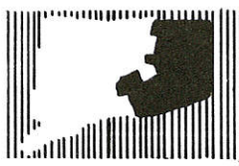
environmental review team report

# SEWAGE DISPOSAL SYSTEM

## COMMUNITY CORRECTIONAL CENTER

## Brooklyn, Connecticut



RC&D

EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

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

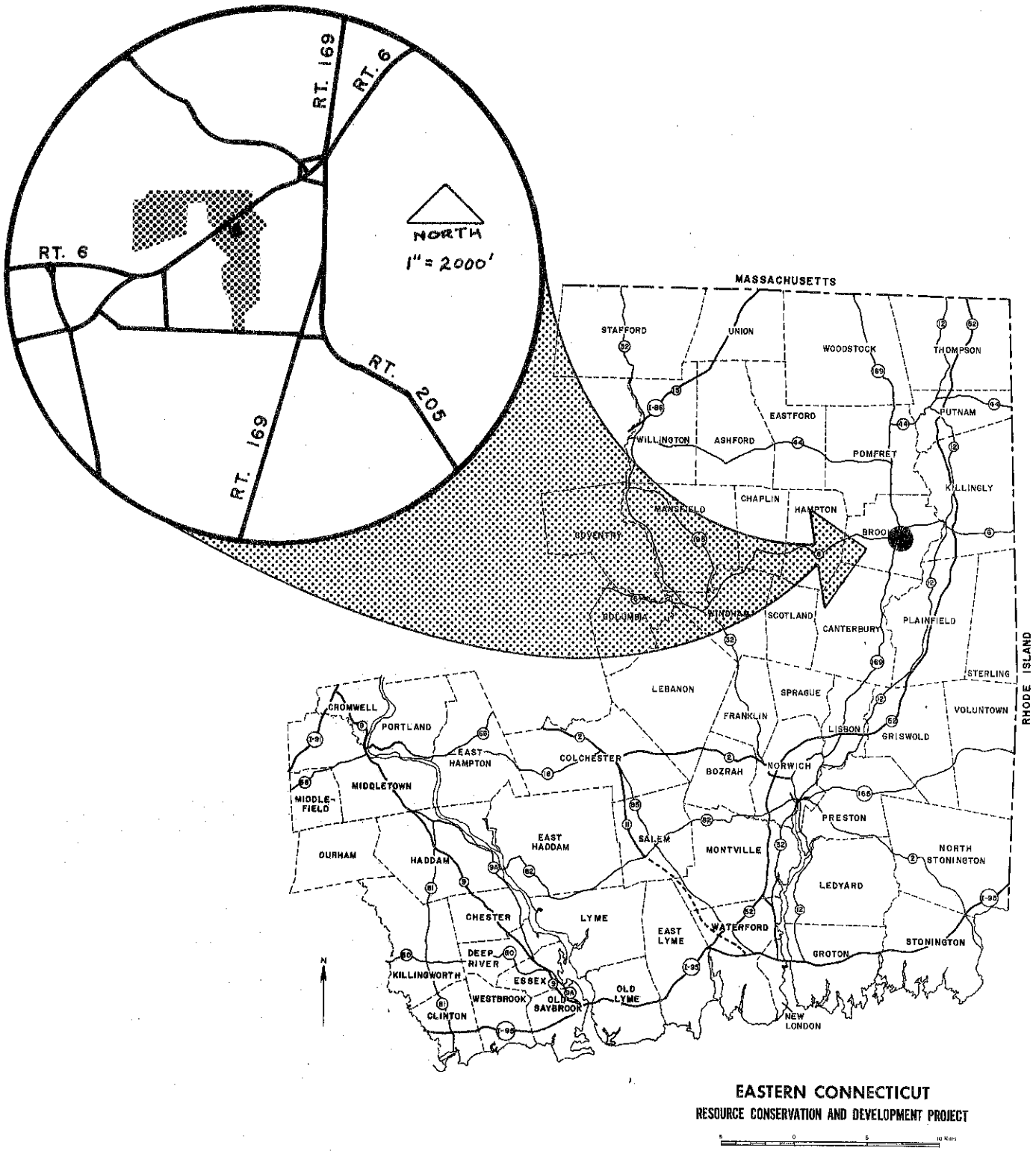
# ENVIRONMENTAL REVIEW TEAM REPORT
# ON THE
# PROPOSED SEWAGE DISPOSAL SYSTEM
# STATE OF CONNECTICUT COMMUNITY CORRECTIONAL CENTER
# BROOKLYN, CONNECTICUT
# JUNE 1973

