

# Sherwood Acres Subdivision

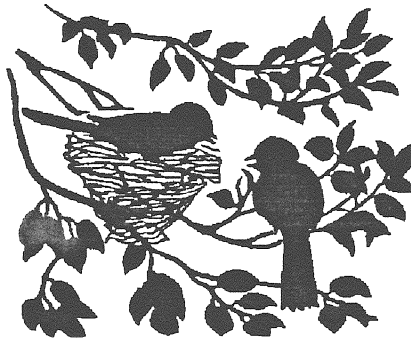
Cheshire, Connecticut

## King's Mark Environmental Review Team Report

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

# **Sherwood Acres Subdivision**

**Cheshire, Connecticut**



## **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 Wetland Commission and Planning and Zoning Commission  
Cheshire, Connecticut**

**August 2001**

**CT Environmental Review Teams  
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# Acknowledgments

This report is an outgrowth of a request from the Cheshire Environmental Commission to the New Haven County Soil and Water Conservation District (SWCD) and the King's Mark Resource Conservation and Development Area (RC&D) Executive Council for Environmental Review Team assistance. The request was approved and the project 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, May 8, 2001.

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I would also like to thank Mark Kasinskas, town environmental planner, Neil Grosberg, environmental commission member, and Jim Sakonchick, project engineer, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project along with location and soils maps. During the field review Team members were given plans and additional information. Some Team members unable to attend the field review made visits on their own or conducted a plan review, while other Team members made additional field visits to the area. 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 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 Cheshire Environmental Commission has requested assistance from the King's Mark Environmental Review Team in conducting a review of the proposed Sherwood Acres Subdivision.

The 62 acre site is located in Cheshire's north end in an R-40 (one acre residential). It is within the North Cheshire Aquifer Zone, and is bounded to the north and northeast by the Town of Southington and the Quinnipiac River and its associated riparian wetlands, I-691 to the south, a residential development to the west and State of Connecticut land to the east. The proposed subdivision will contain 47 single family house lots with individual on-site sewage disposal systems and public water supply. A road network is planned that will tie into the existing neighborhood roads at Birch Drive and Poplar Drive.

## **Objectives of the ERT Study**

The commission is requesting the review to assist them in their evaluation of this project. Specific concerns include soils, erosion and sediment control, stormwater management, river ecology, wetlands, hydrology, sewage disposal, and water quality. The ERT report provides a natural resource inventory, a discussion of impacts, and guidelines and recommendations for the mitigation and protection of natural resources.

## The ERT Process

Through the efforts of the environmental commission this environmental review and report was prepared for the Town of Cheshire.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the commission. 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, May 8, 2001. Some Team members made individual 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.

Figure 1.

