environmental review team report

WESTERN PEQUOT INDIAN RESERVATION

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
WESTERN PEQUOT INDIAN RESERVATION
LEDYARD, CONNECTICUT

OCTOBER, 1976

The preparation of this report was assisted by a grant under Title 1, Section 107(a)4 of the Housing and Community Development Act of 1974, 24 CFR, Part 570, Section 570.406.

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT PROJECT
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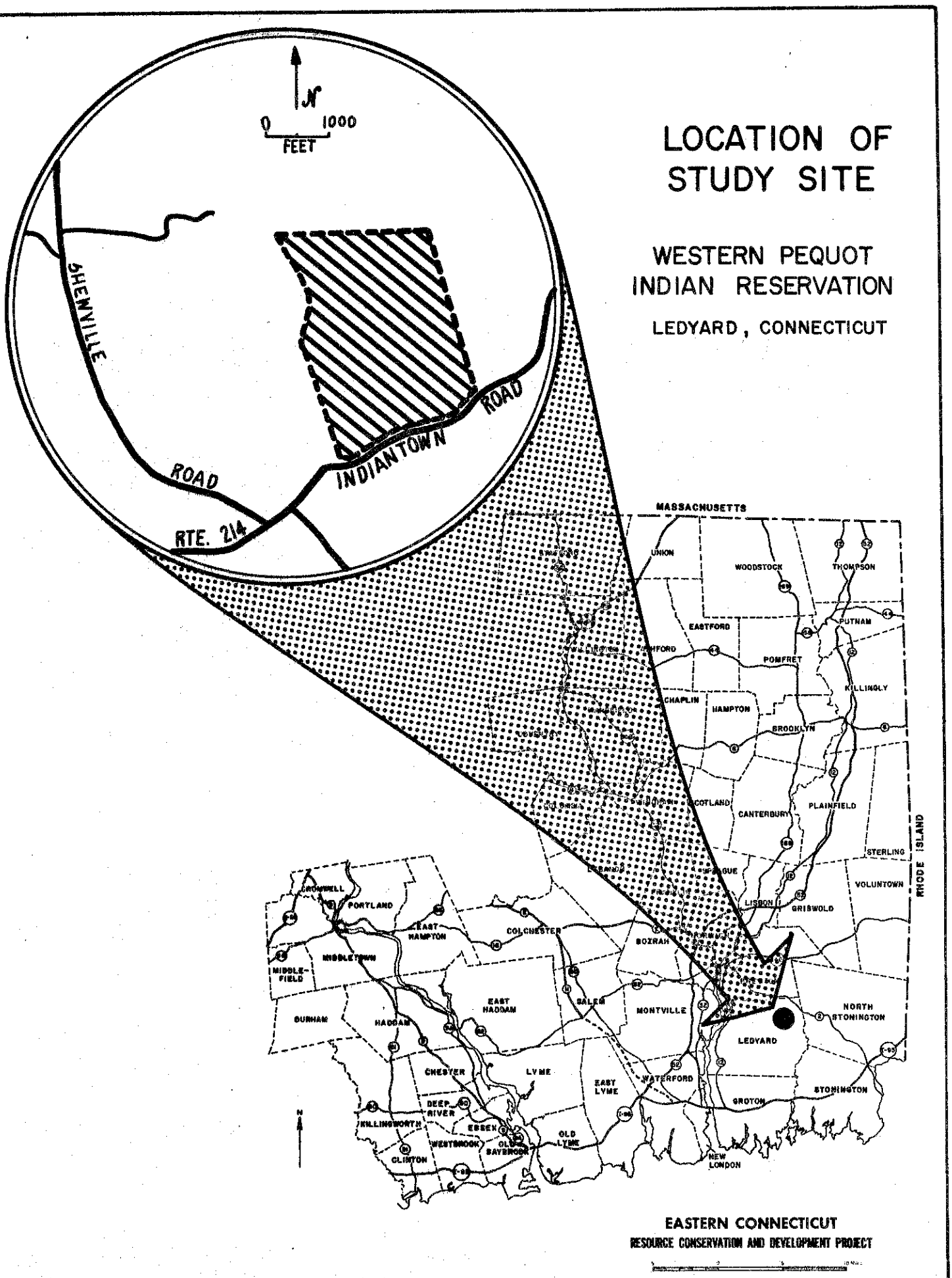
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INDIAN RESERVATION
LEDYARD, CONNECTICUT
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WOODSTOCK
THOMPSON
EASTFORD
PUTNAM
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POMFRET
KILLINGLY
CHAPLIN
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BROOKLYN
SCOTLAND
CANTERBURY
PLAINFIELD
STERLING
VOLUNTOWN
LISBON
GRISWOLD
CROMWELL
PORTLAND
EAST HAMPTON
COLCHESTER
BOZRAH
MIDDLETOWN
MIDDLE-FIELD
EAST HADDAM
SALEM
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NORTH STONINGTON
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EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
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WESTERN PEQUOT INDIAN RESERVATION
LEDYARD, CONNECTICUT

This report is the outgrowth of a request from the Indian Affairs Council of the Connecticut Department of Environmental Protection (DEP), who is also the landowner in this instance, to the New London County Soil and Water Conservation District (S&WCD). The Eastern Connecticut Resource Conservation and Development (RC&D) Project Executive Council also approved the request as a project measure which was subsequently reviewed by the Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses, and a topographic map showing the property boundaries were forwarded to all members of the Team prior to their review of the site.