*Preparation of this report has been, in part, assisted by a grant from the New England Regional Commission administered by the Southeastern Connecticut Regional Planning Agency*

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

# LOCATION OF STUDY SITE

## COMMUNITY CORRECTIONAL CENTER
## BROOKLYN, CONNECTICUT




**EASTERN CONNECTICUT**
**RESOURCE CONSERVATION AND DEVELOPMENT PROJECT**

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# BROOKLYN, CONNECTICUT

This report is an outgrowth of a request from the Town of Brooklyn Planning and Zoning Commission, with the approval of the Brooklyn Community Correctional Center, to the Windham County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Project Committee 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, soil series descriptions and a table of limitations for septic systems were forwarded to all members of the Team prior to their review of the site.

The Team that reviewed the Brooklyn Community Correctional Center property consisted of the following personnel: Albion L. Weeks, District Conservationist, Soil Conservation Service (SCS); Dean Rector, Soil Scientist, SCS; Bill Brown, Geologist, SCS; Dwight Southwick, Engineering Specialist, SCS; Richard Hyde, Elliott Bronson, Geologists, Natural Resource Center, State of Connecticut Department of Environmental Protection (DEP); Joseph Piza, Fish Biologist, DEP; Paul Schur, Principal Sanitarian, State of Connecticut Department of Health; John Hester, Planner, Northeastern Connecticut Regional Planning Agency; Barbara Hermann, Team Coordinator, Eastern Connecticut RC&D Project.

The Team met and reviewed the site on April 19, 1973. 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. The report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to both the administrative agency and the State of Connecticut. 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 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 Barbara A. Hermann (889-2324)
Environmental Review Team Coordinator
Eastern Connecticut RC&D Project
139 Boswell Avenue
Norwich, Connecticut 06360

# BACKGROUND

The State of Connecticut operates a Community Correctional Center in Brooklyn, Connecticut, accommodating approximately 80 inmates. In 1965, a new septic tank and leaching field were installed south of Route 6 and west of the main building. Problems developed with the system almost immediately, and several corrective measures were taken. The problems persisted, however, and the State has resorted to sending out laundry to reduce the load on the system and pumping out the septic tank about four times per week.

In 1971 Griswold and Fuss, Inc., conducted a sewerage study of the Community Correctional Center for the State Department of Public Works. As recommended in the study, the State has proposed a new leaching field on the north side of Route 6.

The proposed system came to the attention of the Brooklyn Planning and Zoning Commission as a violation of their streambelt regulations which prohibits construction of a septic system within 150 feet of a stream. The proposed system has since been relocated 75 feet to the northwest to satisfy the regulations. However, concern still exists over the large quantity of sewage (design flow: 10,000 gallons per day) and possible contamination of the groundwater and nearby streams which feed into the Blackwell Brook, a Class A trout stream.

The Environmental Review Team was requested by the Brooklyn Planning and Zoning Commission to review the proposed system. The following team evaluation briefly describes the existing system, evaluates the proposed system, and presents some alternative solutions.

# EVALUATION

## THE EXISTING SYSTEM

The existing sewage disposal system at the Community Correctional Center originally consisted of a 7,500 gallon septic tank and dosing chamber, with an effective leaching area of about 2,950 square feet. Corrective measures were subsequently taken to relieve the overloading of the system, including items such as a drainage ditch and gravel bed. (Griswold and Fuss, Inc., Sewerage Study at Community Correctional Center, Brooklyn, Connecticut, for the Department of Public Works, State of Connecticut, October 1971, pp. 3-4.) As stated earlier, the problems persisted and regular pumping of the septic tank was resorted to as a temporary solution.

The existing septic system is located within a surficial zone of till. Till is predominantly a non-sorted, non-stratified material, deposited directly by a glacier and composed of gravel, sand, silt and clay mixed in various proportions. Connecticut tills range from compact to fairly loose depending on the content ratio of sand to clay. In general, as the sand content increases, the till becomes more friable and able to transmit fluids, but as the clay content increases, the likelihood for fluid transmission decreases.

