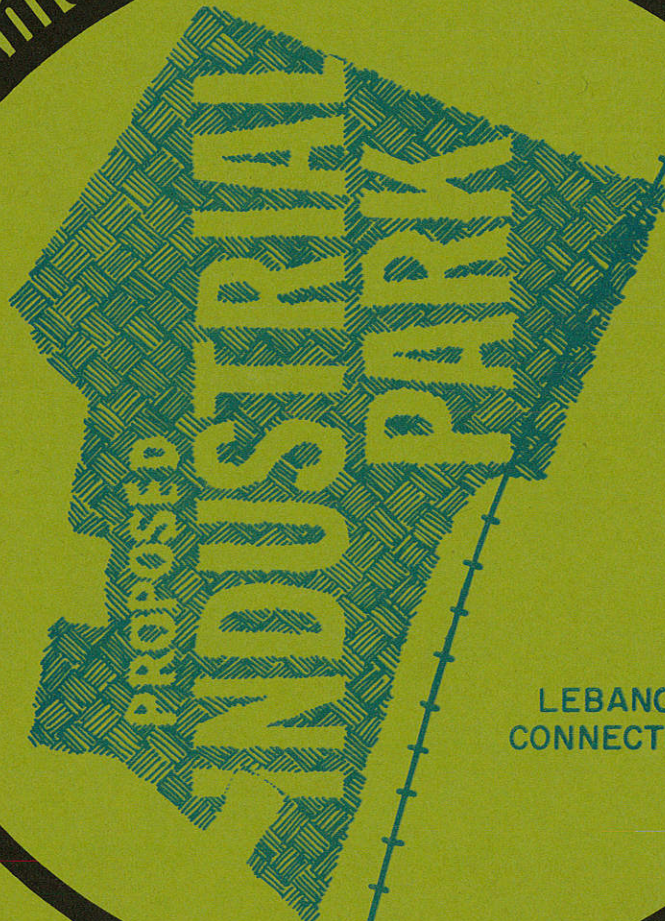


**environmental review team report**



**LEBANON,  
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 THE  
PROPOSED INDUSTRIAL PARK  
LEBANON, CONNECTICUT  
AUGUST, 1974

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



ENVIRONMENTAL REVIEW TEAM REPORT  
ON THE  
PROPOSED INDUSTRIAL PARK  
LEBANON, CONNECTICUT

This report is an outgrowth of a request from the Lebanon Economic Development Commission and Planning and Zoning Commission, with the approval of the land owner, 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) Executive Council for their consideration and approval as a project measure. The request has been approved and the measure reviewed by the Environmental Review Team.

The soils of the site were mapped by a soil scientist of the USDA Soil Conservation Service. Reproductions of the soil survey and a table of limitations for urban development were forwarded to all members of the Team prior to their review of the site.

The Team that reviewed the proposed development consisted of the following personnel: Sherman Chase, District Conservationist, Soil Conservation Service (SCS); Edwin Minnick, Civil Engineer, SCS; Sidney Quarrier, Geologist, State of Connecticut Department of Environmental Protection (DEP); Clarence Merrill, Forester, DEP; T.E. Linkkila, Wildlife Biologist, DEP; Debbie Fuller, Wildlife Biologist, DEP; David Miller, Climatologist, Connecticut Cooperative Extension Service (EXT); Rudy Favretti, Landscape Architect, EXT; Lester Barber, Planner, Windham Regional Planning Agency; Barbara A. Hermann, Team Coordinator, Eastern Connecticut RC&D Project.

The Team met and reviewed the site on July 11, 1974. Reports from each Team member were sent to the Team Coordinator for review and summarization.

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 Town of Lebanon and the developers. 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 Council 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 Barbara A. Hermann (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Project, 139 Boswell Avenue, Norwich, Connecticut 06360.



## INTRODUCTION

In an effort to broaden the local tax base, the Lebanon Economic Development Commission is proposing to develop an industrial park. The site that was chosen is located north of Route 207 along the Lebanon/Franklin town line. The most favorable aspect of this site is the Central Vermont Railroad which abuts the eastern boundary of the site. The Railroad has also indicated a willingness to develop additional facilities at the site.