The Environmental Review Team that field-checked the property consisted of the following personnel: Sherman Chase, District Conservationist, SCS; Tim Dodge, Wildlife Biologist, SCS; Richard Hyde, Geologist, DEP; George Cloutier, Forester, DEP; David Miller, Climatologist, University of Connecticut Cooperative Extension Service; Donald Capellaro, Sanitarian, Connecticut Department of Health; Thomas Seidel, Regional Planner, Southeastern Connecticut Regional Planning Agency (SCRPA); and Linda Simkanin, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and reviewed the site on Thursday, July 1, 1976. 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 any developers, the Indian Affairs Council, and the Western Pequot Tribal Members. 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 Project 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 Project, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to review approximately 213 acres of land comprising the Western Pequot (or Mashantucket) Indian Reservation. The Western Pequot or Mashantucket Tribe intends to develop single-family housing as well as some community facilities such as a recreation area, community garden, and a commercial (open to the public) trading post. The tribal heads, as well as the Indian Affairs Council (DEP), are seeking planning suggestions on the preliminary site plan which was offered for Team comment, and which is reprinted here in the report.

The preliminary site plan indicates about 21 individual house lots of approximately 2 1/2 acres each, plans for the community facilities listed above, and devotes the remaining acreage to open space for the present time.

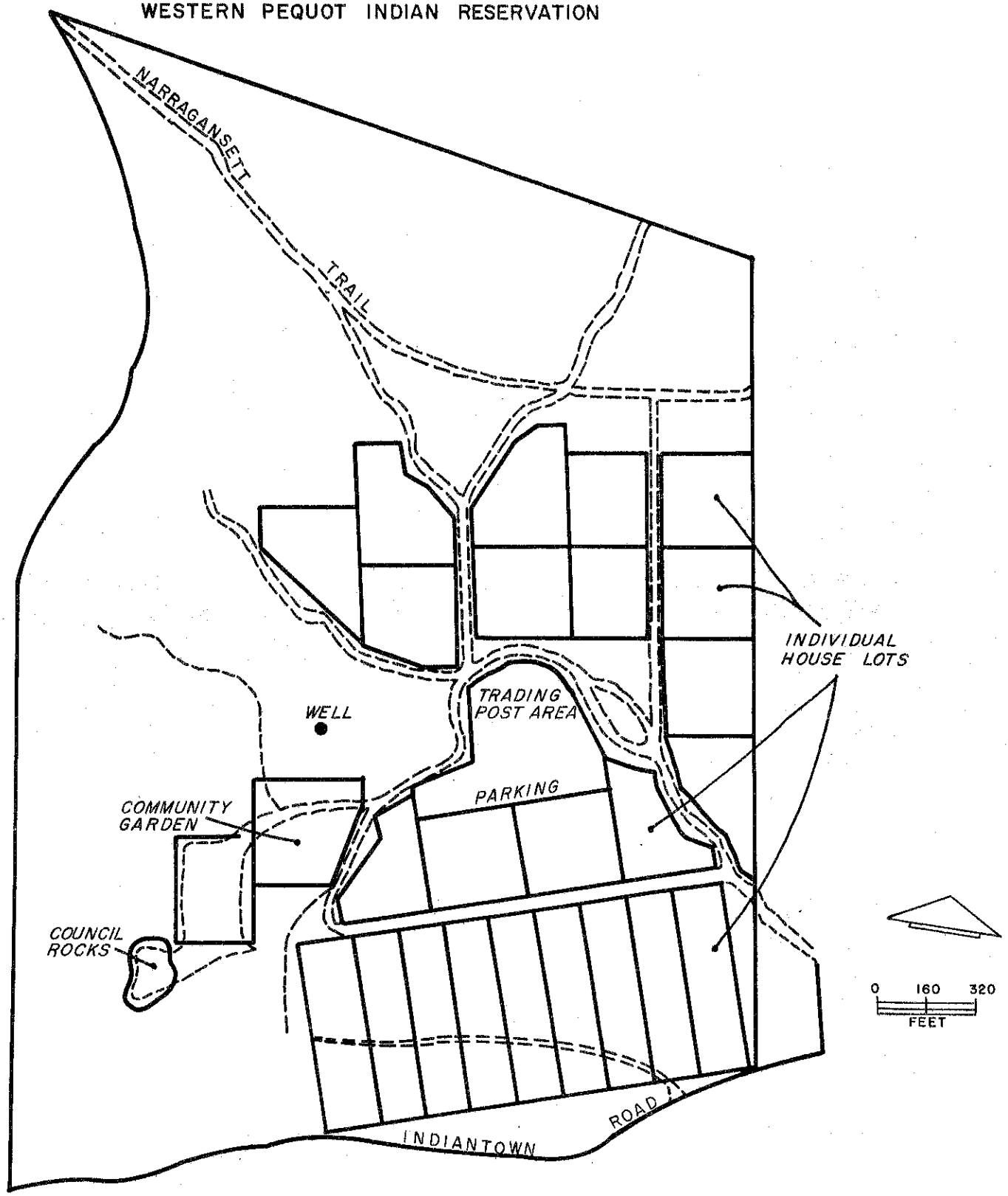
With the exception of a few houses and house trailers now established on the property, the site is undeveloped. Present land uses include wooded uplands, some wetland, and a burned out area now being logged. Water retrieval and sewage disposal would have to be developed on-site.

Some aspects of the proposed development discussed by the Team include waste disposal, water supply, and the need to prepare an erosion and sediment control plan in an effort to control runoff during and after construction in some of the steeper areas of the site.

The report will also describe the natural characteristics of the site including topography, geology, soils, forest cover, and wildlife habitat. Consideration will be given to the compatibility and suitability of the development relative to the natural resource base. Comments or recommendations made within the report are presented for consideration by members of the Mashantucket Tribe, the Indian Affairs Council, any developers who may undertake actual construction, and should not be taken as mandatory or regulatory in nature.

PRELIMINARY SITE PLAN

WESTERN PEQUOT INDIAN RESERVATION



TOPOGRAPHY AND GEOLOGY

The property is located on the north side of Indiantown Road between the road and Cedar Swamp. The land form is irregularly hilly, with many steep slopes, but some flat or gently sloping areas do exist in the southern half of the property. The northern half is all fairly steeply sloped toward Cedar Swamp. Bedrock outcroppings are very numerous throughout the western half with an occasional outcrop on the rounded hill in the southeastern corner of the reservation.