When till and stratified materials are compared, it is found stratified sand and gravel passes fluids several orders of magnitude faster than the till but they are not as effective in purifying septic effluent. The host conditions of the existing system, as seen by the continued failures of this system, indicate the natural resource conditions are so marginal that this till host is inadequate to serve as a septic medium for so large a quantity of effluent.

## THE PROPOSED SYSTEM

The proposed sewage disposal system includes a new 10,000 gallon septic tank, the existing dosing chamber, a pump, and a force main leading to a new leaching field on State owned property north of Route 6 (approximate location is shown on map of Tanner Brook Drainage Basin on page 8). The effective area of the leaching field will be about 2,880 sq. ft. (Griswold and Fuss, Inc., October 1971, p. 13). These plans comply with the Public Health Code of Connecticut.

### Inventory of Natural Resources:

The site of the leaching field is bound on the east, south, and part of the west by a small unnamed watercourse which flows into Tanner Brook at this point. Tanner Brook flows south and completes the western boundary. Tanner Brook continues south about 1,100 feet before joining Blackwell Brook. Both Tanner and Blackwell Brooks have Class A ratings.

The soils at the proposed location of the leaching field (60BC, 67A - see map in Appendix) are of the Hinckley and Windsor series. Both soils are unstable and sloughing can be expected in trench construction. The soils are also classified as poor soil renovators.

The proposed leaching field is to be located on a kame or kame terrace within an area of widespread stratified drift which extends both north and south of Route 6 approximately 1,500 feet west of the village of Brooklyn. Generally fine to medium grained sands prevail in the upper three to four feet and are underlain by stratified sands and gravels to depths greater than 15 feet.

The site would definitely be capable of disposing of the expected 10,000 gallons of septic effluent per day from the correctional center's system. The stratified sands and gravels at this location will allow for rapid movement of effluent away from the leach fields but, because the host material has a low silt and clay content, little renovation of these fluids will likely take place. The path of the poorly renovated septic fluids will generally be vertically downward until the water table is encountered. Once within this saturated zone all fluids move laterally until they are discharged into one of the nearby watercourses.

Potential Hazards:

The major concern with the proposed leaching field is the possible contamination of Tanner and Blackwell Brooks to a point where trout might disappear and/or the brooks might lose their A rating.