An entrance would be provided to the site from Route 32, replacing Route 207 as the major access. Alternatives for providing adequate water supply and sewage disposal are now being explored with on-site facilities being anticipated for any immediate development.

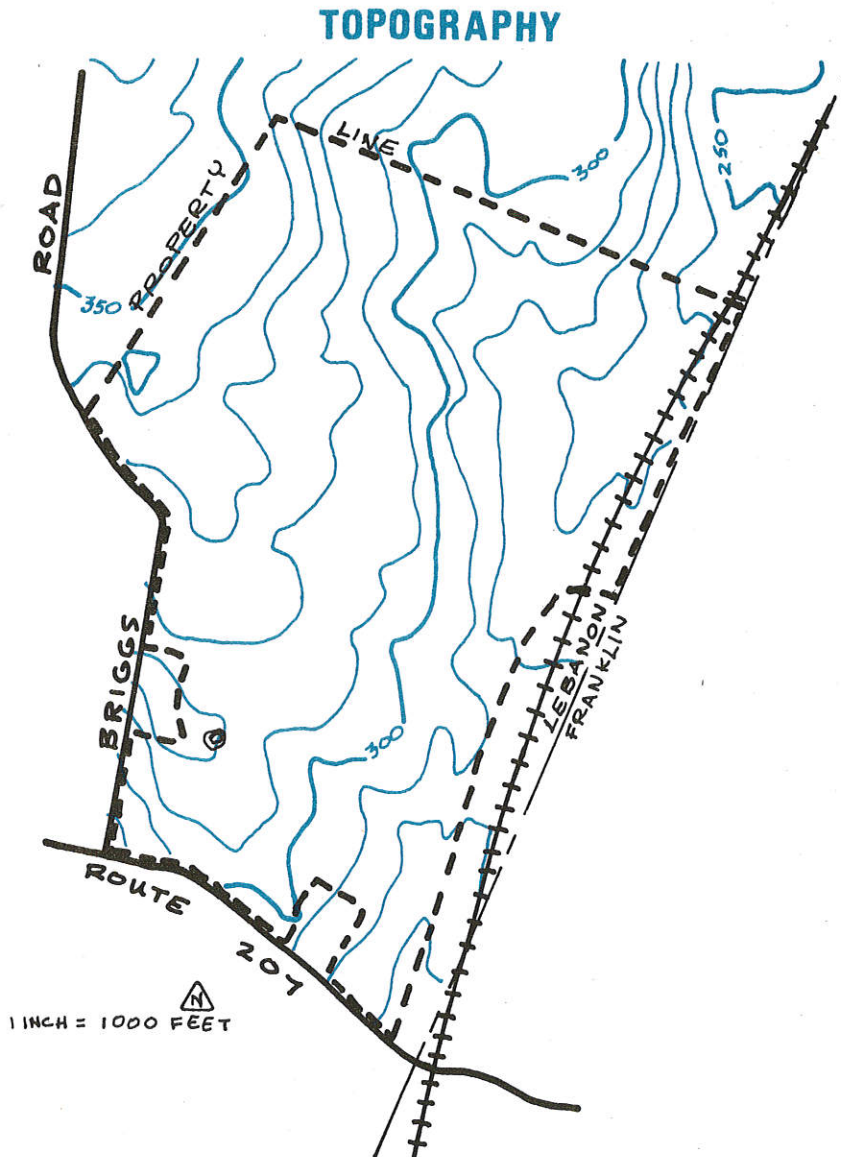
The following report will first describe the natural resources on the site and then discuss the various aspects of the proposed development. Comments or recommendations are offered for consideration by the developer and town in the preparation and review of development plans, but should not be construed as mandatory or regulatory in nature.

**EVALUATION**



## EXISTING RESOURCES

Topography. The site is in an upland area with an average elevation of about 300 feet above sea level. The land slopes eastward toward the railroad tracks on grades varying from 3 to 8 percent, mostly in the 3 to 5 percent range. The topography does not appear to present any particular problems for the proposed use. The map below shows the site's topography.



