Rose Court of Branford

Branford, Connecticut

King's Mark Environmental Review Team Report

King's Mark
Resource Conservation and Development Area, Inc.

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Environmental Review Team Report

Prepared by the
King's Mark Environmental Review Team
of the King's Mark
Resource Conservation and Development Area, Inc.

for the
Inland Wetlands Commission
Branford, Connecticut

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CT Environmental Review Teams
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Acknowledgments

This report is an outgrowth of a request from the Branford Inland Wetland Commission to the Southwest Conservation District (SWCD). The SWCD referred this request to the King's Mark Resource Conservation and Development Area (RC&D) Executive Council for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The King's Mark Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Tuesday, October 14, 2003.

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**Report expected.*

I would also like to thank Danny Shapiro, chairman, Branford Inland Wetland Commission, Diana Ross, inland wetland enforcement officer, Russell Waldo, engineer, Rob Sonnichsen, environmental consultant, and Bob Russo, consultant, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. During the field review Team members were given additional information. Some Team members unable to attend the field review made visits on their own and others made additional field visits to the site. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town and landowner/applicant. This report identifies the existing resource base and evaluates its significance to the proposed use, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The King's Mark RC&D Executive Council hopes you will find this report of value and assistance in the review of this proposed subdivision.

If you require additional information please contact:

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Introduction

Introduction

The Branford Inland Wetlands Commission has requested assistance from the King's Mark Environmental Review Team in reviewing a proposed subdivision.

The 11.84 acre site is located in the center of Branford, south of Route 1 with Ivy Street and Hillside Avenue on the east, Rose Street on the south and Cedar Street on the west. The site is located in an R-1 Zone which is designed for medium to high density single and two-family residential units. The proposal is for a 35 lot subdivision with a mix of duplexes and single family homes for a total of 54 dwelling units.

The proposed road system will include access from Route 1 and from Hillside Avenue. A wetland crossing is necessary for the Route 1 access.

The site is a shallow to bedrock hill which will require blasting and extensive regrading. Phase I, the blasting and regrading of the site, is anticipated to be a six month continuous operation as explained by project consultants.

Objectives of the ERT Study

The commission has asked for assistance in reviewing the potential impacts to the wetlands and watercourses on site and off site during construction and post construction. Major concerns that the Team could address include: pre- and post-grade construction activities with regard to erosion and sediment control and

stormwater management, impacts to wetland areas and wildlife habitat and recommendations and guidelines to mitigate impacts to wetlands and watercourses.

The ERT Process

Through the efforts of the Branford Inland Wetlands Commission, this environmental review and report was prepared for the town of Branford.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the town. Team members were able to review maps, plans and supporting documentation provided by the applicant.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on Tuesday, October 14, 2003. Some Team members made separate and/or additional site visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

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Location Map

Scale 1″ = 2000′


Location Map
Scale 1" = 200'

Topography and Geology

The proposed subdivision will be built on and adjacent to a hill that has 70 feet of relief and moderate slopes and thus will require extensive alteration (grading) of the natural topography.

The area is underlain by northwesterly-dipping (tilted) Waterford Gneiss and/or Branford Gneiss (Rodgers, 1985). Waterford is a light to dark, medium-grained gneiss. The Branford is gray to white well-foliated granitic-gneiss. Rodgers includes these rock with others in the area that are pre-Cambrian in age and have affinities with Avalonian rocks. Rocks of the Avalon Terrane were formed originally as part of another continent (Baltica) and were juxtaposed to North American (Iapetus Terrane) rocks by plate tectonic processes approximately 350 million years ago (see Bell, 1985, Ch. 8). Eventually the process created a huge super continent (Pangaea) that included Africa, Europe, and South and North America (see map on p. 148 of Bell, 1985). The boundary between the two terrane rocks lies just north of I-95 (and the proposed subdivision) and is a westward extension of the Honey Hill Fault (inactive), although it is not designated as such by Rodgers' map (compare for instance with map on p. l50 of Bell, 1985). The plate tectonic activity involved with the juxtaposition of the two terranes produced a huge mountain range (since eroded) and caused earthquakes and the metamorphism of the rocks of both terranes.

Pangaea began to fragment about 200 million years ago, creating a large rift-valley in central Connecticut and Massachusetts. The rift valley was bounded on the east by a major normal fault or system of faults and high, probably mountainous, terrane which underwent erosion. The eroded debris from the mountains washed into the low fault bounded valley filling it with sand, mud, and gravel, now lithified to shale and sandstone (brownstone). Lava (trap rock) erupted into the valley on several occasions. The major fault (inactive) is located just west of the proposed subdivision (see map). The conduits through which lava made its way to the surface are just east of the proposed subdivision.

The above referenced history took place millions of years ago. More recently, during and immediately following the last ice age, glaciers caused erosion and both the glacier and its melt water deposited a variety of unconsolidated debris mantling the bedrock and forming a veneer from several inches to several tens of feet in thickness (Flint, 1962 ?). Most of the area of the proposed subdivision is covered with thin deposit of till (unsorted debris deposited beneath glacial ice). Exceptions are the hill in the northern part of the subdivision proposed and possibly a small area on the southeastern

corner of the subdivision. Glacial melt-water streams flowed along the edge of the valley where flow the Branford River flows. They did not flow in the deepest part of the valley because left over ice still remained. The glacial melt-water streams deposited sand and gravel as they flowed. The streams lapped onto the southeast corner of land that is now part of the proposed subdivision and, hence, a small area of thin sand and gravel may be found in that area. The hill has very thin to no soil (glacial till) covering bedrock (Flint, 1962, ?). Possibly till was not deposited on the high land or perhaps it was eroded by another melt water stream that flowed beneath the melting glacier.

The site plans submitted for review by the owner-applicant (dated January, 2003, rev. Aug. 2003) indicate in excess of 30 feet of the hill will be removed from some locations. The grading proposed by the applicant, therefore, will require the use of quarry procedures (explosives). Several thousand (>150,000?) yards[1] of broken granitic rock debris (earth material) will be generated. Granitic rock, when crushed, is a valuable construction material ($15-20/yd. retail). Quarries are normally closely regulated and although the proposed activities are couched in terms of a subdivision, 150,000 yards appears to this reviewer to be a quarry operation requiring close attention during the regulatory process.