## Location Map

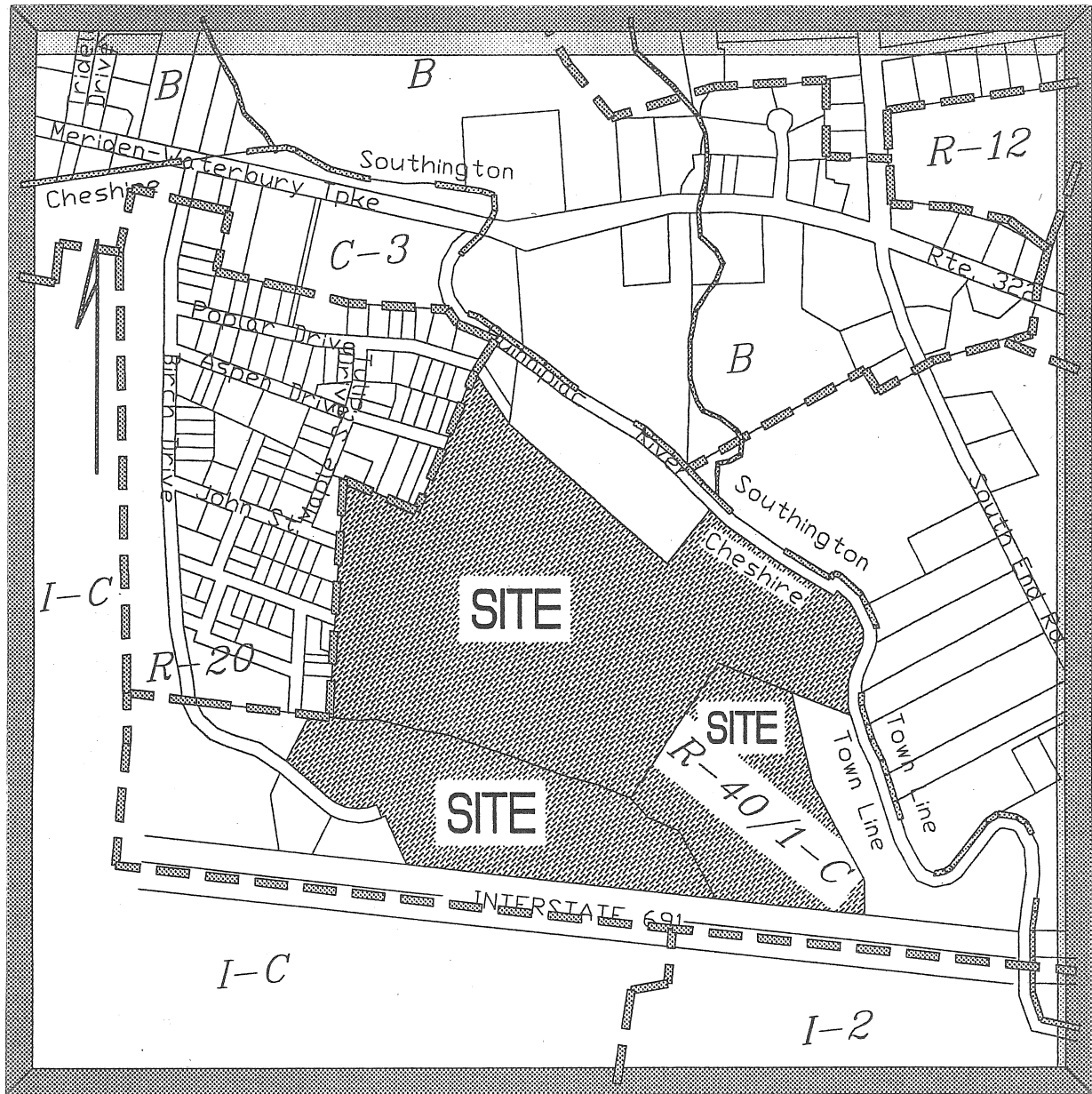
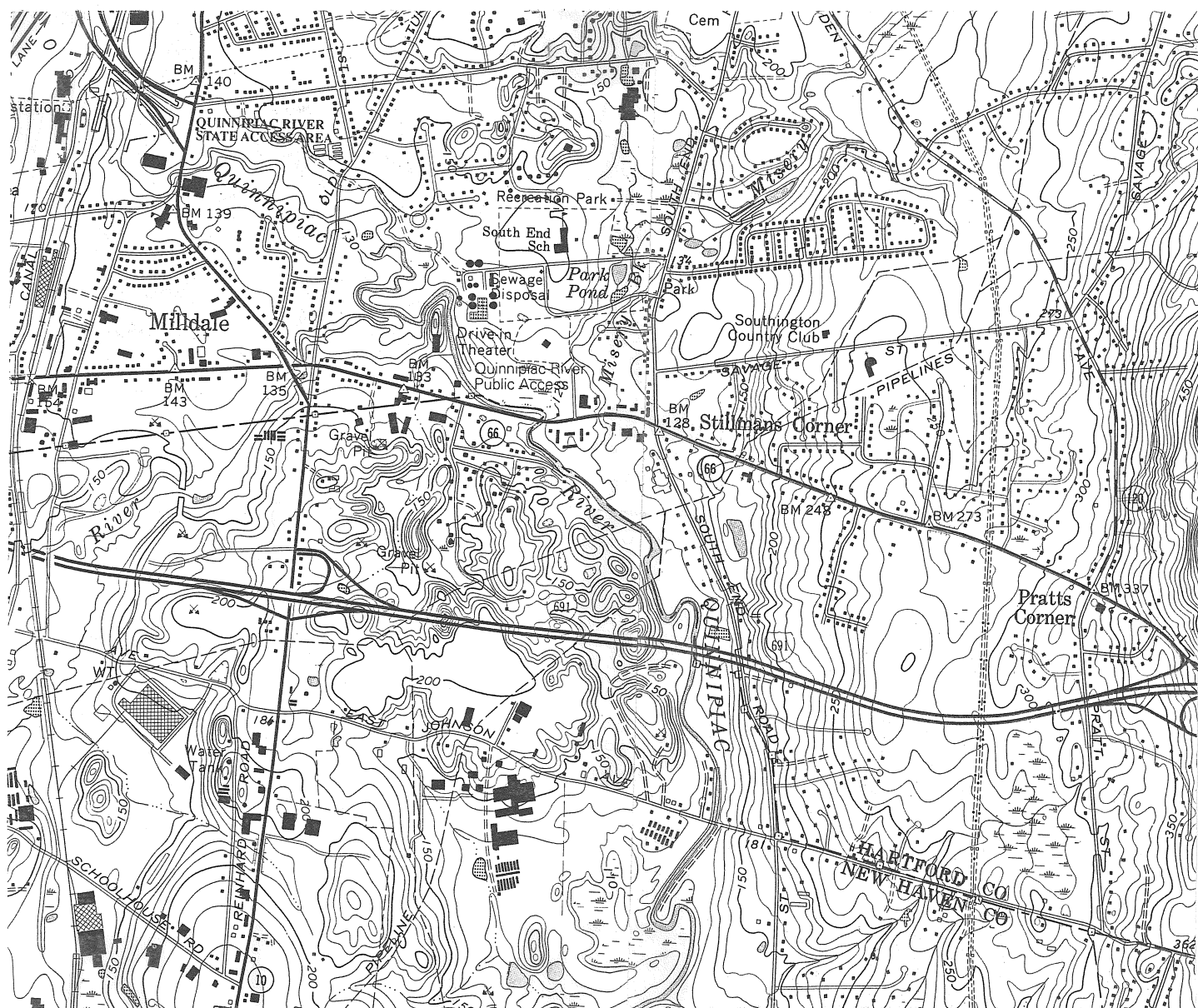
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Figure 2.