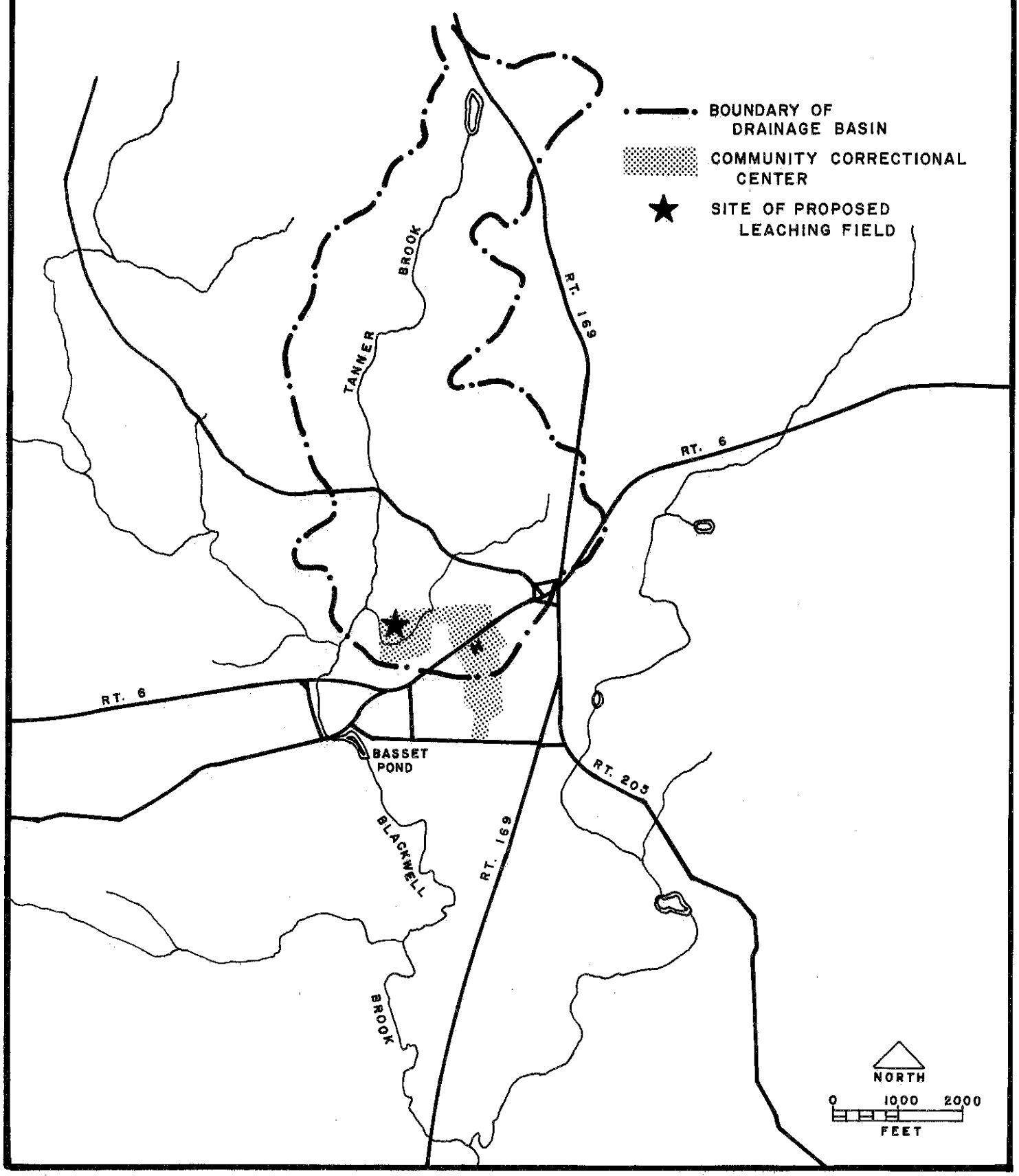
As mentioned before, movement of the septic effluent will be rapid down to the water table where it will soon discharge, along with the groundwater, into the nearby watercourses. Limited renovation of the effluent will result due to the poor renovating characteristics of the Hinckley and Windsor soils.

Pollution and eutrophication of the nearby waterways may result, unless there is sufficient water within the hydrologic system to maintain a safe dilution factor between the natural and man-induced fluids. To better visualize what the potential for pollution is at this site, if there is any, the low flow characteristics for the Tanner Brook drainage basin (see map on next page for area of drainage basin) were calculated using several methods.

The actual equations used to determine the low flow value for the Tanner Brook drainage basin are given in the appendix. By using various calculations, none of which particularly represent a <u>correct</u> numerical value, they all indicate that discharges from this area can be quite low several times a year. During years of average precipitation the natural low flow is approximately

# TANNER BROOK DRAINAGE BASIN

(0.95 SQUARE MILES)



43,000 gallons per day within the Tanner Brook drainage basin. Using this figure and the 10,000 gallon per day estimated effluent, the dilution ratio in average years should be approximately 4:1. In exceptional years where the low flow values are much lower, the dilution ratios can get down to 1:1 or even less.

If it is determined that the dilution ratios are insufficient to ensure the protection of plant and animal life of the Tanner Brook drainage basin, one alternative may be to relocate the proposed facility along Blackwell Brook. This drainage basin, which includes Tanner Brook, is much larger and would have a low flow dilution ratio of greater than 20:1, a much less critical setting for pollution.

The low flow dilution ratio can also be improved by reducing the daily amount of effluent. This could be accomplished somewhat by continuing to send out all laundry. Treatment of the effluent prior to disposal in the leaching field would also reduce the overall impact.

Another potential source of water pollution is the siltation resulting from construction of the force main across the wetland area east of the site. During construction a temporary debris basin should be constructed to protect Tanner Brook and Blackwell Brook. There might also be a possibility of relocating the proposed sewer lines along existing roadways, thus reducing the potential for sedimentation.

Compatibility of Surrounding Land Uses and Alternative Land Uses for the Area:

The property owned by the State at the site of the proposed system is zoned Rural Residential - 40,000 square feet, by the Town of Brooklyn. Surrounding land is also zoned Rural Residential - 40,000 or Rural Residential - 30,000. The installation of the proposed leaching field would be compatible with present zoning and existing local land use.