References

Bell, Michael, 1985, *The Face of Connecticut*. Connecticut Geol. and Nat. Hist. Survey, Bull 110, 196p.

Flint, R.F., 1962?, Surficial Geology of the Branford Quadrangle, Connecticut Geo. and Nat. Hist. Survey, Quad. Rpt. 14, plate 1.

[1] In the construction industry, a yard is actually a volume term referring to cubic yard (27 ft.^{3}). A yard of crushed granite weighs approximately 1.5 tons.

Stratified sand and gravel
(Surficial deposit)

Jurassic diabase

Eastern Border Fault

Soils Resources

This soils report applies to an 11.84 acre parcel known as the Rose Court project in the center of town bordered by RT. 1 to the north, Hillside Ave on the east, Rose Street to the south and Cedar Street to the west. The information in this report is based on the soils series descriptions and the mapping unit descriptions as presented in the 1979 USDA Soil Survey of New Haven County plus field observations.

This site can be found in sheet number 69 of the New Haven County Survey.

A copy of the Southwest Conservation District original site plan review report dated 6/5/03 may be found in the appendix of this report.

Mapping Units

Wetland Soils

AQ - Aquent unit consists primarily of man-made or man-disturbed cut and or fill areas that are wet. Slopes range from 0-3 percent. These soils have a seasonal high watertable at less than 2 feet; have a aquic moisture regime and can be expected to support hydrophytic vegetation. Typically, these soils are in places where a less than 2 foot thick layer of earthy material have been placed over poorly and very poorly drained soils; or where the natural soil have been mixed so that the natural soil layers are not identifiable; or where the soil materials have been excavated to the ground watertable.

Non-wetland Soils

Map Unit CyC - Cheshire Holyoke complex

The CyC map unit complex consists primarily of two dominant soils that are so intermingled that they could not be separated on the map. Slopes range from 3 to 15 percent. Both soils have medium to rapid runoff.

The first soil is named Cheshire. Cheshire soils are well drained, very deep to bedrock soils. Typically, they have a fine sandy loam, loam or silt loam surface layer and a subsoil over a friable sandy loam, fine sandy loam substratum that extends to a depth of 60 inches or more. This soil has moderate permeability.

The Holyoke soil component is limited in its depth to bedrock of 10 to 20 inches. This soil is droughty and has severe erosion hazard and a moderate tree windthrow due to the shallow root zone.

Map Unit HuD - Holyoke-Cheshire complex

The HuD map unit consists of moderately steep and steep well drained and somewhat well drained soils on uplands where the relief is affected by the underlying bedrock. Slopes range between 15 to 35 percent. This complex has low permeability and runoff is rapid. It is limited mainly by steep slopes, shallowness to bedrock and outcrops. Disturbance of these soils would require intensive measures such as diversions, vegetative cover and mulching to prevent excessive runoff, erosion and siltation.

The dominant soil is Holyoke, which is shallow and well drained. They have sandy loam textures overlying consolidated bedrock at a depth of 10 to 20 inches. These soils do not have a high watertable within their 20 inch depth. The second soil component is Cheshire. Cheshire soils are very deep and well drained. Typically, they have fine sandy loam textures to a depth of 60 inches or more. Depth to the seasonally high watertable is greater than 6.0 feet.

Map Unit HZE - Holyoke-Rock outcrop complex

The HZE complex consists of moderately steep to steep, well drained to somewhat well drained soils on uplands. Slopes range from 15 to 35 percent. The Holyoke component is a well drained, shallow to bedrock soil. Typically, they have a loam, silt loam or fine sandy loam surface layer and subsoil over hard bedrock at a depth of 10 to 20 inch depth.

If these soils are disturbed, they require intensive conservation measures, such as mulching, re-establish vegetative cover and diffuse surface runoff to control excessive runoff, erosion and siltation.

The bedrock is comprised of Branford Gneiss: A metamorphic rock, which is a gray to white, well foliated granitic gneiss. The surficial material is predominantly a thin upper till less than 10 to 15' thick over bedrock. The till is loose to moderately compact, generally sandy and commonly stony.

Additional Comment

The approach of attaining a buildable lot by reducing all the natural topographic relief and physical attributes of a site does not suggest or promote a balance between economic development and natural resource conservation. In the 2002 CT Guidelines for Soil and Erosion Control manual, Chapter #3, page 3-7 & 3-8, the guidance on plan development provided seems to be lost regarding this project. "Sites with resource limitations should be developed in conformance with the capacity of the site to support such development, rather than by attempting to modify a site to conform to a proposed activity." See following pages 11-12.

Minimize direct impact to coastal resources and other sensitive areas.

When the project is located in a public drinking water supply watershed area review the DEP's publications Protecting Connecticut's Water-Supply Watersheds, A Guide For Local Officials, January 1993, and Protecting Connecticut's Groundwater: A Guide For Local Officials, January 1997, DEP Publication # 26. **Identify** measures needed to reduce potential impacts to the public water supply caused by the development activities. It is suggested that a copy of the plan be submitted to the water utility for their review and comments.

Adjacent Areas: Investigate areas adjacent to the site which will either impact or be impacted by the project. Features such as perennial and intermittent streams, roads, houses or other buildings, or wooded areas should be shown. Wetlands, watercourses and downstream culverts which will receive runoff from the site should be located and surveyed to determine their ability to retain or discharge projected runoff. **Identify** sensitive downstream areas, such as existing stream bank erosion, hydraulic constraints, public water supply reservoirs, Aquifer Protection Areas, and in-stream recreation areas. **Identify** approved and future development site(s) in the upper watershed area.

In addition to the hydraulic concerns raised in the Drainage Patterns subsection, **evaluate** the environmental conditions in areas down slope and up slope from the construction project. The potential for sediment deposition on down slope properties should be analyzed so that appropriate erosion and sediment controls can be planned. Down slope wetlands and watercourses (especially those containing drinking water reservoirs or cold water fisheries habitat) which will receive runoff from the site are concerns.