Drainage. The northern two-thirds of the site drains into a swampy area along the east side of the site. The swampy area is the headwater drainage for Cold Brook, which drains into the She-tucket River. The southern third of the site drains across Route 207 into the wetlands of the Susquetonscut Brook system. At the present time, most of the site is being farmed with the undisturbed wetlands acting as sediment traps, collecting the sediment from the farm lands and keeping it out of the downstream areas.

Geology. The underlying bedrock on the site has been mapped as the Hebron Formation and is composed of an interlayered mixture of schists and gneisses. The rock may contain both calcium and sulfide rich zones which could possibly affect the quality of bed-rock-derived ground water. Although no specific information is available for this area, the Hebron Formation in other parts of the state has a high degree of variability in the volume of ground water which can be produced from it.

No bedrock exposures were observed on the site. Though the depth to bedrock has not been determined, it is possible that it lies within 5 to 15 feet of the surface in several areas. [Bedrock reference: USGS, GQ-355, 1964.]

A preliminary surficial geology map is available and indicates that the bulk of the site is underlain by "glacial" till, the pre-dominant type of overburden found in Connecticut. Till is the technical term used by the geologist referring to such lay terms as "hardpan" or "boulder clay." Characteristically, till may be described as a fairly compact material consisting of a heterogeneous mixture of various quantities of boulders, gravel, sand, silt, and clay particles none of which are significantly sorted or stratified by grain size.

A small area of stratified drift (sand and gravel) and/or swamp deposits may be present in and around the swampy area at the northeastern part of the site. The thickness and extent of these deposits is not estimated to be great.

Soils. A detailed soils map of this property is given in the Appendix to this report along with a soils limitations chart. Due to the original scale at which the soils are mapped (1"=1,320') the lines shown on the soils map should not be viewed as precise boundaries, but rather as guidelines to the distribution of soil types on the property. The soils limitations chart indicates the probable limitations for each of the soils for on-site sewage, basements, landscaping, and streets and parking. However, limitations, even though very severe, do not always preclude the use of the land for development. If economics permit greater expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used.

The majority of the site consists of soils underlain by a hard-

pan, which restricts internal drainage. Soil type 35B is the best drained of the soils. However, due to the hardpan and resultant rise and fall of the water table, problems can be encountered with the installation of basements and on-site sewage systems.

Soil 31B is the next best drained soil and encompasses 62.7 percent of the site. Here the seasonal high water table can come within a foot of the ground surface, imposing quite severe limitations for basements and on-site sewage.

The remaining soils on the property fall within the legal definition of an inland wetland. Soil type 43M is a complex of three soils ranging from poor to very poor drainage and 98 is somewhat poorly to poorly drained. A permit to use these areas for development will be required from the local inland wetlands office, or the state if a local agency does not exist. These soils comprise 34.6 percent of the site.

Forestry and wildlife. With the exception of the major wetland area (43M), there is very little forest on this site. Even within the wetlands, there are no trees of commercial value. However, the red maple swamps, shrubby trees, and small ponds provide nesting cover, brood cover, and food for waterfowl.

The upland areas are a combination of pastures with thick herbaceous growth, shrub thickets along stone walls, corn fields, and mixed hardwood stands. These areas contain essential habitats for upland game such as squirrels, grouse, quail, rabbits, and deer.

Land Use. The site and surrounding area are now agricultural or scattered residential, with Route 207 to the west acquiring a somewhat suburban character. Zoning at the site is industrial on the 100 acres closest to Route 207, with a change from a rural agricultural zone to an industrial zone proposed for the remaining acreage.

## WATER SUPPLY

Due to the composition of till, there is very little potential for producing groundwater from the surficial materials. Bedrock wells would thus be the more reliable on-site source, though problems with both quantity and quality may be encountered. As mentioned previously, calcium and sulfide rich deposits are common in the type of bedrock found on the site which may lower the water quality. Bedrock wells normally yield at least 3 gallons per minute, but large quantity wells are extremely scarce.

