EASTERN CONNECTICUT RC&D
ENVIRONMENTAL REVIEW TEAM REPORT
ON
KILLINGLY TOWN-OWNED LAND
Suitability for a Sanitary Landfill

EASTERN CONNECTICUT RC & D ENVIRONMENTAL REVIEW TEAM

REPORT ON

KILLINGLY TOWN-OWNED LAND - SUITABILITY FOR A SANITARY LANDFILL

Purpose: To determine if other parts of the town-owned site are suitable for a landfill operation

This report is the outgrowth of a request from the Town of Killingly, to the Windham County Soil and Water Conservation District. The S & WCD referred this request to the Eastern Conn. RC & D Project Committee for their consideration and approval as a project measure. The request had 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 were made of the soil survey and forwarded to all members of the Team prior to their review of the site.

The Team that reviewed the site consisted of the following personnel:

Al Weeks, District Conservationist, SCS
Ed Minnick, Engineering Specialist, SCS
Dave Miller, Climatologist, Extension Service, UConn
Tim Linkkila, Wildlife Biologist, Region IV, DEP
Cliff Tiffany, Supervising Forester, Region IV, DEP
Joseph Piza, Fisheries Supervisor, Region IV, DEP
Hugo Thomas, Geologist, Natural Resource Center, DEP
Sid Quarrier, Geologist, Natural Resource Center, DEP
John Hester, Planner, Town of Plainfield

The Team met and reviewed the entire site on the afternoon of November 20th. 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 land use. The results of the Team action are oriented toward the development of a better environmental quality and the long-term economies 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:

Windham County Soil and Water Conservation District
Brooklyn Agricultural Center
Brooklyn, Connecticut 06234

Phone: 774-0224

Summary:

In the opinion of the Environmental Review Team, no area exists at the site reviewed that would allow a sanitary landfill operation with normal consideration of conventional design or site preparation. Even with special design or site preparation, a properly operated landfill within the scope of reasonable costs is likely to be prohibitive. The critical factors of consideration in part or combination are: Location within the headwaters of a watershed, rapid surface and sub-surface water flow into the Quaduck Brook, shallow to bedrock conditions, high or perched water table conditions, slope conditions, adjacent favorable location for availability of groundwater supplies, existing fish management aspects of Quaduck Brook, and a productive wildlife marsh to the south.

Although the public acceptance of the site, its "out-of-sight" location, and the existence of a suitable road condition are all favorable attributes, they cannot be considered as a reasonable trade-off for the critical leachate and sedimentation problems that would likely occur.

Several suggestions are made relative to the operation of the present landfill which include: A request to the Soil Conservation Service for the handbook, "Erosion and Sediment Control," which discusses the standards and specifications for both temporary and permanent seeding on critical areas; also the availability upon request of the Departmental of Environmental Protection assistance in forest and wildlife management, if the town should decide to apply such management to the site.

NATURAL RESOURCE CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL - Woodbury, Connecticut

ITEM FOR CONSIDERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY MEETS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR DESIGN OR SITE PREPARATION	CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
Topography	Erosion	Surface flow through drainage	Slope		Slope varies - in places it exceeds 15% - average 9.4%	
	Land stability	Sheet runoff Mass movement Settling and compaction	Physiographic location	Small portion in upland	Remainder is a valley wall	
	Surface water collection	Depressions Exterior drainage collection on landfill surface	Surface drainage		Minor flow through drainage	Headwater for watershed
Overburden (or Soils)	Trans-missibility	Host Remains dry and workable year round	Type of Unconsolidated Material (or Soil)		Clayey till over shallow to bedrock conditions	
	Ion exchange	Retards leachate movement and renovates that which moves				
	Workability	Cover Not susceptible to erosion or burrowing organisms			See soils map	
		Workable source year round				
		Supports vegetations				
		Allows gases to dissipate but does not allow water to infiltrate				
Bedrock	Rapid movement of leachate	Leachate will flow through bedrock-overburden contact without renovation to the surface or groundwater	Depth to bedrock and type of overburden			Shallow to bedrock conditions
			Degree of fracture, porosity, bedding, etc.	Not observed		
	Solution of rock	An undesirable chemical reaction will occur with the bedrock	Composition of bedrock	Mainly gneisses and schists (chemically stable rocks)		
Hydrology	Prevent leachate from forming	To keep solid wastes dry (i.e., the landfill out of the water and the water out of the landfill To control leachates that do form (i.e., retard movement and renovate; collect leachate and treat)	Thickness of unsaturated overburden and water table	Very little overburden - likely perched water table condition in till and bedrock depressions		
	Prevent contamination of water supplies and surface water bodies		Perched water table conditions			
			Transmissibility of cover material			
			Transmissibility of host material			
	Prevent leachate from moving		Location of water supplies, wells and surface water bodies			
			Groundwater circulation system			Movement of water toward a potential wat. supply
Ecologic, economic, or aesthetic	Effects of landfill on environmental quality or resource use	A fragile, unique, ecologically important, etc., area may be degraded	Identification of ecologic, economic or aesthetic aspects	No unusual or unique conditions identified in area		
Alternative land use for area	Best use of land	A priority use may exist for site as a water supply	Identification of other users			