Drainage conditions up slope or off site from a proposed embankment cut need to be checked to insure that the cut does not eliminate a hydrologic and hydrogeologic feature. These features could be providing for flood storage and/or water quality renovation on or adjacent to the site. Additionally, drainage swales and depressions that traverse the cut area will require an engineered design to ensure channel stability both on and off site.

Principles of Site Planning for Erosion and Sediment Control

The primary function of erosion and sedimentation controls is to absorb erosional energies and reduce runoff velocities that force the detachment and transport of soil and/or encourage the deposition of eroded soil particles before they reach any sensitive area. Erosion and sedimentation control principles are all formulated on the premise that it is easier, cheaper and less environmentally damaging to reduce soil detachment in the first place than it is to control its transport and deposition or to remediate damage after it occurs. Specific control measures are discussed in detail in Chapter 5 of these Guidelines.

After reviewing the data and determining the site limitations, the planner can then develop a site plan. This plan is based upon basic erosion and sediment control principles. These principles are as follows:

Plan Development to Fit Environmental Conditions

Start by selecting a site that is suitable for a specific proposed activity. Sites with resource limitations should be developed in conformance with the capacity of the site to support such development, rather than by attempting to modify a site to conform to a proposed activity.

- *Utilize the existing topography.*
- *Align roads on the contour wherever possible and use them to divert surface water, thereby reducing slope lengths.*
- *Concentrate development on flattest area of the site to avoid excessive slope cuts or fills where possible.*
- *Avoid steep slopes and soils with severe limitations for the intended uses. If there are no feasible alternatives to avoiding steep slopes and/or erodible soils, sound engineering practices should be employed to overcome the site limitations. For example, long steep slopes need to be broken up by benching, terracing or diversions to avoid erosion problems. Seeps emanating from cut slopes will need provisions for internal drainage to prevent slope failure.*
- *Avoid flood prone areas, wetlands, beaches, dunes and other sensitive areas and when possible keep floodplains free of fill or obstructions.*
- *Keep stockpiles, borrow areas, access roads and other land-disturbing activities away from critical areas (such as steep slopes and highly erodible soils) that drain directly into wetlands and water bodies.*
- *Avoid siting buildings in drainage ways, over watercourses and over storm drainage systems.*
- *Utilize the natural drainage system whenever possible. If the natural drainage system of a site can be preserved instead of being replaced with piped storm sewers or concrete channels, the potential for downstream damages from increased runoff can be minimized, making compliance with storm water management criteria easier.*

Keep Land Disturbance to a Minimum

The more land that is kept in vegetative cover, the more surface water will infiltrate into the soil, thus minimizing stormwater runoff and potential erosion. Keeping land disturbance to a minimum not only involves minimizing the extent of exposure at any one time, but also the duration of exposure. Phasing, sequencing and construction scheduling are interrelated. **Phasing** divides a large project into distinct sections where construction work over a specific area occurs over distinct periods of time and each phase is not dependent upon a subsequent phase in order to be functional. A **sequence** is the order in which construction activities are to occur during any particular phase. A sequence should be developed on the

premise of "first things first" and "last things last" with proper attention given to the inclusion of adequate erosion and sediment control measures. A **construction schedule** is a sequence with time lines applied to it and should address the potential overlap of actions in a sequence which may be in conflict with each other.

- *Cluster buildings to minimize the amount of disturbed area, concentrate utility lines and connections in one area, and provide for more open space. The cluster concept not only lessens the area subject to erosion, but reduces potential increases in runoff, and generally reduces development costs.*
- *Limit areas of clearing and grading by concentrating construction activities on the least critical or sensitive areas. Protect natural vegetation from construction equipment with fencing, tree armoring, and retaining walls or tree wells.*
- *Route traffic patterns within the site to avoid existing or newly planted vegetation.*
- *Phase developments so that areas which are actively being developed at any one time are minimized and only that area under construction is exposed. Clear only those areas essential for construction. Consider restricting the start of a later phase contingent upon the completion of a prior phase. At any given point of time, when the disturbed area exceeds 5 acres and drains to a common point of discharge the construction of a sedimentation basin is indicated. Restrictive phasing can sometimes keep the disturbed area below this 5 acre threshold.*
- *Sequence the construction of storm drainage and sewer systems so that they are operational as soon as possible during construction. Ensure all outlets are stable before outletting storm drainage flow into them. See Chapter 4 for examples of sequences for large construction sites.*
- *Schedule construction so that final grading and stabilization is completed as soon as possible. Include early stabilization or covering of stockpiled topsoil or other erosive materials when they will not be used within 30 consecutive days. Grading and stabilization of steep slopes and erodible soils with severe limitations should be sequenced early in the construction so that grading work proceeds from the highest to lowest elevation.*
- *Schedule construction where possible to avoid disturbing large or critical areas during frozen ground conditions (December to February) and spring thaw (February to early March).*
- *Use planning tools such as flow charts, Critical Path Method (CPM) or Gantt Charts (see Appendix G) to develop feasible sequences and schedules in the most environmentally sound and cost effective way. Additionally, they can be used by financial lenders to develop funding schedules.*
- *Schedule the implementation of erosion and sediment controls so that they are timed to match the erosion and sediment needs created by the sequencing in each phase.*

Slow the Flow

Detachment and transport of eroded soil must be kept to a minimum by absorbing and reducing the erosive energy of water. The erosive energy of water increases as the volume and velocity of runoff increases. The volume and velocity of runoff increases during development as a result of reduced infiltration rates caused by the removal of existing vegetation, removal of topsoil, compaction of soil and the construction of impervious surfaces.

