pan in wet seasons. This can be a serious limiting factor in the operation of a subsurface sewage disposal system. Surface stoniness varies from essentially stone-free on areas where stones have been removed to extremely stony. More discussion will be devoted to the operation of septic systems in the section on WASTE DISPOSAL.

The remaining half of the site not exhibiting a high groundwater table is composed of soils which are shallow to bedrock (17LC, 17LD, 200C) or have some slope (11/MC). The areas of Hollis-Charlton complex, 17LC and 17LD, again are composed of two soil types which occur in too intricate a combination to be separated in this scale of mapping. In general, these are well-drained upland soils developed in friable (crumbly) to firm glacial till. These soils normally have moderate to moderately rapid permeability throughout, but slowly to very slowly permeable horizons may be present below 40 inches in some places. Charlton soils are naturally stony, and stones in varying amounts and sizes may be encountered both on the surface and during excavations. The "deep pockets of soil" usually found in 17LC and 17LD soils which can provide suitable locations for subsurface sewage disposal systems depending on the amount of slope present, are the Charlton soils. The Hollis portion of the soil complex unit comprise the shallow to bedrock soils which can exhibit soil depths of up to 20 inches, as well as the rock outcrops. Slopes can range from gentle to steep.

A significant portion of the site is composed of Canton 11MC soil which covers a broad hilltop in the eastern section of the site and which slopes down toward Lee Brook. Canton soils are well drained upland soils developed in friable to slightly firm glacial till. These soils have moderate to moderately rapid permeability in the upper horizons and rapid permeability in the substratum. Canton soils are naturally stony and bouldery. Of all the areas examined on-site, this section comprised of Canton soils presents the fewest limitations to development, and so offers the potential for some of the better building lots within the preliminary site plan. As noted on the soil map, within the eastern area of 11MC mapping are many small inclusions of poorly drained Ridgebury soils and moderately well drained Woodbridge soils (the "wetspots"), and some excessively drained Hollis soils (bedrock outcrops). Although these areas are too small (less than one acre) to show as separate mapping units, they have been indicated symbolically as they will present significant concerns when planning the use of this area.

(There are, for example, lots designated for this area on the developers site plan for which satisfactory percolation tests were not achieved).

In summary, the soil map provides the Town and the developers with significant information concerning the potential opportunities as well as the limitations for development on this or any other site. The percolation and deep hole tests provide information on the actual lot by lot conditions which will contribute to the ultimate decision-making regarding use of this land. Such on-site tests performed in the spring (or wettest time of the year) are most valuable as they will usually indicate the worst conditions around which to plan land use.

EROSION AND SEDIMENTATION CONTROL

Provisions should be made to prevent excessive erosion and sedimentation during development. It would be desirable for the Town to require the developer to prepare a plan for erosion and sedimentation control prior to breaking land. The plan should show the construction timetable, the proposed handling of disturbed areas, and the provisions for surface water control. Components of effective erosion and sedimentation control can include both mechanical and vegetative measures.

Mechanical measures include: land grading of only those areas going into immediate construction; diversions to intercept and divert rainfall runoff without causing harmful effects on land users within a watershed's downstream area; storm drains to dispose of runoff from streets, parking lots, and buildings; catch basins; sediment basins to detain runoff and trap sediment; grassed waterways and/or lined channels; drop structures to safely carry water to protected outlets; and the installation of permanent roads as early as possible.

Vegetative measures include: keeping much of the area under existing vegetative cover and keeping areas devoid of cover exposed for the shortest practical period of time; temporary seeding of cover crops plus mulching to stabilize areas during construction; and establishment of permanent vegetative cover after construction.

Connecticut's Erosion and Sediment Control Handbook published by the Soil Conservation Service will aid both the developer and the Town in preparing and approving an adequate erosion and sediment control plan. Standards and specifications for both mechanical and vegetative practices listed within the Handbook are available at the New London County Soil Conservation Service office, 562 New London Turnpike, Norwich, Connecticut.