Approximately 2/3 of the surface drainage is to the north toward Cedar Swamp, the remaining 1/3 drains to the west and Indiantown Road.

Surficial Geology

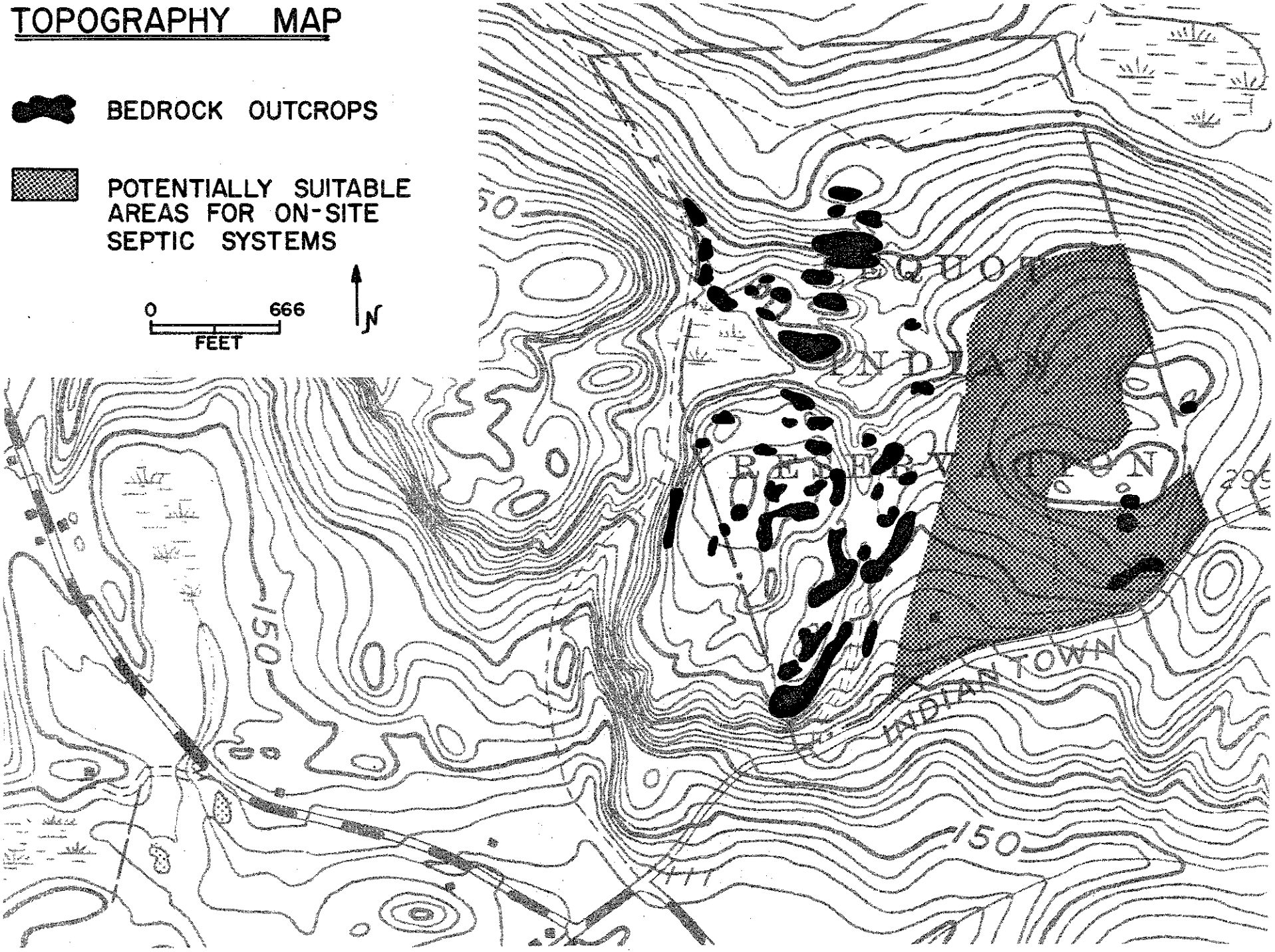
The two principal overburden materials found within the property boundaries are glacial "till" and swamp deposits. The surficial geologist, unlike the soil scientist, is concerned with the primary overburden found lying on top of the solid bedrock surface. By primary overburden, we mean the material below the soil layer where weathering has developed a soil profile, that was deposited by glaciers thousands of years ago and has been relatively undisturbed ever since. Till is the most widely distributed overburden found in Connecticut. It was formed from the rock and soil particles picked up, mixed in with, and carried on and in the active glacial ice. After the ice melted, the solid materials that remained in place consisted of various mixtures of boulders, gravel, sand, silt, and clay, none of which exhibit significant sorting or stratification according to grain sizes.

The till deposits in this area range in thickness from nothing, where the bedrock is exposed at the land surface, to a maximum average thickness of 10 to 15 feet in the northern and northwestern portion. Also, there probably are scattered pockets of till 20 and 25 feet thick in these areas.

The locations of individual on-site septic systems are required to meet specific criteria to ensure against premature failure of the system, to prevent pollution of subsurface and surface water supplies, and to protect the general population's health. Two such requirements are the bottom of the leaching field shall be at least 18 inches above the maximum ground water level, and at least 4 feet above bedrock. These are in addition to the various other requirements of sizing, set-back distances and placement as outlined in the State Health Code for domestic sewage. In terms of the depth to rock and water table, those areas of the reservation, where such criteria can most likely be achieved, are illustrated on the Topography Map found on the following page. The map is intended to be general, and it is assumed that with the use of a backhoe, deep pockets of suitable overburden could be located in other portions of the site.