## Topographic Map

Scale 1" = 2000'



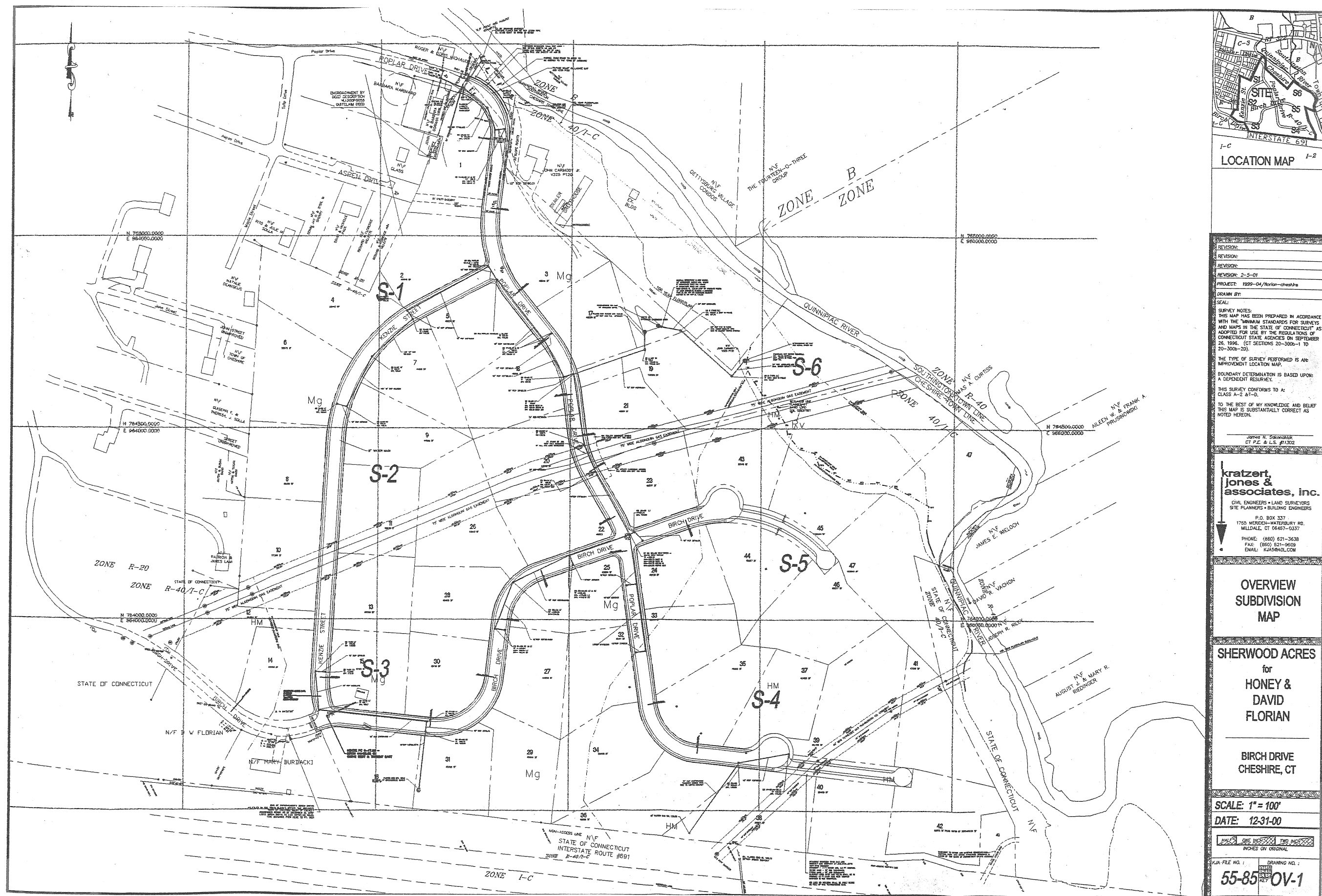


Figure 3.  
Overview Subdivision Map

## A Watershed Perspective

These recommendations to the Town of Cheshire are given from the perspective of improving water quality and maintaining and supporting designated uses of the waters of the State in accordance with Connecticut's Water Quality Standards<sup>1</sup>. These recommendations also reflect the DEP's growing commitment to address water quality concerns from a watershed perspective, taking into account the cumulative impact of numerous activities within a given watershed which may effect water quality.

The following recommendations may overlap with those of other ERT members who are dealing with more specialized aspects of the review (i.e. - aquatic habitat, historical/archaeological significance, wetlands, stormwater, erosion and sedimentation control, etc.). In such cases, these recommendations are meant to support or supplement these specialized reviews, not to supplant them.

### **Proposed Project**

The Sherwood Acres Subdivision is 62 acres in size and is located in the Town of Cheshire's north end in an R-40 zone (1 acre - residential). It lies within the North Cheshire Aquifer Zone, and is bounded to the east in part by the Quinnipiac River and its associated riparian wetlands. The proposed subdivision will contain 47 single-family homes with on-site septic systems, public water, associated roadways and drainage.

### **Issues**

The Town of Cheshire's land use commissions are concerned that the proposed development of this site may adversely affect the South Central Regional Water

Authority's groundwater supply as a result of residential applications of lawn and garden fertilizers and pesticides or from the proposed on-site septic systems. They are also concerned with the erodibility of the soils and question whether any special controls need to be in place during the project's construction. In addition to these issues, will the stormwater runoff generated from this new development adversely affect the River and riparian wetlands?

## Site Morphology

This site is located over glacial lake deposits of sand and gravel overlying sand within the Quinnipiac River subregional drainage basin, number 5200. The soils on site are primarily excessively drained, gravelly sandy loam with moderate to extreme topography. Due to the steepness and droughtiness of the soil, site stabilization may be quite difficult. In order to minimize erosion and sedimentation during and after construction, use of an appropriate seed mix specifically selected based on the site's soil moisture conditions and adequate amounts of mulch is recommended. Application rates for seed and mulch are prescribed by the Connecticut Guidelines for Soil Erosion and Sediment Control<sup>2</sup>, but the Soil and Water Conservation District or the USDA Natural Resources Conservation Service (NRCS) may have more current information on the various seed mixes and mulches which are now available. *Note:* avoid seed mixes containing Reed Canary grass, an invasive species.

Temporary sedimentation basins and other stormwater control structures (i.e. siltation fence and staked hay or straw bales) should be inspected and maintained weekly, and within 24 hours of receiving a 0.1" or greater rainfall event.