FOREST COVER

At present, the site is undeveloped and in a forested condition of predominantly mixed hardwoods. Most standing timber of commercial value had been harvested about three years ago. Major hardwood species represented on the site include: red and white oak, ash, sugar maple, tulip poplar, hickory, birch, red maple, black gum, dogwood and aspen. Species composition is excellent, predominantly represented by the principal highest value hardwoods such as ash, red oak, sugar maple and tulip poplar for this Region. The forest site is a rocky, moist, moderately drained one with excellent growth potential. Many excellent species of hardwoods suitable for

pleasing and desirable landscape trees are present on site, particularly sugar maple, red oak, tulip poplar, ash and dogwood. During any construction, disturbance of root systems and trunks of trees should be avoided. Fill around root systems should be kept to a minimum to avoid smothering the trees. Careful planning and placement of homes and utilities will help prevent unnecessary damage to existing desirable plant communities.

The harvesting of the site has left scattered trees of good form and potential, as well as many trees of little or no future potential. Conversion of this forest site to house lots is a gradual erosion of the forest land base in the Region. The proposed (open space) buffer strip along Lee Brook and the maple swamp at the Southeast corner of the property are necessary to protect downstream watercourses. Development regulations should be formulated that will assure minimum disturbance and minimum deposition or movement of upland soils into this area (erosion and sedimentation control).

WILDLIFE HABITAT

Since the time of the forest harvest, the increased amount of sunlight reaching the ground has stimulated a moderate to dense understory of shrubby vegetation. This growth includes hardwood sprouts such as red maple, white ash, tulip poplar, oak, hickory, American beech and flowering dogwood. This understory vegetation provides browse material and fleshy fruit valuable to many forms of upland wildlife. These include numerous songbirds, cottontail rabbit, ruffed grouse, whitetail deer and small mammals such as the raccoon and chipmunk. The understory, as well as the brushy marsh areas (slash) provide some limited cover to wildlife. Without any management the area will maintain good conditions for wildlife for about five years then begin to decrease as plant growth decreases sunlight reaching the ground. The wetland designated as open space is wooded and provides a woodland wildlife habitat of lesser value to species listed above.

If developed, as proposed, much of the existing area will be devoted to house lots. Existing brushy type vegetation would be replaced by grasses and buildings. Development which would be most beneficial to wildlife would include planting fleshy fruit bearing shrubs with high values to wildlife. As much native vegetation as possible would be retained to favor wildlife, this includes trees, and bushy growth. In general, there would be a loss of wildlife diversity, as habitat becomes more restrictive.

Fish Habitat

The site is largely composed of sloping lands of moderately steep grades which are oriented toward Lee Brook which bisects the site. The soils on-site are subject to downhill movement, which can be especially aggravated during construction. Because of this, the potential is high for severe siltation in the downstream watershed. Lee Brook appears to be a high quality, small upland stream of an intermittent nature which during periods of low flow possibly has little or no visible surface flow.

If the development proceeds as proposed, Lee Brook will be subject to increased runoff and soil erosion during construction phases. To avoid problems associated with bare soil and moderately steep slopes (8%) a timely plan of development which includes erosion and sediment control measures should be encouraged. Temporary vegetation and other practices suggested in the earlier section on EROSION and

SEDIMENTATION CONTROL would help preserve stream quality and protect the downstream resources.

From a fisheries standpoint, there is concern that there is a high potential for damage to Lee Brook in terms of siltation, pollution, and potential loss of wildlife and fish habitat. Any damage to Lee Brook would affect streams to which it is a tributary as Seth Williams and Whitford Brooks. These two brooks in particular are heavily stocked with brook trout as well as large numbers of sea trout. Results have been excellent to date with the sea trout program. Two of the larger trout taken since March in the Mystic River weighed 7 1/2 and 8 pounds, respectively.

Direct runoff into Lee Brook must be avoided, but this will be difficult due to the slope of the land on which the homes are proposed. There is a very real possibility of destroying miles of downstream trout habitat. Sudden discharge of large quantities of storm runoff from a newly created drainage system may create some very great changes in the ecology of the watershed. At the very minimum, the proposed (open space) buffer strip along Lee Brook and the maple swamp at the Southeast corner of the property should be preserved to protect downstream watercourses. Development regulations should be formulated that will assure minimum disturbance and minimum deposition or movement of upland soils into this area (erosion and sedimentation control).