Full development of the industrial park would probably require an off-site supply. Having an ample water supply would be an asset to industrial development. However, existing municipal supplies in Willimantic are located five miles from the site at the City of Willimantic/Town of Windham border. So it would appear more economical to develop some other off-site supply, specifically for the park, when needed.



## WASTE DISPOSAL

Existing soil conditions for on-site sewage systems are judged to be quite limiting. Two problems exist: areas of seasonal high groundwater levels and the relatively impermeable character of the hardpan. Remedial measures which would be required in soils 35B and 31B include special design, drainage, and fill. The measures for 31B would need to be more intensive than for 35B. Soils 43M and 98 should not be used for septic disposal due to their poor drainage and high water tables.

No industrial chemicals or other potential pollutants should be discharged on the site. It is also possible that various commercial and industrial uses of the site would produce discharges with dissolved solid concentrations that are considerably higher than residential discharges. In the long term, planning for full development and utilization of the site should include provisions for treatment of sanitary and possibly industrial wastes.

As with water, existing municipal sewers in Willimantic are located five miles from the site. The Economic Development Commission is now studying the feasibility of tying into that system. The adopted water and sewer plan for the Windham Region and the State Plan of Conservation and Development suggest that at some time in the future the Willimantic sewer system could be extended as far as South Windham. Neither plan envisions or favors the further extension of that system into the Town of Lebanon at the South Windham area. In these plans concern is expressed that the introduction of public facilities would inevitably encourage the growth and expansion of high density urban uses; commercial, industrial, and residential. Extension of sewers and possibly water would thereby stimulate intensive development in the vicinity of the proposed industrial park, an area considered more suitable for low intensity development.

It does not appear that extension of the sewer system from the City of Willimantic to even South Windham is likely to occur in the near future. Despite about 15 pollution abatement orders which have been issued to homes in the South Windham area, no action has been taken on the sewer extension.

Given the demands soon to be placed on the newly expanded Willimantic sewage treatment plant from sewer expansions into Windham and Mansfield and an as yet undetermined limitation of the Shetucket River to accept additional effluent, the expansion of any system beyond South Windham is not likely to be encouraged by Willimantic or Windham and might be actively discouraged by the State and possibly Federal governments if any monies were to be supplied by them.

The one remaining alternative is to construct a sewage treatment facility at the site. In light of the above comments, this would appear to be more desirable in the long run. In addition to providing the necessary treatment, there would not be the demand

for intensive development in the area between South Windham and the industrial park.

## FOUNDATION DEVELOPMENT AND GRADED CONDITIONS

Substratum support. Most of the area has severe limitations for the installation of basements. This is primarily due to the high water table and not to any structural deficiency of the soil material. With proper footing and/or slab drainage these limitations can be overcome.

Drainage. During the field visit, it was mentioned that the density of development would be 1:7, that is, for every acre under roof or paved, there would be seven acres left undeveloped or grassed. With this low density and considering much of the land use at present is for the growing of corn, there will be very little change in the runoff.

Poor subsurface drainage could cause problems with foundations, roads, basements, on-site sewage systems, and landscaping. It is suggested that plans to provide for adequate drainage be formulated prior to construction. The New London County Soil and Water Conservation District could provide consultative assistance based on experience with drainage of hardpan soils.

Erosion and sedimentation. As is the case with most land development, the highly critical period for erosion occurs during construction. Several things can be done to minimize erosion or at least reclaim a portion of the soil lost during the erosion process.

1. Schedule construction so that the minimum amount of land is left without vegetation as practical.
2. Avoid creating point discharge from large areas unless adequate stable outlet conditions exist.
3. Use the Connecticut Erosion and Sediment Control Handbook as a guide in planning and implementing erosion and sediment control practices.
4. The installation of erosion and sediment control practices should be included in the critical path scheduling for construction.
5. When possible, limit earth work activities to the more favorable seasons.

Again, the District can provide assistance in preparing erosion control plans.