## Water Quality Classifications

The surface water quality designation for the Quinnipiac River which borders the site and to which stormwater will be discharged is Class C with a goal of Class B. This means that although the water quality designation is Class C, the water resource is managed to the standards of Class B; maintaining Class C water quality is unacceptable. Class B surface waters have the following designated uses: recreational use; fish and wildlife habitat; agricultural and industrial supply and other legitimate uses including navigation. Class C water quality classification denotes that one or more of the Water Quality Criteria for Class B waters are not currently being consistently achieved. Class C water quality results from conditions which are usually correctable through implementation of established water quality best management programs to control point and nonpoint sources of pollution. The water quality data gathered through stream monitoring indicate that this segment of the Quinnipiac River lacks pollution-sensitive benthic organisms (indicating impaired water quality) and does not support primary contact (i.e. fishable/swimmable) in part due to high levels of indicator bacteria which may be caused by stormwater runoff, waterfowl, human sewage and unknown sources. Other causes of impairment include the presence of PCBs, metals, mercury (a state-wide fish consumption advisory is in effect due to atmospheric deposition), and pathogens.

The groundwater quality designation is Class GA with the following designated uses: existing private and potential public or private supplies of water suitable for drinking without treatment; baseflow for hydraulically - connected surface water bodies (e.g. Quinnipiac River). This area is located within the North Cheshire Aquifer Zone, the source of supply for the South Central Regional Water Authority. It should be noted that the particular soils on site exhibit rapid to very rapid permeability and that caution should be taken in the design and installation of the septic systems to prevent groundwater pollution.

## Stormwater

The proposed project is a typical 1-acre subdivision with an expansive, phased roadway network to support the storm drainage collection system. There are three discharge locations: two to an existing drainage swale located at the base of the embankment for Interstate Route 691, and a third combined with an existing, severely eroded outfall to the Quinnipiac River. A majority of the collected storm drainage will be directed to an infiltration basin. Any overflow will be discharged through the system directly to the river. As discussed at the Town Hall preceding the field walk, the infiltration basin's effectiveness over time could diminish as a result of the soil voids becoming clogged with sediments, even with periodic maintenance. It was suggested that the basin design be modified to dually provide water quality renovation to improve the water quality prior to being discharged off-site. Various treatment methods include nutrient uptake by hydrophytic vegetation, biodegradation of pollutants by microbial activity, and sediment trapping and filtration by organic or synthetic materials and vegetation. However, more fundamental than modifying the design of the infiltration basin to improve water quality is the utilization of the permeable soils on site to promote infiltration, and thereby reduce the amount of stormwater runoff that requires treatment.

Percolated through the ground, stormwater is filtered by the soil, stored, and gradually released to the river via the hydraulic connection through the river bed. This slow rate of release benefits the riverine system by moderating fluctuations in the water surface elevation of the river as well as stream temperatures. Discharging stormwater runoff to the river can have a deleterious effect on the riverine system well beyond just the point of discharge. These effects include: increased bank erosion and sedimentation of the channel caused by the volume and velocity of the discharge; settling out of suspended sediments carried or eroded by the discharge which can destroy benthic habitat, thereby

impacting the food chain for fish and wildlife; discharge of excess nutrients from lawn fertilizers and pet wastes which can cause excessive algal growth, depleting oxygen from the water and stressing or suffocating aquatic life; discharge of other contaminants such as automobile oils and fluids, vehicle and tire wear, pesticides, and atmospheric deposition of air-borne pollutants which can adversely affect the aquatic ecosystem; impacts to the aquatic biota due to stress caused by the increased temperature of the stormwater runoff; and exacerbation of the general cumulative effect of stormwater discharges basin wide which can alter stream morphology and dynamics, leading to increased flooding, erosion, and degraded riverine systems.

By itself, the effect of stormwater runoff from the proposed subdivision to the Quinnipiac River may seem insignificant. However, the contribution from this site should be viewed with regard to the collective impact of all other land use activities within the watershed. From this perspective, treating and reducing runoff from all developed sites throughout the region will help to minimize surface water pollution and flooding problems caused by storm events.

The subdivision's conventional 1-acre layout maximizes the number of house lots which increases the amount of impervious surface and consequently, increases the amount of stormwater runoff and promotes lawn maintenance applications of fertilizers and pesticides. As an alternative, "cluster" housing can typically accommodate the same number of homes on smaller lots while providing large, communal open space that may then be used as a playground, park, or walking/hiking trail, etc., resulting in less stormwater runoff, reduced roadway and infiltration basin maintenance, minimal lawn maintenance, preservation of wildlife habitat and open space, as well as retaining groundwater infiltration, thereby further reducing the impacts associated with stormwater runoff.