DISCUSSION

The average valley slope above the floodprone west of the brook is 9.4%. The Quaduck Brook receives all waters from this slope. The longest length of travel water must take to reach the brook on the west side is 2500'. This indicates if a landfill could by physically located on the west side, and if leachate formed, it would have a short travel distance to the brook.

The dominance of thin cover material and the relatively steep slopes would indicate that runoff is predominantly by surface water flow and would likely produce an erosion and sedimentation problem if the cover material were disturbed.

Although a groundwater supply system has not yet been developed, the adjacent area has been identified as a favorable location for availability of groundwater. This would be contaminated if leachate from a landfill were to enter the system.

A typical upland habitat of Eastern Connecticut exists at the site. Immediately south of the area there are substantial wetlands along Quaduck Brook which conceivably could be harmed by pollutants leaching from a landfill area. Also one mile south there is a highly productive state-owned wildlife marsh which may be adversely affected by continual leaching of pollutants into Quaduck Brook.

Quaduck Brook is one of the best small trout stream within the state. There ar many miles of the stream stocked below the Disposal Area. It is one of the few streams within the state where small natural reproduced brown trout can be found.

B. ECONOMIC CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL

EM FOR IDERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION	CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION	
Value	Availability of land and purchase price	Land not available (Cost or not for sale)	Finances				DISCUSSION: No problem apparent in transporting the waste to the landfill. Brichhouse Road which leads directly to the entrance of the landfill has recently been paved which facilitates easier truck traffic.
paration	Preparation cost to overcome limitations	Limitations require too great a cost for site preparation	Amount of site preparation				
gement Operation	Equipment, staff, cover, fence, gate, control for windblown material, etc.	Town does not want to appropriate finances	Finances				
l Grading Cover	Cost to prepare for secondary use	Secondary use preparation requires additional expenditure	Finances and site preparation				

No Comments

C. SOCIAL-POLITICAL CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL

EM FOR IDERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION	CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION	
rounding nd Uses	Acceptibility of use for landfill	Location may not be compatible with surrounding land use	Public attitude	The "out-of-sight" aspect of the area appears acceptable to townspeople, but they may not be as enthusiastic if the trade-off is the pollution of Quaduck Brook. Availability is good off Route 6.			
essibility Location	Is site available to public?	Location may be too remote	Road availability				

NATURAL RESOURCE CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL — East Killingly Eastern Section

L FOR DERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION	CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
graphy	Erosion	Surface flow through drainage	Slope			Generally greater than 15%
	Land stability	Sheet runoff Mass movement Settling and compaction	Physiographic location		Valley wall	
	Surface water collection	Depressions Exterior drainage collection on landfill surface	Surface drainage			Headwater for watershed
burden Soils)	Transmissibility	Host Remains dry and workable year round	Type of unconsolidated material (or soil)		Sandy till	
	Ion exchange	Retards leachate movement and renovates that which moves			Some sand and gravel in pockets	
	Workability	Cover Not susceptible to erosion or barrowing organisms Workable source year round Supports vegetation Allows gases to dissipate but does not allow water to infiltrate			See Soils Map	
ock	Rapid movement of leachate	Leachate will flow through bedrock-overburden contact without renovation to the surface or groundwater	Depth to bedrock and type of overburden Degree of fracture, porosity, bedding, etc		Some bedrock near surface but depth to rock varies	
	Solution of rock	An undesirable chemical reaction will occur with the bedrock	Composition of bedrock	Mainly gneisses and schists (chemically stable rocks)		
ology	Prevent leachate from forming	To keep solid wastes dry (i.e., the landfill out of the water and the water out of the landfill)	Thickness of unsaturated overburden and water table			Water table is near the surface - probably perched water table in the till and shallow bedrock
	Prevent contamination of water supplies and surface water bodies	To control leachates that do form (i.e., retard movement and renovate; collect leachate and treat	Perched water table conditions Transmissibility of cover material Transmissibility of host material			Movement of water toward a potential water supply
	Prevent leachate from moving		Location of water supplies, wells and surface water bodies Ground water circulation system			
gic, omic, or thetic	Effects of landfill on environmental quality or resource use	A fragile, unique, ecologically important, etc., area may be degraded	Identification of ecologic, economic or aesthetic aspects	No unusual or unique condition identified in area		
rnative l use rea	Best use of land	A priority use may exist for site as a water supply	Identification of other users			