Small swamp deposits are found throughout the uplands of southeastern Connecticut. One body of several acres is located along the center of the western reservation boundary. This is merely a low spot at the top of the north and south drainage systems that receive sediments and plant materials from the surrounding hillsides. Over a period of time the bottom of this hollow has become silted in, resulting in a nearly year-round swamp environment. Bedrock is very shallow, probably only a few feet below the swamp surface.

TOPOGRAPHY MAP



SOILS

A detailed soils map of the properties is given in the Appendix to this report. As the map is an enlargement from the original 1320'/inch scale to 660'/inch, 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. 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.

With the examination of the soils map, and the accompanying chart indicating general soils limitations for various land uses (also found in the appendix), a correlation between the soils and the surficial geology can be seen. As was indicated on the Topography Map, the soils in the southeastern portion of the reservation appear to be suitable for the proposed development. Except for some steep slope areas, and stoniness, these soils 6MC, and 200/BC are well drained and should provide adequate locations for basements, subsurface sanitary facilities, roads, and parking areas. The stones and boulders can be cleared, and the development located on the gentler slopes when possible.

There are two soil types in this area. The first nine lots drawn roughly along Indiantown Road appear to be within the 6MC soil series, or Narragansett soil. These soils have developed in silty mantles over very friable (easily crumbled) to firm glacial till. They are well drained and moderately permeable. Surface stoniness, as observed on-site, varies from essentially stone-free to very stony. Slopes range from very gently sloping to a grade of 15%.

Approximately half of the larger lots as well as the trading post area and associated parking (refer to preliminary site plan) appear to fall into the 200/BC, or Narragansett/Hollis complex. This soil complex consists of about 55% deep well-drained silty soils and about 45% shallow moderately well-drained silty soils over bedrock. The deeper soil is basically Narragansett; the shallow soil is mostly a Hollis silt loam with inclusions of moderately deep silt loam over bedrock. Surface stoniness ranges from stony to extremely stony on the deep soils and from very rocky to extremely rocky on the shallow soils. The topography is undulating to sloping upland ridges and depressions with the shallow to bedrock soils occurring on the ridges and the deep silty soils occurring in the depressions. Slopes range from nearly level to a 15% grade.

The preliminary site plan indicates approximately 22 lots of about 2.5 acres each. In areas where homes and roads are planned, sediment and erosion control plans should be developed and implemented. Components of effective sediment and erosion control include, but are not limited to, keeping much of the area under existing vegetative cover and keeping areas devoid of cover exposed for the shortest practical period of time. A suggestion would be to locate the best site for a home on each lot, and then clear only from 1/4 to 1/3 acre for the house, lawn and driveway. This would result in a woodland setting, and also provide a plan to control runoff, erosion and sedimentation. Permanent roads should be installed as early as possible. Temporary seeding and munching may be necessary if development becomes protracted. Sediment basins and other temporary mechanical measures may be necessary to control sediment and reduce the erosive effect of runoff water. The road toward the north end of the property has some steep spots that will need attention to prevent erosion. Control measures could include relocation of the steep sections, paving, and diverting water. Also, a culvert or bridge will be needed over the stream.

It would be advisable to check for ledgerock before final location of the basement and sanitary facilities. Although ledgerock is not so apt to be encountered on the south section, it is possible, and very apparent north of the garden area. The soil in the five acre garden area is productive of vegetables and responds very well to lime and fertilizer. We would suggest that a soil test be taken and also that the New London County Soil and Water Conservation District be enlisted to provide a conservation plan on the property.

FOREST COVER

The Reservation contains about 213 acres. With the exception of clearings for a community garden area and existing buildings, the land is wooded. Lands surrounding the Reservation are primarily undeveloped woodlands including a large wooded wetland area known as Cedar Swamp. This wetland is approximately one square mile in size located immediately north of the Reservation lands. Forest cover includes mixed deciduous trees which include but are not limited to red maple, sugar maple, flowering dogwood, white ash, red oak, american beech, birches, and tulip poplar. The shrubby understory contains hardwood sprouts, viburnams including arrow-wood, blueberry, and spicebush. There are also scattered conifers such as white pine and hemlock.

The woodland of the Reservation can be roughly divided into two sections. The first 150+ acres back from Indiantown Road is stocked with pole saplings of black oak, scarlet oak, white oak, hickory, and some red oak, tulip poplar and sugar maple. The stand originated after a severe fire that burned 35 to 40 years ago. The second section comprises the approximate northernmost 60 acres. This area is timbered and stocked with red oak, black oak, hickory, white oak, tulip poplar, sugar maple, ash, black birch, and beech. This area is heavily fire scarred with 95% of the trees scarred and 15-20% volume loss. Basal area in the timber ranges from 85 to 110 square feet with an average of 91 square feet. Log heights are from 1 1/2 to 2 logs. Increment borings reveal growth is fair (10 to 14 rings per inch). Reproduction of desirable species is scattered, light to medium over the area (red oak, sugar maple, tulip poplar). As total topography and soils vary, so does the species size class.

The landowners indicated they desired a multi-managed forest to involve (1) managing sugar maples as a source for a maple sugaring operation (2) source of fuel wood for personal consumption as well as for monetary income (3) increasing and managing wildlife habitat (4) managing for a high value timber crop.

The second section of 60 acres mentioned earlier has been marked for timber sale on a single tree and group selection basis. Silviculturally the harvest will remove 15-25 square feet of basal area of coarse, dominant, fire scarred dominants and co-dominants and some thinning for residual crop tree release. On an average, 1700 board feet per acre was marked for a total of 101,820 board feet. Cull was deducted in the field. A dry season is recommended for the harvest operation, as slopes might be subject to erosion and the moist soils subject to rutting. Yarding areas will be suggested by a Department of Environmental Protection Forester. The timber marked was of medium grade. Stumpage value, however, should be relatively low because of the high percentage of cull involved, the accessibility being difficult and logging chance being poor.