CLIMATOLOGY

The area is on the edge of the Connecticut coastal region and its climate is characteristic of a mixture of the coastal marine climate and the Northwestern uplands. Therefore the climate is basically mild and humid in all seasons. When low pressure weather systems bring southerly air flow from the south the area experiences humid maritime conditions especially in the winter and spring seasons. When high pressure systems prevail the area experiences relatively cool dry weather which are the prevailing summer and fall season conditions.

The following data was taken from the CLIMATE OF CONNECTICUT, Bulletin of the Connecticut Geological and Natural History Survey.

Annual Mean Temperatures	50°F
Probability of Winter temperatures getting below 0°F	2 in 5
Probability of Summer temperatures getting above 90°F	2 in 5
Annual Heating Degree Days	5800
Precipitation (mean annual) (relatively evenly distributed by month)	50 inches
Snow Depth (mean annual)	35 inches

Since Ledyard is currently below the state limits for various air pollutants, the ambient air quality should not change with regard for the uses planned for this site. Changes in air quality could occur in the summer months when vehicle miles traveled increases. Air pollutants generated in the adjacent industrialized coastal town of Groton could affect Ledyard air quality.

Due to the surrounding topography - a substantial ridge on the south edge of the property which effectively blocks most sun and wind - the site has very little potential for utilizing any current or future solar energy technology. Very little sunshine reaches the site in the cold months. In addition, the site also has very little potential for utilizing wind energy due to its protected location.

WATER SUPPLY

It was indicated by the developer that water supply for the development would be from the continued expansion of an existing community or public water supply system operated by the Southeastern Connecticut Water Authority. The water for the system is derived from wells located in the general area. From a public health viewpoint, there should be no particular problems with the system assuming there is (or could be) adequate water at sufficient pressure to meet the needs of the project.

WASTE DISPOSAL

As there are no municipal sewerage facilities available, sanitary systems are to be attained on-site by the installation of septic tanks and subsurface leaching systems. Based on visual observations of the terrain and soil survey mapping data, it is apparent that the major portion of the property is severely limited (due to the high groundwater condition or slope) and generally unfavorable for sewage disposal purposes. It was indicated that some 23 acres of the property would be left as open space (wetlands-streambelt). Such adverse factors as high ground water, surface boulders or underlying shallow bedrock, slope and the previously mentioned watercourses dominate the site. The exception to these conditions would be in the parcel (upper terrain) near Gallup Hill Road which is soil mapped as Canton 11MC. It also appeared that some part of the land towards the northern side (Beau Jenny Lane) had more favorable site conditions (grade, contours). The landowners' engineer has indicated that seepage tests made during October, 1976 averaged about 1 inch in 12 minutes. It is also noted that on a number of lots no tests were made due to high groundwater. This condition was evident in the remains of many of the test pits. It also appeared there was more rock than actual soil dug from these excavations.

In order to combat the high groundwater, a roadway drainage system is to be installed with perforated pipe and stone which is intended to act as an effective groundwater control drain. The storm drains will be about five feet deep. This shallow depth would seem to be a limiting factor.

In general the risks for long term, properly functioning sewage systems, are high under such adverse conditions. Therefore, the State Department of Health would be basically opposed to the development. Should the subdivision be granted by the Town the following are recommended:

1. The effectiveness of the storm and groundwater control system is to be determined by actual installation and reinvestigation of the site during the time of the year when groundwater levels are near their maximum.

2. Each lot being considered for possible approval should have a detailed engineering design for site preparation, surface and subsurface drainage, and the sewage disposal system. The plan should show two foot contour intervals including a cross section of the sewage disposal system. Reserve areas are also to be tested and shown to be suitable for sewage disposal purposes.

3. Where extensive site work may be involved, the site work should be completed and be satisfactory to the responsible Town officials(s) before a building permit is issued and construction is started.

4. During construction the sewage disposal system should be under the supervision of the consulting engineer who should certify that the system was installed in accordance with the design plans. If changes, which had been approved, were made "as built", drawings should be prepared and submitted to the town.