The roadways themselves seem unnecessarily wide with 30' of pavement, curbing and sidewalks on both sides. The CT DOT standard width of pavement for secondary roads is only 24' with 10' travel lanes and 2' shoulders. This subdivision comes off of side (tertiary) streets which range in width from 26' to 16', therefore the need to construct the subdivision roads wider than the streets that lead into the subdivision seems tenuous. Additionally, it is not necessary to have sidewalks on both sides of the street, or even at all, unless there is an attraction nearby such as a school, playing fields, or park. This extra pavement further increases imperviousness and decreases on-site infiltration.

Also, it may not be necessary to completely pave the interior of the cul-de-sacs. Emergency vehicles and snow removal equipment turning radii have been adequately addressed in other communities with modified cul-de-sacs designed with a depressed and pervious (unpaved) center. The center of the cul-de-sac can then serve as an effective treatment for stormwater runoff before percolating into the ground. A demonstration of this alternative design can be viewed at the Glen Brook Green Subdivision, located in the Jordan Brook sub-watershed in Waterford.

And finally, in lieu of curbing which is designed to collect and direct stormwater runoff, road sands and pollutants to the storm drainage collection system, it would be less expensive and more prudent to use sheetflow and vegetated drainage swales to promote groundwater infiltration; thereby replenishing groundwater supplies and reducing the cost of road construction and maintenance, including seasonal street sweeping, catch basin cleaning, and maintenance for the infiltration basin.

In general, residential use poses minimal, but relatively more dispersed sources of pollution, such as household waste and lawn maintenance. A proactive approach to addressing these threats would be for the Town of Cheshire to provide the homeowners with information on residential Best Management

Practices; much of which is readily available from the UConn-Cooperative Extension System's Home-A-Syst Program. On a broader scale, the Town may also suggest other design alternatives which would further reduce nonpoint source pollution, such as using gravel or pavers for driveways. The University of Connecticut Cooperative Extension System (UConn/CES) with funding support from CT DEP administers a program, Non-Point Education for Municipal Officials (NEMO), whose purpose is to educate municipal land use decision makers about the connection between land use and water quality, and provide them with technical information on how to reduce the environmental impacts of new development. Particular emphasis is placed on topics regarding impervious surfaces and on-site recharge. NEMO can be contacted at: NEMO, UConn Cooperative Extension System, 1066 Saybrook Road, Box 70, Haddam, CT 06438-0070; Phone: (860) 345-45 11; <http://www.nemo.uconn.edu/default.htm>.

## **Wetlands and Water Resources**

The subdivision plans show a 100' buffer from the wetlands edge and indicates that no regulated activity may occur without a permit. The DEP supports and recommends the use of buffers to protect wetlands and watercourses from environmental impacts. Buffers trap road sands, contaminants and other pollutants contained in stormwater runoff generated from roadways, parking lots, roof tops, and other impervious surfaces, as well as eroded sediments occurring from natural scour or land moving activities such as site development and other soil disturbances, including farming activities. The importance of forested streamside buffers has been well documented in the scientific literature. In addition to the benefits described above, these riparian buffers also help moderate the temperature of stormwater runoff before it enters the watercourse, thereby reducing thermal impacts on aquatic wildlife. Riparian wetlands may additionally provide valuable wildlife habitat, flood attenuation, water quality

renovation, and groundwater recharge, so it is important to protect these areas from degradation. Leaving a vegetated strip around surface water resources, including wetlands helps protect surface and groundwater quality, and fish and wildlife habitats from nonpoint source pollution.

To protect riparian buffers from noise, human encroachment, and other development impacts, including stormwater runoff, the CT DEP Fisheries Division recommends a 100 foot buffer zone along perennial streams, and a 50 foot buffer zone along intermittent streams<sup>3</sup> measured from the outer edge of any riparian wetlands. DEP Fisheries further recommends that this buffer zone remain in a naturally vegetated and undisturbed condition. If existing buffers at the site do not meet these criteria, consider providing native plantings to enhance or extend the buffer zones and/or adopting a no-mow zone to allow these areas to revegetate naturally. The USDA Natural Resources Conservation Service also has developed guidelines for planning and installing riparian buffers. For more information, contact USDA - NRCS Wallingford Service Center, North Farms Executive Park, 900 Northrop Road, Suite A, Wallingford, CT 06492, or call Tom Ladny at (203) 269-7509.