In order to facilitate the owner objectives numbered above, the conditioning

cut so marked should be made. Sugar maples were purposely left for the maple syruping and seedling potential. The understory of sugar maples will respond to the release. Fuel wood will be a byproduct of the hardwood harvest. Hundreds of cords should be made available from the tops of marked trees. On top of this, a badly needed Timber Stand Improvement (T.S.I.) job should follow up the harvest in order to produce an equal amount of fuel wood, as well as to encourage a desirable regeneration of high value species such as sugar maple, tulip poplar, red oak, and ash. This situation would be greatly improved by removing large cull trees unsuited for saw logs that are left as part of the residual stand.

Access into the wood lot is over a rough, rocky road. Bulldozing to remove protruding boulders would facilitate future management, especially the harvest of maple sap and fuel wood, and would provide much needed access for fire protection. As evidenced by the damaged timber and the vast area of evenaged, low grade poles, fire protection should be a part of any management scheme.

The woodlands on this Reservation are an integral part of the cultural heritage of the American Indian. In the past the forest provided most of the necessities of life. Under today's cultural evolution the "forest" can still be an important resource in furthering this heritage. As part of the land base, the best forest stands are found in the rough, rocky wet sections on the northwestern section of the Reservation. This area is unsuitable for cultivation and residential development. A short-term plan of management has been submitted to the Indian Affairs Council by the Region IV Forestry Unit, DEP.

An annual work plan should be drawn up under the guidance of a forester designed to improve the productivity and upgrade the quality of the residual stands. An effort should be made to educate the younger generation on species identification, uses of wood from various species and folklore associated with the forest resource.

WILDLIFE HABITAT

Collectively, the entire Reservation provides good quality wildlife habitat. Habitat elements of food and cover are provided by mixed deciduous hardwood trees, shrubs and vines, with scattered conifers. Woodland animals commonly utilizing this type habitat include white-tailed deer, raccoon, ruffed grouse, gray squirrel, songbirds, birds of prey and small nongame mammals. Existing wildlife habitat quality is best in the northern half of the Reservation. The southern portion contains dense stands of red maple and oak which limit sunlight penetration and development of understory plants. The southern portion is also being considered for housing and tourist development, which would increase disturbance factors to wildlife.

Diversity of plant species is greater on the northern portion of the Reservation than on the southern portion. Soils on the northern area have slight to moderate limitations for maintenance and development of woodland wildlife habitat elements. A detailed management plan for development of wildlife habitat could become part of an overall plan for the Reservation based on the management goals of the tribe. A management plan should call for development of woodland "edge," woods roads seeded to grasses and legumes and development of small woodland openings. The wildlife biologist located in the main SCS office in Storrs can assist in the preparation of detailed wildlife management plan.

CLIMATOLOGY

There are no severe climatic limitations to development of the site for residential housing. The area is on the edge of the Connecticut coastal region and its climatic characteristics are 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 Nautral 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

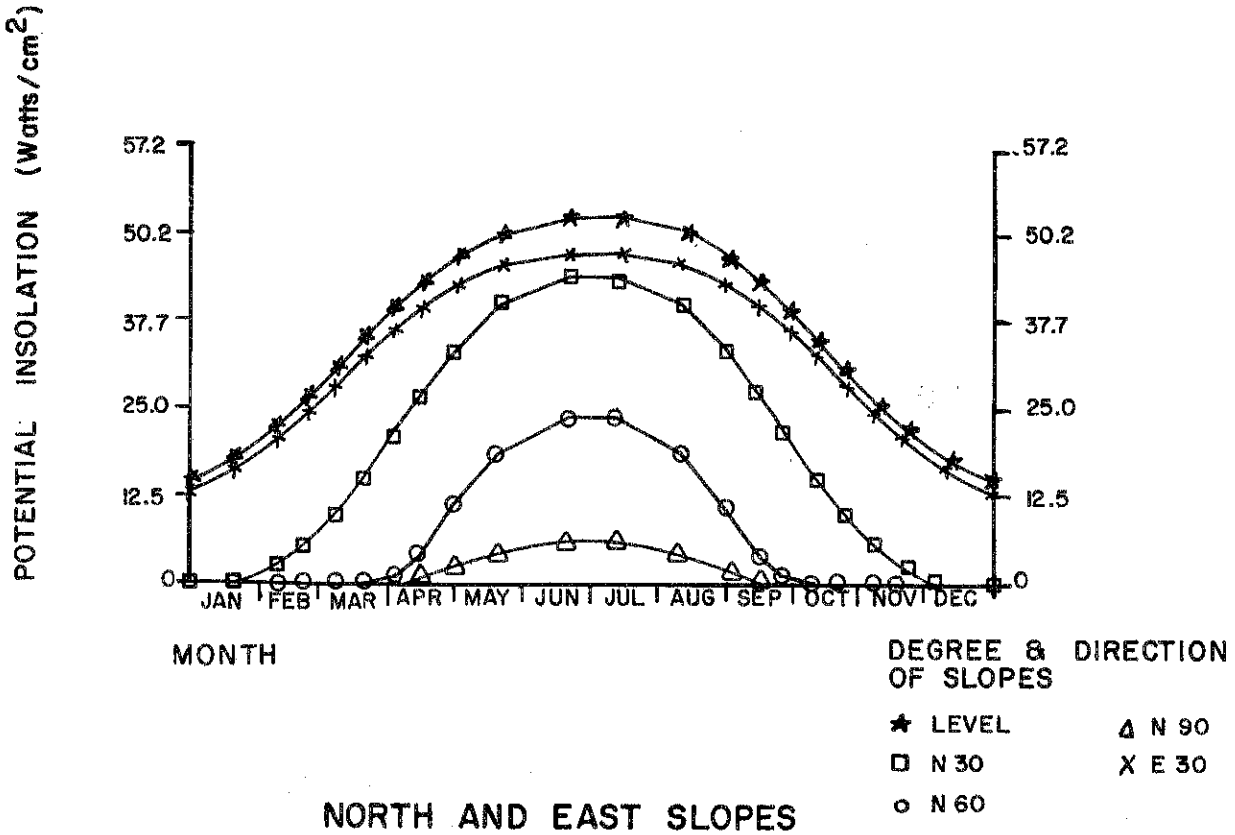
The surrounding topography is gentle and therefore does not influence the local climate in any limiting manner. Since Ledyard is currently below the state limits for various air pollutants, the ambient air quality should not change with regard for the uses planned for this site. Changes in air quality 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.