HAZARDS

It was indicated during the site inspection that curtain drains using perforated pipe would be placed five feet under the roadway and connected to the surface through catch basins. The purpose is principally to get rid of excess road drainage during rain storms but also to act as a constant groundwater drain for lots in which percolation tests could not be conducted previously. It is the engineer's hope that this technique will lower the water table sufficiently to allow for percolation tests to be made after the water table is lowered.

Engineering calculations depicting the effectiveness of curtain drains are generally based on the assumption of flow through a homogenous material. If there is one thing glacial till is not, it is a homogenous material and a five foot deep curtain drain probably will only have a limited lateral effect on the groundwater table. Curtain drains are only effective within the immediate vicinity of the drain but obviously the deeper the drain is within the overburden zone, the wider its lateral effect will be.

Catch basins along the roadway are to be tied into the central curtain drain systems with exits at various down-slope locations. Such a combined system may result in the effectiveness of the curtain drain function to be diminished over time. Any catch basin system is a constant collecting point for sand, dirt, and debris from the road and nearby lawns and driveways. This condition is particularly aggrevated in areas of house construction and if strict, timely and regular clean out measures are not adhered to, a large amount of these materials will move into the curtain drain. If silt and sand get into the curtain drains during periods of low groundwater table conditions, water moving through the catch basins will seep out of the perforated pipe carrying with it the fine sediment particles. Over a period of time this action will plug the gravel around the perforated pipe and thereby reduce the curtain drains effectiveness for lowering the groundwater table. After a period of five to ten years or sooner if catch basin maintenance is neglected or is haphazard, the water table will tend to rise to its previous level causing any lots dependent on lowered water tables for proper septic system operation to be in trouble.

Both community wells are located in an area downstream of the great majority of lots within the proposed Gray Farm subdivision. Water entering these wells comes from the surrounding groundwater aquifer, principally water within the sand and gravel deposit along Lee Brook at the northern boundary of the property. If, however, there are numerous failing septic systems within the Lee Brook drainage system, and if such contaminated surface water or groundwater is entering Lee Brook itself, and if the cone of influence of the community wells extends under the brook, it is reasonable to expect that water from the brook, through infiltration, will enter the community wells. Such contamination, it is true, will be in a very dilute form but if all conditions are right, water supply problems could occur. One very good way to minimize infiltration through the bottom sediments of the brook is to maximize the distance between the wells and the watercourse.

Foundation Development

From the on-site investigation, it appears that all houses located in moderately well drained soils will need footing drains with outlets. Another potential problem for houses located on steep slopes is surface water entering the basement. It may be necessary to construct diversions uphill from these houses.

Mosquitoes

The environment of the area will, no doubt, support a heavy mosquito population and therfore will likely be a source of nuisance and annoyance to future residents of the area.

Erosion and Sedimentation

A sediment and erosion control plan should be developed for the area. With the construction of water drainage systems, etc., there is potential for siltation of the wetlands and the streams that flow through them. The components of effective erosion and sediment control have been outlined earlier in this report. In addition, the Town of Ledyard should seriously consider the formal adoption of erosion and sedimentation control regulations. The SCS is available to assist in the development, technical review, and implementation of such regulations.

SERVICES TO SUPPORT DEVELOPMENT

The site is close to the elementary school, fire department, town hall and commercial facilities located within 1 mile to the west at Ledyard Center. The high school is immediately southeast of the site. Ledyard is a member of the Regional Transit District and local bus service is proposed for year two of the transit program (1979 or 1980) along Colonel Ledyard Highway and Gallup Hill Road to the Highlands. The potential exists for mass transit to decrease the reliance upon the private automobile to serve the area. Road access from the site to both Gallup Hill Road and Iron Street will improve circulation and avoid long deadend streets.