- *Minimize impervious areas. Encourage infiltration where appropriate[3]. Keep paved areas such as parking lots and roads to a minimum. This complements cluster developments in eliminating the need for duplicating parking areas, access roads, and other impervious areas.*
- *Keep in mind that increases in runoff may require control measures or channel improvements.*
- *Use diversions, stone dikes, silt fences and similar measures to break flow lines and dissipate storm water energy.*
- *Consider collecting and detaining runoff when there is an increased potential for flooding and resultant damage to downstream facilities.*
- *Avoid diverting one drainage system into another without calculating the potential for downstream flooding or erosion.*
- *Perform runoff calculations to determine the effect of the development on the existing hydraulic system. Make changes where necessary to avoid downstream damage and to comply with runoff requirements of the municipal reviewing agency.*
- *Determine the potential need for detention basins. Attempt to locate detention basins outside of floodplains, wetlands and water courses, and adjacent to steep escarpments.*

[3] Slope stability and soil permeability must be considered when considering infiltration options.

Wetland Review Comments

The wetland issues for the Rose Court development are mainly centered around the unnamed brook that flows south and southeast along the west border of the parcel.

At the time of the visit the watercourse had been flagged and mapped and the numbers were easy to follow in the field.

The stream varied along its course in width and depth. It ranged in width from three feet at WF 6 Revised to 10-12 feet in width at WF 21. The bottom varied in its makeup from silty and leafy around WF 21, to narrowing with confined, scouring flow, which exposed a cobbly bottom around WF 6 and 7 Revised. In places (around WFs 9-14) iron bacteria was evident on the water surface. In other places (WFs 3 and 4 Revised) course woody debris had fallen across the watercourse causing some pooling in the stream before it disappeared underground heading generally south to Cedar Street. In addition, the water took on a murky aspect at WF 7 Revised, and between WFs 9-12 Revised the bottom was covered with a bacteria covered, filamentous algae that heretofore this reviewer had only seen below secondary treatment (as opposed to tertiary treatment) waste water treatment plants .

The proposed road crossing of the stream is at/near WFs 17 and 18. Here the watercourse is at its narrowest due to fill on the stream's west side. The fill of concrete chunks/blocks and tires was visually apparent. In addition, general surface dumping of miscellaneous household goods was also evident in this area.

Over the years there has been a lot of impact to the stream. Construction debris berms, channelization, urban runoff, and buried in-pipe sections have combined to leave the remnant we see today. In fact, the headwaters of the stream was quite extensive as seen on the 1954 USGS Topographic map (attached). Though some encroachment into the headwater marsh and swamp was present then (1954 map), a + 5 acre headwater wetland did exist. Today that no longer exists. It is lost under the footprint of commercial and residential construction. Indeed, some length of the stream has been put below grade as a result.

Conflicting sentiment is garnered on these types of urban wetland scenarios. First is that since the wetland is so historically degraded future impacts have a negligible effect. The other side is that since there has been *so* much impact historically, what remains should be preserved.

In fact, what riparian area still exists offsite along the stream, in combination with the 6,000+ square feet of proposed renovated wetlands, will provide a small oasis in this otherwise urbanized area. Increased wetland value as wildlife habitat, its own ecological integrity, possibly improved water quality and aesthetics will be the result.

Comments

- Soil erosion and sediment control will have to be implemented correctly to be effective on this slopey site. As almost always happens, the wetland (watercourse) is "downhill" from the work being done and has the opportunity to be greatly impacted. With so much heavy equipment work proposed, and the slopes being in the 10 to 13 % range, protection of the watercourse from siltation is a must. The proposal describes its phased work and the E&S controls. If adhered to, the wetlands should be relatively unimperiled.

- The proposed road crossing shows the stream confined to a pipe under the proposed road. About 48 feet of 18-inch diameter pipe will carry the stream under the road. The commission should consider requesting a submerged bottom or open-bottom box culvert to keep the stream bottom as close to the existing state of "natural" bottom as possible. Historically, this stream had an over all, above-ground length of ~5,100 feet from its headwaters to its outlet. Now about 40% of that (2,025 feet) length remains open. On the site, ~1,085 feet of the stream are open water. Putting 48 feet of the stream in a pipe reduces the onsite open water by ~4.4% of what it is now.

- If evaluated, the existing water quality of the stream would likely be rated low. Visually it is messy and disturbed in places, though no apparent odors were present on the day of the visit. Indeed, with grassy yards running nearly to the waters' edge southeast of the hill, and historic demolition debris lining its channel, the offsite contributions impact the watercourses harshly. Any desired improvement of the water quality would likely have to be on a watershed level which would force the understanding of each impact by abutting landowners. It should be clear that the algae and bacteria growth mentioned above are the result of nutrient loading (lawn fertilizers?) elsewhere in the watershed.

- Airborne sediment and fines are sometimes the result of quarrying operations. Known as "Fugitive dust" the town may want to research the potential impact of larger airborne matter as it affects the wetland. A variety of information may be obtained on the internet. http://www.nsbdcdep.org/pages/fugitivedust.htm & http//www.epa.state.oh.us/dapc/sba/stones.html, and "The Act" http//www.adeq.state.ar.us/mining/pdfs/quarryinfo5_0212210.pdf are just a few.

- Time limit for work - Because of the large-scale nature of site preparation and the potential for impacts increasing the longer the project goes on, the commission should understand the longevity of the different phases of this proposal.

- Reclamation/restoration bond for reclamation work - the commission might ask for a restoration bond to insure that the site will be stabilized and vegetated if, for some unforeseen reason, the housing construction phase of the project is not pursued once the quarrying operation is completed.

- While on the site walk, when over-looking the to-be-renovated wetland area, it was apparent that some small bird population currently makes use of this wetland. The proposed 6,000 square foot wetland renovation will be a welcome (re)addition to this system. The proposed wide range of wetland plantings will only enhance and benefit this wetland value making it truly an oasis in an otherwise intensely developed area (as can be seen by the 2000 aerial photograph.)

- Obligate vernal pool species were located in the small wetland that occupies the parcel near where it intersects Rose Street (on the maps labeled as the Mary Williams Property in the 10/18/02 report from Elizabeth Young, Soil Scientist.) *Rana sylvatica* (wood frog) were found on the site by R. Mrozinski during his earlier site walk for his 6/5/03 site plan review and as such indicate the presence of a vernal pool. Its uniqueness in this heavily suburbanized area and because of potential impact from development further investigation is recommended. This should be undertaken by an experienced ecologist or biologist in the late winter or early spring (typically around March) to establish 1) which species use the pool for breeding and 2) identifying the upland needs of the species.