Solar Energy Availability

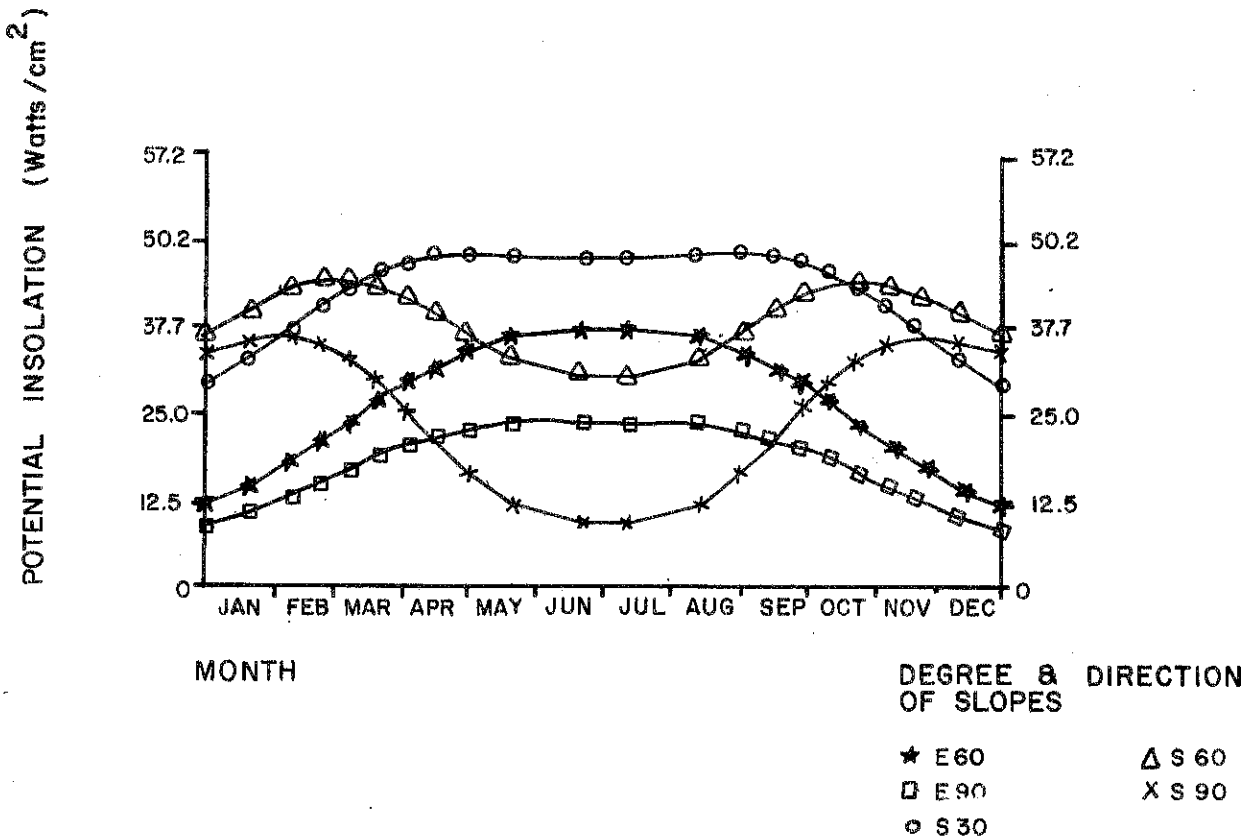
From the graphs presented on the following page, it should be apparent that the site's south facing slopes are best suited to the utilization of solar energy. It should be pointed out that the isograms (the lines on the graph connecting the point values) show the approximate maximum potential solar radiation for clear days. In actuality, in this region of the country there is a cloud cover, on the average, 1/2 of the time in winter, and on the average, 1/3 of the time in summer. This is substantiated in the data presented in the table below.

Average No. of hours of sunshine daily			Approximate Day lengths
Jan.	-	4.5 hours	9 hrs.
Feb.	-	6 hours	10 hrs.
Mar.	-	6 hours	12 hrs.
Apr.	-	7 hours	13 hrs.
May	-	8 hours	14 hrs.
June	-	9 hours	15 hrs.
July	-	9 hours	15 hrs.
Aug.	-	8 hours	13 hrs.
Sept.	-	7 hours	12 hrs.
Oct.	-	6 hours	11 hrs.
Nov.	-	5 hours	10 hrs.
Dec.	-	4.5 hours	9 hrs.

DAILY VOLUMES OF DIRECT SOLAR RADIATION AT 40 DEGREES NORTH LATITUDE



NORTH AND EAST SLOPES



SOUTH AND EAST SLOPES

During cloud cover periods, the solar radiation is reduced to less than 10% of the potential values shown. It should also be pointed out that the figures on the previous page are averages and that cloud cover periods generally last several days at a time or longer. Thus the average amounts of energy collected may be sufficient for limited periods, but enough radiation for power generation cannot be depended on for a day after day basis during extended periods of cloud cover.