DISCUSSION

The average valley slope above the floodplain east of the brook is 9.1%. The Quaduck Brook receives all waters from this slope. The longest length of travel water must take to reach the brook on the east side is 1500'. This indicates if a landfill could be physically located on the east side, and if a leachate forms, it would have a short travel distance to the brook.

At the time of the review water was flowing out of the material along the cuts in the sandy till from the east slope indicating rapid movement of ground water into the valley. Although a ground water supply system has not yet been developed, the adjacent area has been identified as a favorable location for the availability of ground water. The relative rapid movement of water from the slope to the valley would carry with it any leachate that would form from refuse coming in contact with this water.

A typical upland habitat of Eastern Connecticut exists at the site. Immediately south of the area there are substantial wetlands along Quaduck Brook which conceivably could be harmed by pollutants leaching from a landfill area. Also one mile south there is a highly productive state-owned wildlife marsh which may be adversely affected by continual leaching of pollutants into Quaduck Brook.

Quaduck Brook is one of the best small trout streams within the state. There are many miles of the stream stocked below the Disposal Area. It is one of the few streams within the state where small natural reproduced brown trout can be found.

B. ECONOMIC CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL

EM FOR IDERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION	CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
l Value	Availability of land and purchase price	Land not available (Cost or not for Sale)	Finances			
paration	Preparation cost to overcome limitations	Limitations require too great a cost for site preparation	Amount of site preparation			
gement and ration	Equipment, staff, cover, fence, gate control for windblown material, etc.	Town does not want to appropriate finances	Finances			
l Grading	Cost to prepare for secondary use	Secondary use preparation requires additional expenditure	Finances and site preparation			

NO COMMENTS

DISCUSSION

No problem apparent in transporting the waste to the landfill. Brickhouse Road which leads directly to the entrance of the landfill has recently been paved which facilitates easier truck traffic.

C. SOCIAL-POLITICAL CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL

EM FOR IDERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION	CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
rounging nd Use	Acceptability of use for landfill	Location may not be compatible with surrounding land use	Public attitude	The "out-of-sight" aspect of the area appears acceptable to townspeople, but they may not be as enthusiastic if the trade-off is the pollution of Quaduck Brook. Availability is good off Route 6.		
ssibility Location	Is site available to public?	Location may be too remote	Road availability			

NATURAL RESOURCE CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL - East Killingly Central Section

M FOR DERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION: USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION	CONFLICT; REQUIRES SPECIAL DESIGN OR SITE PREPARATION	CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
graphy	Erosion	Surface flow through drainage	Slope	0 to 15% slope		
	Land stability	Sheet runoff Mass movement Settling and compaction	Physiographic location			Floodprone area
	Surface water collection	Depressions Exterior drainage collection on landfill surface	Surface drainage			Major drainage adjacent to landfill, surface water ponding
burden (Soils)	Transmissibility	Host Remains dry and workable year round	Type of Unconsolidated material (or soil)		Water saturated sand and gravel grades into sandy till See Soils Map	
	Ion exchange	Retards leachate movement and renovates that which moves				
	Workability	Cover Not susceptible to erosion or barrowing organisms Workable source year round Supports vegetations Allows gases to dissipate but does not allow water to infiltrate				
ock	Rapid movement of leachate	Leachate will flow through bedrock-overburden contact without renovation to the surface or groundwater	Depth to bedrock and type of overburden Degree of fracture, porosity, bedding, etc.	Greater than 10 feet, but water saturated		
	Solution of rock	An undesirable chemical reaction will occur with the bedrock	Composition of bedrock			
ology	Prevent leachate from forming	To keep solid wastes dry (i.e., the landfill out of the water and the water out of the landfill	Thickness of unsaturated overburden and water table Perched water table conditions			Water table near present surface Ponding in deeper excavations
	Prevent contamination of water supplies and surface water bodies	To control leachates that do form (i.e., retard movement and renovate; collect leachate and treat)	Transmissibility of cover material Transmissibility of host material Location of water supplies, wells and surface water bodies Groundwater circulation system			Favorable ground water supply area downstream
	Prevent leachate from moving					
logic, nomic, or sthetic	Effects of landfill on environmental quality or resource use	A fragile, unique, ecologically important, etc., area may be degraded	Identification of ecologic, economic or aesthetic aspects			
rnative l use area	Best use of land	A priority use may exist for site as a water supply	Identification of other users			

Discussion

The entire town owned land flows into Quaduck Brook. Although the materials are physicically capable of being excavated, and cover material is locally available, the surface and groundwater system associated with the area flows into the brook adjacent to the site. Any leachate forming (there are indications that leachate is forming) will move directly and rapidly into the brook.