## ROADS AND UTILITIES

Both Route 32 and Route 207 are inadequate to handle significant amounts of industrial traffic and would require upgrading to handle the loads that could reasonably be expected from an even partially developed industrial park. The alignment of Route 207 is particularly poor and consideration might be given to emphasizing the new access to Route 32. Briggs Road is clearly inadequate and would require complete upgrading by the town should the industrial park be built.

The design of the uses within the park should discourage the use of adjacent public roads to service park occupants individually. The orientation of all park occupants for both delivery and employee needs should be to internal park roads.

Moderate to very severe limitations exist for the installation of roads and parking lots on the site. The major source of these limitations is the high water table. Installation of an adequate subsurface drainage system will reduce the effect of these limitations.

The fact that the Central Vermont Railroad adjoins the proposed industrial park is one of the most, if not the most, favorable aspects associated with this site location. Development of spur lines as shown on the plan will increase the railroad's utility.

## HAZARDS

Specific industrial uses could present potential hazards, but more information on types of industrial uses would be required to make further comment.

The type of railroad crossings installed, particularly at the main entrance to the site, should offer maximum safety.

## AESTHETICS AND PRESERVATION

Specific measures should be taken to protect and preserve the swampy wetland areas and the adjacent seasonal wetlands. Among many other functions, these wetlands serve to protect and maintain the quantity and quality of water in Cold Brook. With the possible extension of water and sewer service into this area and resultant increased development pressures, the potential negative effects on Cold Brook from general development could be significant. Protection of the local wetlands would help protect the stream by acting as a sediment trap and would tend to set a precedent in the area for the protection of this and other local stream systems.

The proposed industrial park will eliminate all forms of wildlife through destruction of the habitat. Preservation of the major



wetland area would continue to provide some habitat for small wildlife, though larger game and wildlife will still leave the area as a result of the surrounding development.

Development of this site will reduce agricultural land for pasture and crops, as well as wildlife habitat. The long term need for agricultural land in the region and the relative agricultural potential of this land should be assessed. In developing the site, construction should be controlled so that as much of the area as possible can remain in agriculture for as long as possible.

Aesthetically, the site has much going for it. The open fields, stone walls, trees along the walls, and sweeping views across and off the site make this site worthy of special care in development. Any development should be done to preserve these features. A plan that would encourage the clustering of buildings and the preservation of open sweeps of land between such clusters would preserve the integrity of the site and that of rural and agricultural Lebanon.

This site is quite visible from other areas, especially as viewed from the southwest. Development should occur in such a way that it does not deteriorate this view. Buildings should be effectively buffered by new tree plantings and be sited in such a way that they preserve the present character of the view.

In general there are no foreseeable detrimental climatic effects of the proposed park. The area is situated on an uplands hilltop and any air pollutants would be dispersed rather rapidly. The area has a minimum number of inversions. There are no steep slopes so cold air drainage and frost pockets (except along the railroad tracks) will not be a factor. The whole area has an easterly aspect which makes it somewhat colder in the winter due to less sun and the wind exposure.

East-west wind breaks of conifers would break up the cold winds across the site and make it more comfortable in the winter. Wildlife border plantings could also be made along the conifers.

#### SERVICES TO SUPPORT DEVELOPMENT

Little in the way of supporting services now exist at or near the site. Significant commercial activities exist three to five miles away in Willimantic and Franklin. Norwich is about ten miles away. Commercial uses are permitted within an industrial zone in the Lebanon Zoning Regulations and some supporting commercial uses could be included in the park. Such uses, however, generate considerable vehicular activity which is more constant and intrusive than that generated by industrial uses.

The site is located within easy commuting distance of the Norwich and Willimantic labor markets. For delivery purposes,

the railroad is very accessible and the distances from major road arteries are not so great as to hamper trucking, if desired.

#### COMPATIBILITY OF SURROUNDING LAND USES

With principal access to the site from Route 32, the park need not be a seriously disruptive influence on the residential-agricultural land use zone which would surround the park. However, a fully developed park supplied with water and sewer would stimulate extensive and intensive urban development in its vicinity and the whole character of this area could change. With sewer facilities available it is not likely that large lot, dispersed residential patterns would be maintained over the long term. There are better locations in the Windham Region and in Lebanon for such intensive urban development and neither the State or Regional plans suggest this area for intensive development.