Wind Energy Availability

The clear view to the north and south from the site are evidence that at this location wind speeds and incidences of wind will generally be higher than the average conditions. The prevailing wind directions are from the NW in winter and SW in summer.

Monthly average wind speeds at New Haven are shown below and are similar to the winds that can be expected at the site. Again these are averages. The wind speed is generally zero overnight and twice this during the midday.

Mean hourly windspeed (miles/hr.)	
January	9.4
February	9.8
March	10.1
April	9.8
May	8.4
June	7.6
July	7.2
August	7.2
September	7.8
October	8.5
November	9.1
December	8.7

WATER SUPPLY

On-site water supply would have to be derived from a well or wells drilled into the bedrock aquifer underlying the property. This rock is highly metamorphosed, that is, it has undergone great change from being exposed to intense pressures and temperatures, a result of deep burial in the past. Because the rock is a relatively hard and dense material composed of tightly interlocking mineral grains, fluids cannot pass between the grains easily. For this reason, any water potentially available within the rock must be that which is trapped and carried through crack openings within the rock itself. If the cracks are large and numerous, then the chances of a well shaft intersecting such cracks and consequently receiving water from them is much greater than if there are only small scattered ones. The well water yield available to the user then is directly proportional to the amount and rate of ground water flowing into the well.

Except for fault zones, highly fractured areas created by earthquakes or rock movements that may extend deep into the earth, the largest number of rock openings are primarily found between the bedrock surface extending down to a point 200 to 250 feet deep. Therefore, as a general rule, the capacity for rock

to yield water declines with depth. Based on statistics published in the "Water Resources Inventory of Connecticut, Lower Thames and Southeastern Coastal River Basins," the average bedrock well yield for 274 wells sampled was 14 gallons per minute with nine out of ten of these yielding at least 3 gallons of water per minute.

If a community well is going to be used to supply single-family dwellings, a community well is any well supplying two or more houses. The amount of water being pumped is between 10 and 50 gallons of water per minute, and there must be at least 150 feet separation between well and any septic system. (This will be discussed further.)

A 3 bedroom home requires approximately 250 gallons of water per day, although, the peak demand is crowded into the morning and evening hours. One well yielding 3 gallons per minute will produce a daily total of 4,320 gallons per day, but peak demand periods probably will exceed the well's capability to meet short-term demands if more than 1 or 2 houses are using the system at the same time. Additional wells could be drilled or surface water storage tanks could be incorporated into the system to meet short-term needs.

At the present time there are several occupied dwellings located on the Reservation close to Indiantown Road. As indicated in the INTRODUCTION to the report, the preliminary site plan shows about 21 individual house lots of approximately 2 1/2 acres each. The Team was told that there is an immediate desire to provide housing on 10 of these lots. The Team was also informed that plans were being considered for cluster housing, possibly for as many as 50 families. Commercial development centering around a trading post and possible restaurant is also planned.

It is understood that a central or public water supply is being considered. There is an existing shallow well (stone lined walls, no cover, about 8 feet deep) on the property and this type of construction is not appropriate for a public water supply. In considering such a facility, it is necessary that a well site be properly located and separated from any potential sources of sewage or other types of pollution. In general, a minimum separating distance of 150-200 feet, depending upon the yield of the well and the projected needs of the supply to meet the various requirements of the development, should be maintained. While there should be no particular difficulty in meeting this criteria, there remains the problem of proper well construction to afford protection of the supply from surface wash or subsurface drainage near the surface or other possible contamination. Certain established requirements are provided for in the State Public Health Code. The actual yield test of the well and the results of a laboratory examination will give data in order to prepare plans and specifications for storage, pumping and distribution facilities, and also to note the quality of water and whether treatment of the water for certain minerals (iron, manganese, excessive hardness) or to reduce corrosiveness, may be desirable or needed.

In respect to the possible development of some ten lots along Indiantown Road, with the existing terrain, site conditions and the proposed size of the lots (2 acres or more), it would also appear feasible to derive water from individual, on-site wells. Again satisfactory location of the wells, proper construction, sufficient yield, and satisfactory water quality should be provided for any new wells prior to using the water for drinking and/or other domestic use.

WASTE DISPOSAL

It is understood that there is some interest in having a possible central or community sewerage system. In general, with a project of this kind experience has not shown a system of this type to be feasible, presenting operational and maintenance problems.

In accordance with requirements of the Public Health Code, each building is to be served by a separate subsurface sewage disposal system, unless approved by the State Department of Health as a public sewerage system. In addition to the Health Department, the Department of Environmental Protection would most likely want to review and approve plans for such a facility.

Based on visual observations, consideration of the topography and soil mapping data it appears that most of the land along Indiantown Road would be fairly well suited for subsurface sewage disposal. The more upper ground (area of proposed trading post) would have more limitations, primarily due to the presence of underlying ledge rock, and a more pronounced slope towards the northern end of the property. In order to properly evaluate for subsurface sewage disposal, soil tests (deep test pits and percolation tests) need to be made in the area(s) that would or may possibly be utilized for this purpose. There may be areas suitable for sewage leaching systems or other areas, with certain modifications and improvements, which could be made satisfactory. Development on very poor land or areas of special concern should certainly be restricted. However, considering the probable scope of this project and the total acreage available, the density level should not be excessive although certain facilities (public restrooms and a possible restaurant) in the trading post area would tend to increase this, at least on a seasonal basis.