Residential land use is the only alternative to the present rural land use for the site under the present zoning. Since the land is state owned, a change in land use from rural to residential does not seem probable. Installation of a septic leaching field will not substantially change the rural character of the site.

ALTERNATIVE SOLUTIONS

There appear to be a range of options regarding the present sewage disposal problems at the Community Correctional Center in Brooklyn. There are problems associated with each of the options, primarily due to practicality and expense.

a. Continue present pumping operations indefinitely. At its present cost and pumping schedule, the annual cost would be $4,160. If laundry were resumed, daily pumpings would probably be required, at an annual cost of $7,480. Additional storage tanks could be installed to reduce the frequency of pumpings.

b. A package treatment plant with disposal into Blackwell Brook (see Griswold and Fuss, Inc., 1971, pp. 16-21).

c. A package treatment plant with disposal into a leaching field, either in proposed location or along Blackwell Brook.

d. Proposed septic system with or without minor modifications.

e. Relocate leaching field along Blackwell Brook.

f. Sewers extended from East Brooklyn.

g. Close the correctional center.

Alternative A, though now considered a temporary solution could be continued for the 10 or more years expected before the sewer program for the Brooklyn village area is constructed. Its cost should be compared when considering the cost and expected life of the other alternatives.

Of the more permanent solutions and disregarding alternative F due to the time factor involved, alternative C appears to allow the greatest safeguards for the ground and surface water quality.

## ADDITIONAL COMMENTS AND RECOMMENDATIONS

Due to the lack of data on sewage disposal systems and the combined effects of soil types, quantity of effluent, drainage basins, and such, it is difficult and sometimes impossible to predict the effect of a proposed system on a given area. Regardless of the actual system installed, the present proposal offers a chance to develop some definite information on a set flow of sewage in a particular soil type and its effect on ground and surface water.

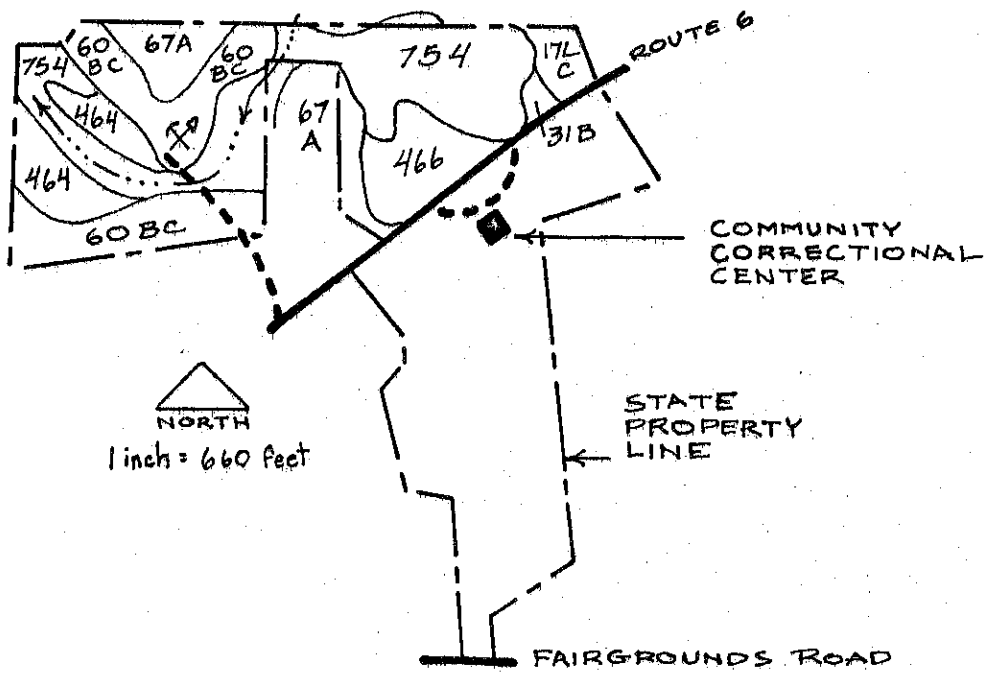
This data can be developed by first measuring the sewage flow (could be done by metering the water supply). Well points should be placed to ground water at varying depths and the quality of the ground water monitored on a periodic basis. Surface water should be similarly monitored. This monitoring system could prove useful for both identifying inadequacies and potential pollution sources of the system and providing information useful in the installation of similar systems elsewhere in Connecticut.