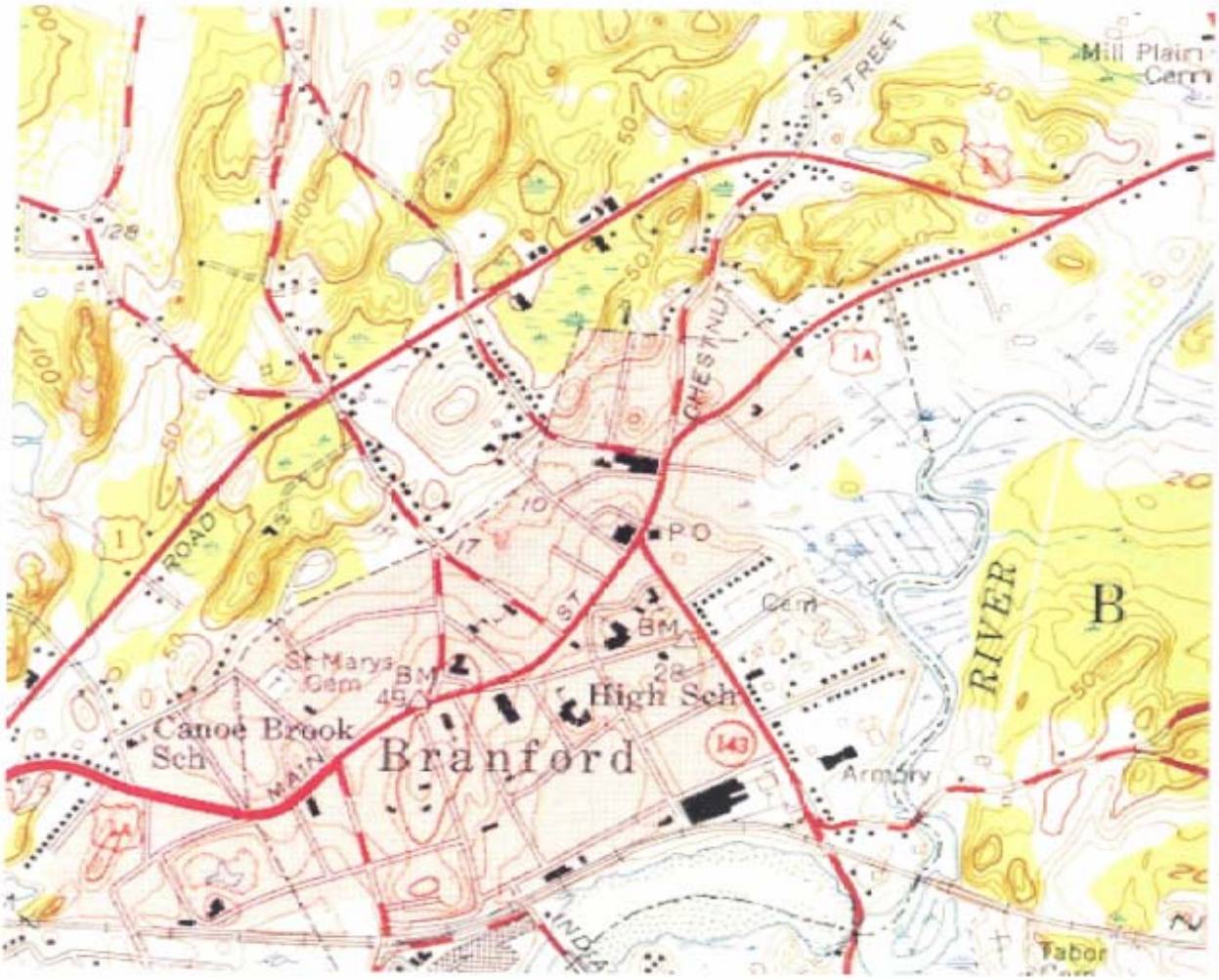
There is extensive information in print about vernal pools. Much of it points to the fact that the reduction of more than a certain percentage of critical habitat and adjacent upland could have telling impacts on pool ecology.

Dr. Michael Klemens suggests in this recent book entitled: "Best Development Practices - Conserving Pool Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States" that the upland use by various vernal pool amphibians can range from 386 feet from the pool for spotted salamanders to 1550 feet from the pool for juvenile wood frogs (3835 feet for adults). Indeed, he suggests there be no development in the 100 foot buffer around the vernal pool and no more than 25% in the critical terrestrial habitat, that is, the distance from 100 to 750 feet away from the pool.

(Copies of this book may be obtained from the DEP Store at: http://www.whereeverythingis.com/depstore/ , search on "breeding".)

1934 Air Photo

1954 Topographic Map



2000 Air Photo

Stormwater Management

Stormwater Permitting

Since the site construction involves the disturbance of over five acres, Connecticut's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities* ("general permit") will cover the project. The general permit requires that the developer registers with the Department of Environmental Protection (CTDEP) and submits a Stormwater Pollution Control Plan (the "Plan") *at least* thirty days before the start of construction. The permit requires that the "Plan shall ensure and demonstrate compliance with the Connecticut Guidelines for Soil Erosion and Sediment Control (the "guidelines"). Also, the Plan must be flexible to account for adjustment of controls as necessary to meet field conditions. Please note that many erosion, sediment control, and stormwater detention issues must be dealt with on a local level before being included in the Plan.

The Plan must include a site map as described in Section 6(b)(6) of the permit and a copy of the erosion and sediment (E & S) control plan for the site. The E & S plan that has been approved by the Town in conjunction with the CTDEP Inland Water Resources Division (IWRD) and the local Soil and Water Conservation District may be included. The Plan must include a description of the E & S controls that will be used during each phase of construction, construction details for each control used, details of all outlet structures and velocity dissipation controls, and a description of procedures to maintain all erosion and sediment control measures. Specific dewatering procedures must be addressed. Section 6(b)(6)(C)(ii) requires that dewatering wastewater be infiltrated into the ground unless otherwise approved by the commissioner in writing. The locations of all stockpiled materials must be shown along with necessary erosion control measures. The permit requires inspections by qualified personnel provided by

the permittee at least once every seven calendar days and after every storm of 0.1 inches or greater. In addition, the Plan must include monthly inspections of stabilized areas for at least three months *following* stabilization. The Plan should note the qualifications of personnel doing the inspections and must allow for the inspector to require additional measures as necessary.