SURROUNDING LAND USES AND OTHER USES

Surrounding land uses are residential along Colonel Ledyard Highway to the south and Iron Street (Route 214) to the north. The Ledyard Senior High School is across Gallup Hill Road southeast of the site and the Town of Ledyard open space Blonder property is on the south side of Colonel Ledyard Highway. Ledyard Center is within one mile of the site to the west via Colonel Ledyard Highway. The adopted Ledyard Town Plan of Development recommends this area of Ledyard for medium and high density residential uses and a commercial center on the west side of the Gray Farms site. The Town Plan intends that these areas eventually be served by public water and sewer systems. Until all utilities are available, these more intensive land uses are not desirable. In terms of this particular site, a possible alternative would be to remain undeveloped. The site does not contain sand and gravel, and is too wet, rocky, and forested to be used for agriculture. For residential uses the soils present problems in terms of the high water table, stoniness, hardpan, and slope. The question remains whether

septic systems can be satisfactorily accommodated by these soils so that they function properly all year and do not cause runoff or surfacing problems. Any surface runoff will flow downstream in the direction of the community well fields.

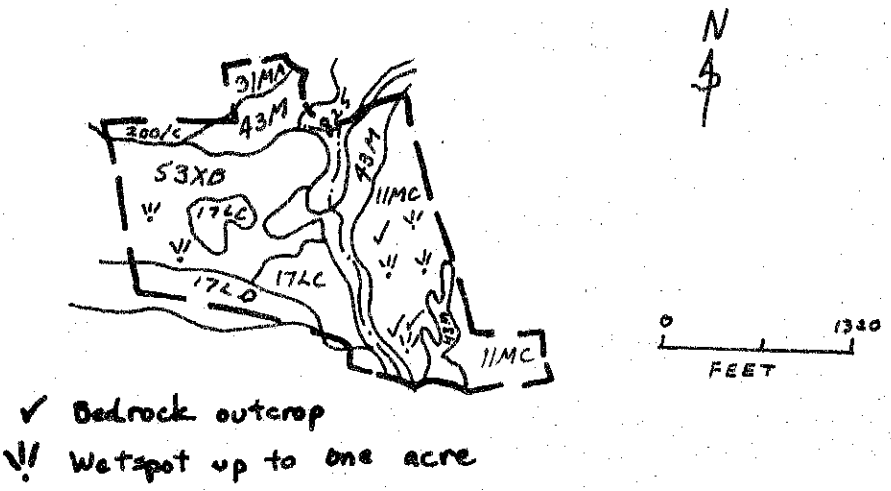
Currently, 24 lots have no on-site percolation test data with a note that they will have to be individually approved upon installation of a curtain drain and design of a leaching field by a professional engineer. These lots are generally in wet soils. Section 7-7 of the Ledyard Subdivision regulations requires percolation data on all lots as part of the approval process for a subdivision. If these lots are not to be approved as building lots this should be noted on the final subdivision plan. If these lots are to be sold subject to the purchaser's ability to lower the water table and conduct a percolation test, then this should be noted on each appropriate lot and recorded on the deed. This approach will warn the perspective lot buyer that he or she has an additional cost to bring the lot up to acceptable standards for installation of a septic system. The more environmentally sound approach would be simply to remove these wet lots as building lots and include the area as part of the open space system.

APPENDIX

SOIL MAP

GRAY FARMS SECTION IV

LEDYARD, CONNECTICUT



Prepared by: UNITED STATES DEPARTMENT OF AGRICULTURE, Soil Conservation Service.

Advance Copy, subject to change.

LEDYARD: GRAY FARMS SECTION IV

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
					On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Hollis-Charlton	17LC	10	14	Shallow to bedrock, slope	3	3	3	3
Hollis-Charlton	17LD	8	1	"	3	3	3	3
Ridgebury, Whitman, Leicester complex	43M**	14	19	High water table	3	3	3	3
Canton	11/MC	18	23	Stony, slope	2	2	3	3
Rainbow	53XB	20	27	Fragipan, seasonal, high water table	3	2	2	2
Woodbridge, and Rainbow	31MA	2	4	Seasonal high water table	3	2	2	3
Narragansett-Hollis	200/C	4	6	Shallow to bedrock, slope	3	3	3	3
Birdsall	825**	4	6	High water table, floods	3	3	3	3
TOTAL:		80	100%					

* Urban Use Limitations: 1 = slight; 2 = moderate; 3 = severe (see back of this page for a further explanation of limitation classifications.)

** Inland Wetland soils as defined by Public Act 155, as amended.

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.