COMPATIBILITY OF SURROUNDING LAND USES

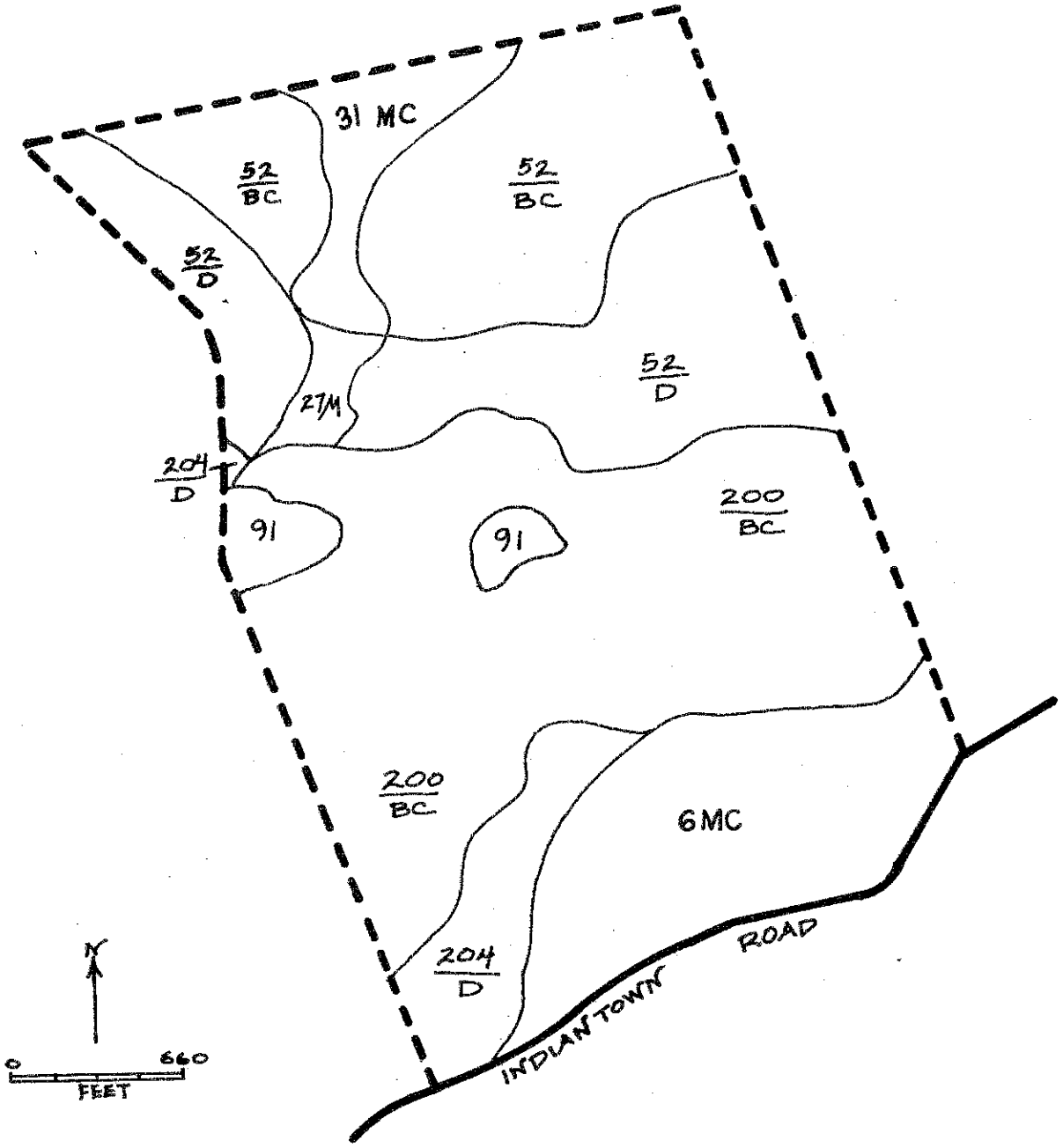
Land uses near the Reservation land include very low density, scattered residential uses along Indiantown Road and Shewville Road, undeveloped lands, and a Town Park located further east along Indiantown Road. This Town-owned parcel, Indiantown Park, is a limited passive recreation area.

The Reservation site has no large sand and gravel deposits for mining, and is too forested and stony, with some steep slope areas to be feasible for major agricultural uses. Under the proposed scheme of development outlined in the preliminary site plan presented earlier in this report, over half of the site will remain undeveloped, and the forest could be managed for timber as was outlined in the FOREST COVER section of this report. The forest area could also be used for extensive (passive) recreative uses such as hiking trails, picnic areas, or natural areas. If the production of maple syrup is to be pursued as one of the commercial activities, then perhaps the hiking trails could be designed also for the collection of sap. The Ledyard Town Plan of Development and the Regional Plan depict the area as an Indian Reservation.

APPENDIX

SOIL MAP

WESTERN PEQUOT INDIAN RESERVATION
LEDYARD, CONNECTICUT



The map is an enlargement from the original 1320'/inch scale to 660'/inch.

Prepared by: UNITED STATES DEPARTMENT OF AGRICULTURE, Soil Conservation Service.
ADVANCE COPY, SUBJECT TO CHANGE. *JUNE, 1976*

WESTERN PEQUOT INDIAN RESERVATION

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
Whitman/Ridgebury	27M	3	1.5	High water table,stony	3	3	3	3
Charlton	52/BC	36	17.8	Slope,stony	2	2	3	3
Charlton	52/D	36	17.8	Slope,stony	3	3	3	3
Peat and Muck	91	6	3	Highwater table, organic material	3	3	3	3
Woodbridge and Rainbow	3IMC	9	4.5	Seasonal high water table,stony	3	2	3	3
Narragansett/Hollis	200/BC	71	35	Shallow to bed-rock,slope	3	3	3	3
Narragansett/Hollis	204/D	12	6	Shallow to bed-rock,slope	3	3	3	3
Narragansett	6MC	29	14.4	Slope,stony	2	2	3	3
TOTAL:		202	100%					

* LIMITATIONS: 1=slight; 2-moderate; 3-severe (see back of this page for a further explanation of urban use limitations.)

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.