The permittee shall provide a copy of the Plan to all contractors or developers conducting construction activities on individual lots or buildings within the overall plan of development, regardless of ownership. These additional contractors and developers must sign the contractor certification (Section 6(b)(6)(E)).

The Plan must be maintained on site during construction and updated as necessary.

Erosion and Sediment Control Notes

A review of the Site Development Plan and the Erosion Control Plan provided with the ERT materials has resulted in the following comments:

1. The Plan must indicate how the stream will be protected during the installation of the detention basins.

2. The construction sequence must be amended to include the installation of the permanent detention basins.

3. The Plan must show stockpile locations and sediment control measures to be installed.

4. Details of all basin outlet structures must be shown.

5. The locations of all construction entrances must be shown.

6. The only erosion and sediment control shown on the plans is silt fence. The general permit outlines the requirements for the installation of sediment traps or basins for any discharge points that serve an area with more than 2 disturbed acres at one time. A sediment basin designed in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control is required for any discharge points that serve an area with more than 5 disturbed acres at one time. The Plan must clarify how this requirement will be met and provide the locations of any sediment basins. In addition, the Department recommends the use of erosion control matting for 3:1 (horizontal:vertical) slopes and steeper. The Connecticut Guidelines for Soil Erosion and Sediment Control require reverse slope benches whenever the vertical height of any slope steeper than 3 :1 exceeds 15 feet, except when engineered slope stabilization measures are installed.

7. The developer should note that the use of silt fence and/or a hay bale barrier at a detention basin outlet is not sufficient to convert a detention basin to a sediment trap during construction. The Department recommends a fabric-wrapped perforated riser pipe and gravel cone, or an alternative outlet that conforms to the guidelines. Outlet structures from sedimentation basins must not encroach upon a wetland as stated in Section 6(b)(6)(C) of the general permit.

Post Construction Stormwater Treatment

The proposal for post-construction stormwater treatment includes catch basin sumps, two detention basins, and at least one oil/water separator. A review of the materials generated the following comments:

Catch basin sumps

Catch basin sumps can trap coarse particles and, if equipped with a hooded outlet, can trap floatables such as trash, debris and oil and grease. These sumps can capture sediment to a level up to 50% of the sump volume, but the sediment can be scoured out during larger storms so the sumps should be cleaned at least annually or more frequently if necessary. The Plan must indicate who will be responsible for long-term maintenance of the catch basins.

Oil/water separator

Limited information was provided about the proposed oil/water separator to be installed near the intersection of Marigold Court and Route 1. Will this be an off-line or in-line unit? What size storm is it anticipated to treat? What will be the frequency of inspections and maintenance of the unit and who will be responsible for maintenance? Stormwater treatment structures can become a source of pollutants if not properly maintained so these units must be inspected regularly and may need to be cleaned out every 1 to 6 months. The baffled oil/water separator shown on sheet M-2 of the plans is more typically installed for the treatment of vehicle maintenance wastewater and will not provide sufficient protection against re-suspension of sediment during storm events or retain trash. The use of a three-chambered unit equipped with trash racks and an inverted elbow pipe to retain floatables, or a less maintenance-intensive alternative to the use of a stormwater structure, such as grassy swales, should be evaluated.

Detention basins

An evaluation of the ability of the two detention basins to treat stormwater and protect the wetlands and stream cannot be made without a detail of the outlet structures and a detail of the rip-rap outlet pads in relation to the stream bank and bed. The inlet and outlet for the larger of the two basins are in-line and fairly close together. Flow through this basin may be short-circuited. A permanent sedimcnt forebay is recommended for each detention basin to help settle out coarse particles and to minimize the maintenance burden of the pond. The Plan must identify the long-term maintenance needs and responsibilities for these basins.

The northeastern slope of the larger detention basin appears to 1:1 (horizontal:vertical). How will this slope be stabilized?

Infiltration system

Limited information was provided about the proposed infiltration system for the Rose Hill Apartment parking lot. This type of system is susceptible to clogging by sediment, so stormwater pre-treatment to remove sediment, as well as floatables and oil and grease, should be considered in the design. Again, the Plan must identify the long-term maintenance needs and responsibilities of such a system.

As a final note, regarding the Stormwater Management Report, the direction of flow should be shown on the existing and proposed drainage watershed diagrams and the proposed drainage watersheds should be overlain on a site map.

Conclusion

The Plans must be amended to address the comments above and to incorporate all of the elements required by the general permit prior to submittal to the CTDEP. This review does not constitute a complete review of the Plans for permitting purposes.

The Natural Diversity Data Base

The Natural Diversity Data Base maps and files regarding the project area have been reviewed. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species that occur at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Environmental & Geographic Information Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Archaeological Review

A review of the State of Connecticut Archaeological Site files and maps shows no known archaeological site listed for the project area. However, four prehistoric Native American archaeological sites are located to the south and east of the project area. These sites represent the activities of hunters and gatherers utilizing interior wetlands dating to 3,000 years ago. They were identified during historic farming and other land use activities. Although the project area has relatively steep slopes, two areas of special archaeological concern include the lowland and the top of the knoll.

The Office of State Archaeology recommends an archaeological reconnaissance survey for the project area to identify other cultural resources, which might be effected by the proposed undertaking. This survey should be conducted to identify all cultural resources in the areas planned for development and provide recommendations on their significance and preservation strategies. The survey should be conducted in accordance with the Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources.*

The Office of State Archaeology would look forward to working with the Town of Branford and the applicant in providing any technical assistance in the conservation and preservation of its cultural resources in the project area.