Other recommendations made, irregardless of the system installed, include provisions for erosion and sedimentation controls during construction, particularly near waterbodies. Also, laundry activities should not be resumed at the center until it is clear that the system is adequately handling the existing load.

# APPENDICES

# SOIL MAP

## PROPERTY OF STATE OF CONNECTICUT, COMMUNITY CORRECTIONAL CENTER, BROOKLYN, CONNECTICUT




*NOTE: The soils south of Route 6 are not shown, since the team did not investigate this area. However, they consist mainly of Paxton soils which have severe limitations for use as a septic tank filter field, due to a slowly to very slowly permeable hardpan at about 2 feet in depth.*

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

*ADVANCE COPY, SUBJECT TO CHANGE.* *APRIL, 1973*

## SOILS LIMITATIONS CHART

| NATURAL SOIL GROUP* | MAPPING SYMBOL | SEPTIC TANK FILTER FIELD | SOIL RENOVATOR | PIPELINE CONSTRUCTION AND MAINTENANCE |
|---|---|---|---|---|
| A-1a | 60 BC | Moderate, hazard of ground water contamination, slope | Severe | Sloughing, unstable trench walls, slope |
| A-1a | 67 A | Moderate, hazard of ground water contamination, slope | Severe | Unstable trench walls |
| A-3a | 466 | Severe, high water table | Very severe | High water table, unstable trench walls |
| A-3b | 754 | Very severe, high water table | Very severe | High water table, unstable trench walls |
| C-2a | 31 B | Severe, fragipan, seasonal high water table | Moderate | Seasonal high water table, stable trench walls |
| D-1 | 17 LC | Because 17 LC is a complex of two soil types, limitations for all three categories range from slight to very severe, depending on the actual combination of soils at a given point. | | |
| G-3a | 464 | Severe, high water table | Severe | Very erodible, high water table, unstable trench walls |

* 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.

# METHODS USED TO ESTIMATE THE LOW FLOW CHARACTERISTICS OF THE TANNER BROOK DRAINAGE BASIN

By Elliott Bronson and Richard Hyde, Natural Resource Center, Department of Environmental Protection

A. Equations of the USGS Water Resources Division, for determining the minimum seven consecutive days of low flow for a ten-year period.

$$M_{7\text{-}10\ YR.} = .457 \frac{\left(\text{Drainage area in sq. mi.}\right)^{.90} \left(\frac{\text{Elevation ft}}{1000}\right)^{.75} \left(\text{Stratified Drift \%}\right)^{.38}}{(\text{Slope in ft/mi of drainage basin})^{.66}} = \text{low flow in cfs} \pm 67.6\%$$

answer: .00037 cfs
or
240 gallons/day

$$M_{7\text{-}10\ YR.} = .015\ (\text{Drainage area in sq. mi.})^{1.37} = \text{low flow in cfs} \pm 83.2\%$$

answer: .014 cfs
or
9,000 gallons/day

B. The other method utilized was to use the known low flow figures for the 16.9 sq. mi. area of the Blackwell Brook drainage basin and calculate from this an approximate figure for the .95 sq. mi. sub-basin in question. Values were determined by utilizing two low flow figures from the records of Blackwell Brook.

Period of record, 1961 to current year:

Minimum discharge recorded 0.4 cfs September 8, 1964, and August 17, 1970.
Minimum discharge for 1971 water year 1.2 cfs September 5, 8, 9, 10, 1970.
Precipitation during the water year 1971 was approximately average for Connecticut.

Minimum low flow for period of record.

$$\frac{16.9 \text{ sq. mi.}}{0.4 \text{ cfs}} \times \frac{.95 \text{ sq. mi.}}{x} = .022 \text{ cfs}$$

or
14,220 gallons/day

Minimum low flow for water year 1971.

$$\frac{16.9 \text{ sq. mi.}}{1.2 \text{ cfs}} \times \frac{.95 \text{ sq. mi.}}{x} = .067 \text{ cfs}$$

or
43,300 gallons/day