The park itself can be quite compatible with surrounding residential uses, if adequate controls are maintained over building design, location, and landscape treatment. Large buffers should be maintained between any industrial use and surrounding residential areas. Industrial facilities should be serviced from internal roads rather than having individual access to the peripheral public roads. The coverage of buildings and paving should be low and landscaping should be generous and well maintained.

#### ALTERNATIVE LAND USES FOR AREA

The purpose to which this site is most readily suitable is agriculture. Any type of development will encounter problems with the high water table. Without the introduction of sewers, low density residential uses and a continuation of the agriculture are the most likely uses. Industry would be seriously limited as to the number of employees and processes permitted because of the on-site soil conditions.

#### ADDITIONAL COMMENTS AND SUMMARY

General speaking, the site appears to have a favorable location for industry. The access to the railroad is its primary asset, though major highways are within a fairly reasonable distance.

The major drawback on the site is the hardpan soils with their seasonally high water table. The aspect on which this places the greatest limitations is on-site sewage disposal. Because of the soils, large capacity systems will not be feasible, thereby limiting the size and/or type of industry able to locate in the park until some sort of sewage treatment system is available. On-site water supplies may also limit the types of industry possible.

With the present day concern for the loss of farming land, serious consideration should also be given to the trade-off being made. Development on the site should be controlled in such a manner that agriculture can continue to some extent on the site until the park approaches full development.

The major wetland area on the site should be protected not only for its wildlife and aesthetic value, but also for its function as a natural sediment trap. It will help keep sediment and other pollutants from the site from entering Cold Brook.

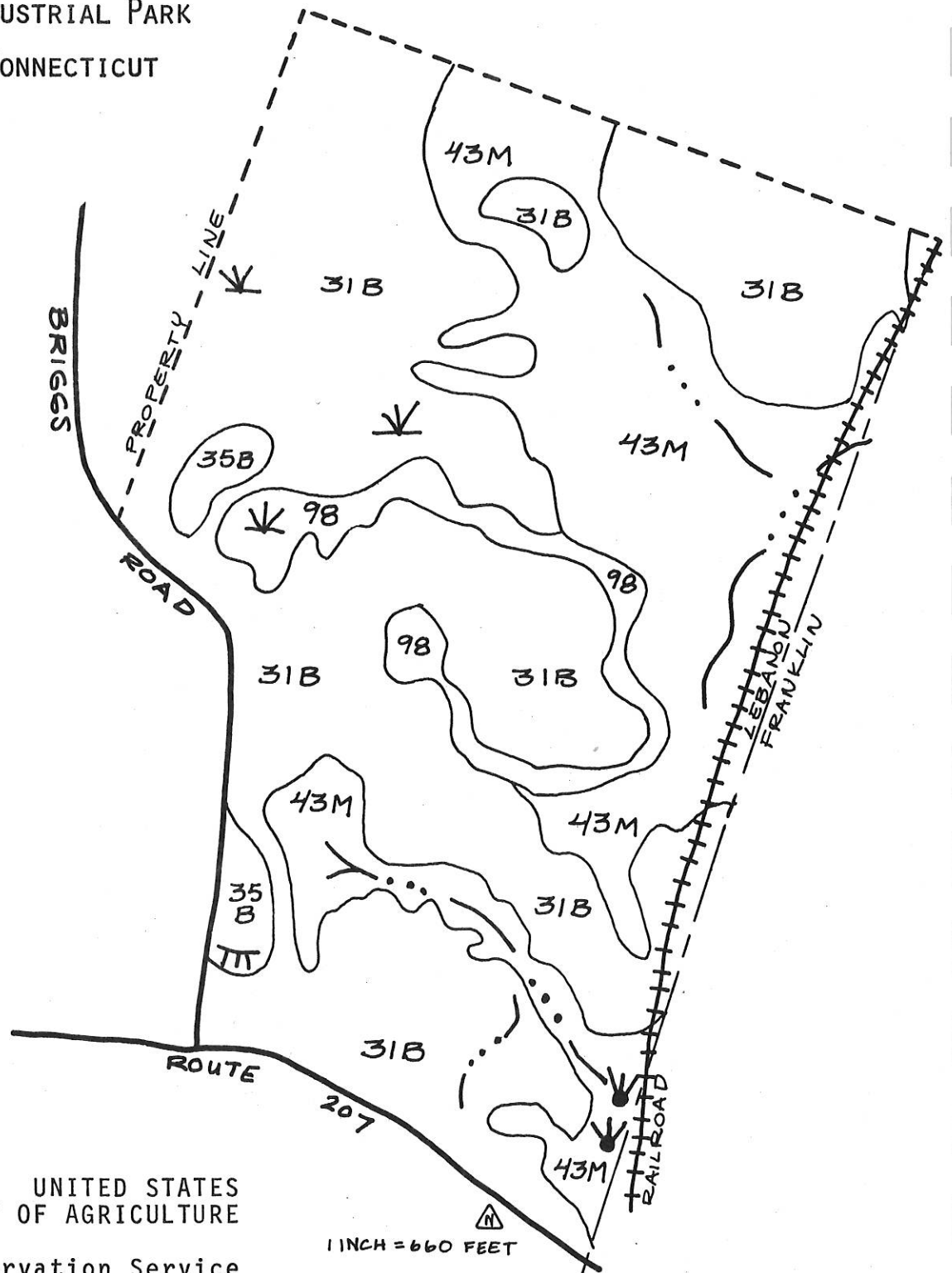
The economics of providing an ample water supply and sewage treatment facilities appears to be the prime factor in determining the feasibility of a fully developed industrial park at this location. More detailed engineering studies on the various alternatives and related costs will be necessary for the local decision-making process. If this aspect of the project is determined to be feasible, there should be no other major obstacles, provided development plans account for the natural limitations of the soils.