Appendix

Southwest Conservation District

North Farms Executive Park
900 Northrop Rd., Suite A, Wallingford, CT 06492
(203) 269-7509 Fax 294-9741
E-mail swcd43@sbcglobal.net
Website www.conservect.org

6-5-03

Town of Branford
Diana Ross, IW Officer
PO Box 150,
1019 Main St.
Branford, CT

Material Reviewed:

- Site plan drawings and related support documents for Rose Court, Cedar / Ivy Street of Branford, CT by Russell W. Waldo, PE & LS and Assoc., 89 State St., Guilford, CT

Dear Ms. Ross,

In response to your request for assistance, the District reviewed the proposed site plans for Rose Court in Branford, CT and conducted a site visits. After the site walk and review of the above referenced materials, the following observations, comments and recommendations are offered. These recommendations are advisory in nature and are intended to assist Branford's Inland Wetlands Commission manage their wetlands and watercourses.

Soils Resources

Mapping Units
Wetland Soils

1) **AQ** – Aquent unit consists primarily of man-made or man-disturbed cut and or fill areas that are wet. Slopes range from 0-3 percent. These soils have a seasonal high watertable at less than 2 feet; have a aquic moisture regime and can be expected to support hydrophytic vegetation. Typically, these soils are in places where a less than 2 foot thick layer of earthy material have been placed over poorly and very poorly drained soils; or where the natural soils have been mixed so that the natural soil layers are not identifiable; or where the soil materials have been excavated to the ground watertable.

Non-wetland Soils

2) **Map Unit CyC – Cheshire Holyoke complex**
The CyC map unit complex consists primarily of two dominant soils that are so intermingled that they could not be separated on the map. Slopes range from 3 to 15 percent. Both soils have medium to rapid runoff.

The first soil is named Cheshire. Cheshire soils are well drained, very deep to bedrock soils. Typically, they have a fine sandy loam, loam or silt loam surface layer and a subsoil over a friable sandy loam, fine sandy loam substratum that extends to a depth of 60 inches or more. This soil has moderate permeability.

The Holyoke soil component is limited in its depth to bedrock of 10 to 20 inches. This soil is droughty and has severe erosion hazard and a moderate tree windthrow due to the shallow root zone.

3) **Map Unit HuD - Holyoke-Cheshire complex**
The HuD map unit consists of moderately steep and steep well drained and somewhat well drained soils on uplands where the relief is affected by the underlying bedrock. Slopes range between 15 to 35 percent. This complex has permeability and runoff is rapid. It is limited mainly by steep slopes, shallowness to bedrock and outcrops. Disturbance of these soils would require intensive measures such as diversions, vegetative cover and mulching to prevent excessive runoff, erosion and siltation.

The dominant soil is Holyoke, which is shallow and well drained. They have sandy loam textures overlying consolidated bedrock at a depth of 10 to 20 inches. These soils do not have a high watertable within their 20 inch depth.
The second soil component is Cheshire. Cheshire soils are very deep and well drained. Typically, they have fine sandy loam textures to a depth of 60 inches or more. Depth to the seasonally high watertable is greater than 6.0 feet.

4) **Map Unit HZE – Holyoke-Rock outcrop complex**
The HZE complex consists of moderately steep to steep, well drained to somewhat well drained soils on uplands. Slopes range from 15 to 35 percent. The Holyoke component is a well drained, shallow to bedrock soil. Typically, they have a loam, silt loam or fine sandy loam surface layer and subsoil over hard bedrock at a depth of 10 to 20 inch depth.

If these soils are disturbed, they require intensive conservation measures, such as mulching, re-establish vegetative cover and diffuse surface runoff to control excessive runoff, erosion and siltation.

The bedrock is comprised of Branford Gneiss: A metamorphic rock, which is a gray to white, well foliated granitic gneiss. The surficial material is predominantly a thin upper till less than 10 to 15' thick over bedrock. The till is loose to moderately compact, generally sandy and commonly stony.

Siting Concerns:

1) **Density:** The proposed residential subdivision is quite dense. There is no attempt to work within the physical constraints and character of the site. The "D and E" slopes should be excluded in any development proposal. This site is marginal at best and it deserves careful scrutiny in allowing this aggressive sprawl to completely eliminate habitat.

2) **Site Data:** The lack of information from test pit data to establish depth of soils and seasonal high watertables, should be made available. This would assist in the quantification of available material to cover this highly quarried project and gauge the need for adequate floor and footing drains due to the constraints imposed by the bedrock to insure building integrity.

3) **Site Drainage:** The control of drainage patterns around dwellings and landscaped areas will be directly affected by the underlying bedrock. The Landscape Drawing – L2 of 2 shows a series of shelves that are backfilled with topsoils. These areas will have perched watertables if they are not properly drained. Potential seeps in lawns and water damage to buildings may occur if drainage patterns and discharges are not addressed properly.

4) **Land Use:** The severe modification of the topographic relief on this parcel for the proposed project raises several other issues. They are as follow;

   a. The attempt to maximize the number of proposed building lots and associated infrastructure would require a high degree of blasting to attain the projected elevations for all proposed facilities and dwellings on this site. Potential risk of damaging adjacent dwellings and commercial buildings would seem to be high.

   b. Based on information provided in the site plan, the proposed road system and infrastructure does not seem to utilize the amount of material quarried from this site. Conservative calculations seem to be in the realm of 140,000 to 150,000 cubic yards of material to be moved. This is a very intense land use activity, which would require special permitting locally as well as compliance with Phase II Stormwater Permitting from DEP regarding earth resource extraction operation. See State Administered Programs.

   c. Guidance on best management practices; performance bonding and operational controls related to a project of this type are addressed in the Earth Resource Extraction Model Regulations provided in Exhibit #1.

   d. Nuisance issues of noise, dust and increases in traffic to RT 1 will be of great concern. In order to move this material off site, blasting will occur. Moving this material expeditiously will require approximately 50 loads of 20-yard dump trucks per day, five days of the week over a 150-day period. Where is this material to be transported to or stored on site? Additional buffering set back distances are usually recommended for this type of intense land use around the entire perimeter. The logistics of performing this operation in such close proximity to private residences may prove problematic.