Water was observed entering the landfill area with no visible outlet. This water infiltrates through the cover and refuse and moves toward the brook.

Although a groundwater supply system has not yet been developed, the area has been identified as a favorable location for the availability of ground water. If any leachate from a landfill were to enter the system, it would contaminate the potential water supply.

The flood storage capacity of the brook is being reduced as the landfill builds up and encroaches upon the brook. This will increase the peak runoff from the area. The situation also increases the potential for undesirable sedimentation in the brook.

The upland habitat being destroyed by the present operation is not unique, but rather is typical upland habitat of Eastern Connecticut. However, loss of habitat near the Quaduck Brook is unique in that all streambelt habitat has high wildlife production potential.

Immediately south of the area are substantial wetlands along Quaduck Brook which conceivably could be harmed by pollutants leaching from the landfill area. Also one mile south there is a highly productive state-owned wildlife marsh which may be adversely affected by continua leaching of pollutants into Quaduck Brook.

When the present landfill operation is terminated, the area could be converted into an upland game habitat by planned planting of wildlife schrubs and trees. DEP personnel, upon request, will assist in plans for future development of the area wildlife.

B. ECONOMIC CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL

M FOR DERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION / CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION / CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
Value	Availability of land and purchase price	Land not available (cost or not for sale)	Finances	Need for major engineering for site preparation
aration	Preparation cost to overcome limitations	Limitations require too great a cost for site preparation	Amount of site preparation	
ement and ation	Equipment, staff, cover, fence, gate, control for windblown material, etc.	Town does not want to appropriate finances	Finances	
Grading Cover	Cost to prepare for secondary use	Secondary use preparation requires additional expenditure	Finances and site preparation	

C. SOCIAL-POLITICAL CONSIDERATIONS FOR THE EVALUATION OF: SANITARY LANDFILL

EM FOR IDERATION	SPECIFIC CONCERN	PROBLEM TO BE ADDRESSED	RESOURCE INFORMATION	CONSIDERATION THAT SHOULD BE GIVEN IN THE EVALUATION USUALLY NEEDS ONLY NORMAL CONSIDERATION OF CONVENTIONAL DESIGN OR SITE PREPARATION / CONFLICT: REQUIRES SPECIAL DESIGN OR SITE PREPARATION / CRITICAL CONFLICT: MAY BE PROHIBITIVE EVEN WITH SPECIAL DESIGN OR SITE PREPARATION
ounding d Use	Acceptability of use for landfill	Location may not be compatible with surrounding land use	Public attitude	The "out-of-sight" aspect of the area appears acceptable to townspeople, but they may not be as enthusiastic if the trade-off is the pollution of Quaduck Brook. Availability is good off Route 6.
ssibility ocation	Is site available to public?	Location may be too remote	Road availability	

DISCUSSION

Since a forest environment is being depleted by cutting and bulldozing, those areas where the landfill operation is complete ought to have a new stand of timber established to stabilize the soil and to make the area more aesthetically pleasing. Tree species such as white pine and larch should do well on the site. The entire acreage could be managed as a town forest and recreation area. Upon request DEP would assist in writing such a management plan for the tract.

On July 2, 1969, decomposed trout and bullheads were observed below the area. The water was very silty and turbid. This condition was traced back to the present disposal area. A rust colored and polluted condition of Quaduck Brook was again observed in the summer of 1972.

Quaduck Brook is one of the best small trout streams within the state. There are many miles of the stream stocked below the Disposal Area. It is one of the few streams within the state where we continually find small natural reproduced brown trout as well as brook trout.

The drainage area above the present landfill site is 36 acres. A diversion or side hill ditch could be installed to divert water south.

Some degree of protection may be afforded by this diversion of all surface runoff away from the sanitary landfill area. This would be extensive and very costly. If removal of existing landfill material is considered, this could certainly be a prohibitive cost.

A management plan should be developed and followed for establishing grades, trees, and schrubs to the area. A Connecticut Erosion and Sediment Control Handbook can be furnished upon town request. This handbook adequately handles standards and specifications for both temporary and permanent seeding on critical areas.