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supply may also limit the types of industry possible.



APPENDIX

SOILS MAP  
PROPOSED INDUSTRIAL PARK  
LEBANON, CONNECTICUT



Prepared by: UNITED STATES  
DEPARTMENT OF AGRICULTURE  
Soil Conservation Service

ADVANCE COPY, SUBJECT TO CHANGE

JUNE, 1974

## SOILS LIMITATIONS CHART

Natural Soil Group*	Mapping Symbols	Acres	Percent of Total Acres	Limitations For:**			Principal Limiting Factor(s)
				On-site Sewage	Base ments	Land-scapping Parking Streets and Parking	
B-3b	43M	65.0	28.8	4	4	4	High water table, stoniness.
C-1	35B	6.0	2.7	3	1	2	Hardpan, slope 3-8%.
C-2	31B	141.5	62.7	3	2	2	Hardpan, seasonal high water table, slope 3-8%.
C-3a	98	<u>13.0</u>	<u>5.8</u>	3	3	3	High water table.
		225.5	100.0				

\* Refer to Know Your Land, Natural Soil Groups for Connecticut, Soil Conservation Service, USDA Connecticut Cooperative Extension Service, for further explanation of the natural soil groups.

\*\* Limitations: 1-slight; 2-moderate; 3-severe; 4-very severe.



## ACREAGE SUMMARY OF SOILS LIMITATIONS

	<u>Slight</u> <u>Acres</u> <u>%</u>	<u>Moderate</u> <u>Acres</u> <u>%</u>	<u>Severe</u> <u>Acres</u> <u>%</u>	<u>Very Severe</u> <u>Acres</u> <u>%</u>
On-site Sewage	-	-	160.5    71.2	65.0    28.8
Basements	6.0    2.7	141.5    62.7	13.0    5.8	65.0    28.8
Landscaping	6.0    2.7	141.5    62.7	13.0    5.8	65.0    28.8
Streets and Parking	-	147.5    65.4	13.0    5.8	65.0    28.8