5) **Detention Basins:** The siting of the two proposed stormwater detention basins directly on top of the watercourse make no provisions for buffering or erosion and sedimentation controls.

   a) A set back distance of 50 feet minimum should be employed and adhered to. The intent of any established wetland set back distance is to limit the maximum encroachment of land disturbances and any proposed facilities in an effort to protect and preserve raw water quality and aquatic habitats from potential contamination.

   b) Creating the stormwater detention basins in a designated "Open Space" area donated to the town or local land trust is one way of relinquishing control and responsibility of these facilities. Does the town wish to maintain and ensure performance of these facilities for the life of this subdivision?

6) **Subdivision Density:** Consideration for the clustering of dwellings or a village approach along with the reduction of the number of dwellings would allow for the preservation of some of the sites physical attributes, lower the cost of construction and provide a more aesthetically balanced subdivision, which is more environmentally friendly. Guidance on this topic can be garnered from a guide on open space called " Conservation Design for Subdivisions by Randall G. Arendt. This information should be shared with the developer. See Exhibit #2.

Site Plan Drawings

- Finish grades and defined sedimentation and erosion controls should be conveyed on the field of the drawings.
- Drawings lack completeness and clarity in their presentation of germane information regarding erosion and sedimentation control.

Erosion & Sedimentation Control

Sheet E-1 Narrative:

1) The narrative should include reference to the NPDES Stormwater Permitting requirement and indicate compliance with the new Phase II permitting process under construction activities with a possible earth resource extraction component. This will require the creation of a comprehensive E&S document that clearly demonstrates the location and installation of temporary and permanent measures.

2) The cognizant person for the inspection and maintenance of the projects erosion and sedimentation controls should appear on the field of the final site plan drawing with their emergency telephone number and address.

3) Note E-4: No evidence of any E&S measures on Sheet M-1 concerning the stormwater detention basin drawings.

Sheet E-2

1) A detailed layout of the entire subdivision E&S measures need to be shown on the field of a drawing showing stockpile locations, stabilizing measures, silt fencing and haybales, etc. The generic representation of the detail named "Typical Sediment and Erosion Control Plan For Residential Building Lot " is inadequate. Especially when this project doesn't require septic and gallery installations.

2) Drawing details and locations of equipment staging, refueling and hazardous materials storage with 125% spill containment capabilities need to be addressed in the Phase II requirement.

Road Construction Narrative Note:

"The maintenance of the detention basins will become the responsibility of the town when the roads are completed and accepted."

- If this is acceptable to the Town of Branford, the town should require the installation of suitable catchbasin designs prior to discharge to basins that will sequester solids and trap floatables within its chamber.

- Access for easy maintenance deserves careful consideration in their location and design.

- Adequate fencing to secure and screen these types of facilities should be considered and incorporated into the plan.

Wetland Delineation and Watercourse Mapping
Sheet 1 of 2

- The watercourse shown on the drawing appears to be inboard of the wetland flagging WF 2-6. The flagging should be shown on the east bank of the stream for accuracy.

Sideline buffers to adjacent properties.

- In a couple of building lots, proposed dwellings and driveways are within 10' and 20' of the property boundaries. Is there a standard sideline distance that is adhered to under P&Z? These lots are #1, 8 and 39.

Wildlife on site

In an effort to obtain an unbiased assessment regarding habitat for this parcel, I recommend that the Commission contact Peter Picone of the DEP Wildlife Division to investigate the mid and upslope environment. I suggest this because the area seems to have a suitable ecosystem to support the Eastern Box Turtle and serves as a refuge for a variety of birds and wildlife.

Open Space

In the past, many towns had open space turned over to the either town or a local land trust. More often than not this land was unusable wetlands and brownfields that had little value in the eyes of the builder. Currently, more townships are requiring a percentage of the usable land adjacent to these reserved wetlands to gain access for the public and preserve a larger area.

In this case, the parcel is limited with just over 11 acres in total, which provides little opportunity to gain open space with such an aggressive planned use of this land. Greater clustering of dwellings in a redesign and layout would provide for an increase in open space.

Alternate Subdivision Configuration
Figure 1: The increased open space and reduced residential footprint preserves the majority of the parcels physical attributes and habitat.

- Reduces the risk of property damage and mishaps from the use of extensive blasting.

- Stormwater management is reduced due the decline in impervious surfaces. Potential to use a Rain Garden for stormwater renovation and treatment with discharge to a adequately sized Level Spreader located outside the 50' wetland setback ultimately allows for infiltration and inflow to the stream. See Exhibit #3

- Traffic on Rt1 is not radically affected by pre and post construction activity.

- Preservation of most of the topographic characteristics maintains buffers and minimizes impacts to an already fragmented forest areas.

State Administered Programs

A general permit for the discharge of stormwater under the National Pollution Discharge Elimination System (NPDES) is required for Commercial and Construction Activities. This permit has three components to it. They are: 1) Registration with DEP, 2) A Stormwater Pollution Prevention Plan (SWPPP), and a Post Construction – 805 Solids Settling requirement. For further information on this program contact Christopher Stone of the CT DEP Permitting Enforcement and Remediation Division at (860) 424-3850.

The diminishing number of suitable building lots and parcels has prompted developers to entertain building on marginal land and land that is even beyond marginal. The extremely aggressive land use activity proposed for this project to attain building lots is quite expensive for the developer and intrusive to the surrounding neighborhood. In this situation, the standard approach to controlling E&S issues on top of these soils and bedrock may prove inadequate if not thought all the way through. This only becomes apparent after too much land has been adversely affected or destroyed, the structural integrity of dwellings has been compromised and habitats lost with no opportunity for recovery.

Should you or your Commission require any additional information please contact the District office.

Sincerely,

Roman S. Mrozinski, Executive Director
Southwest Conservation District

About the Team

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists and landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns within the King's Mark RC&D Area - *free of charge*.

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreation/open space projects.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision making. This is done through identifying the natural resource base of the site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the Team to enter the property for the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977.