Rather than simply informing the property owner of his/her obligation to obtain a permit, it would be more prudent to place the buffer zone in conservation easement in favor of the Town of Cheshire or perhaps the local land trust by way of a deed restriction which specifically identifies what activities (if any) are to be allowed within this area. Additionally, Lot 45 has only a 60' buffer. For the sake of consistency, both for the protection of the wetlands and watercourse, and for compliance among neighbors, the 100' buffer should remain uniformly in effect which may mean omitting Lot 45 from site development.

## Recommendations

To summarize, major considerations to ensure minimal impact with the current subdivision design are:

- redesign infiltration basin to provide water quality renovation;
- select appropriate seed and mulch to quickly stabilize disturbed sites;
- increase groundwater infiltration by eliminating road curbing and allowing for sheetflow, construction of vegetated drainage swales, reducing road width, minimizing sidewalk coverage, designing cul-de-sacs with a pervious center, and promoting pervious driveways;
- placing 100' wetlands buffer in conservation easement, and omit Lot 45 if unable to maintain 100' buffer.

As an additional consideration, choosing innovative approaches which minimize land disturbance and preserve natural buffers and open space (like cluster housing) not only minimize nonpoint source pollution and protect the environment, but also reduce infrastructure costs while affording neighborhoods opportunities to stay connected with their environment. In this new age of "Smart Growth", greenways, environmental equity, and better land use planning, it is incumbent upon the town to consider and address all of the impacts associated with new development.

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<sup>1</sup> State of Connecticut, Department of Environmental Protection. Effective 1996 & 1997. Water Quality Standards. Bureau of Water Management - Planning and Standards Division. Hartford, CT.

<sup>2</sup> The Connecticut Council on Soil and Water Conservation. January 1985 (Revised January 1988). Connecticut Guidelines for Soil Erosion and Sediment Control.

<sup>3</sup> CT DEP Fisheries Division. 1991. Policy Statement - Riparian Corridor Protection; Position Statement - Utilization of 100 Foot Buffer Zones to Protect Riparian Areas in Connecticut.

# Wetland Review

## Wetland Description

The Sherwood Acres subdivision is located in the northeast corner of Cheshire along the Quinnipiac River. Here the river is the boundary that separates Cheshire from Southington. The parcel is 62.4 acres in size of which approximately 5 acres are wetland soils. All of this wetland soil abuts the Quinnipiac River.

The wetland soils are Quinnipiac River floodplain soils. The floodplain constitutes the largest and only wetland on this property. The balance of the site, or approximately 57.4 acres, is situated on sand and gravel. The result of this well drained setting is that there are no other wetland areas present away from the river.

Notable on this floodplain, however, is an isolated wetland that has the potential to be a vernal pool. cursory inspection showed some typical vernal pool characteristics: no inlet, no outlet, wet in spring (the field visit was in May), and shallow enough in depth to potentially dry out in warmer summer months thereby negating any fish populations predators to vernal pool breeders.

Although there has been no long term observation report available for this area of concern, consideration has been given to it regarding its vernal pool potential (this in the form of rerouting stormwater discharge away from the area and back to the Poplar Drive discharge point; and, subsequent to the ERT site walk, the denial of lots 19 and 43 pending further investigation).



If in fact this depression in the landscape is truly vernal, i.e.: supporting diverse obligate seasonal water based wildlife, then consideration should be given to the ranges of the amphibian wildlife that use the pool. After breeding in the vernal pools, amphibians migrate into the surrounding uplands and live out their adult phase returning to the pool in spring to breed. Ranges of migration distances vary by species from 200 to over 700 feet with an average in between. For these reasons, the wetlands commission has done well to limit activity on the surrounding lots pending further investigation.

The parcel for the most part slopes towards the river; that is, from the higher ground on the southwest down to the northeast. Except for a small area along the southern border of the parcel which has its runoff to the south along I-691, runoff that does not infiltrate the generally sandy and sandy/gravelly soils drains in the direction of the river.

The groundwater infiltration from the floodplain wetland, and from most of the parcel, since it is so well drained, serves to recharge the Quinnipiac River.

## **Wetland Assessment**

The Quinnipiac River floodplain is dominated by red maples with a scrub shrub understory, typical vegetation of this alluvial/floodplain position on the landscape. The U.S. Fish and Wildlife Service has mapped the area on its Southington and Meriden National Wetland Inventory maps. These maps describe the area as PFO1C. This is Palustrine (P), the most common type of wetland in Connecticut, (FO) Forested, (I) broad leafed deciduous, and (C) seasonally saturated.

The soils were described and delineated by David Lord, soil scientist, and are mapped as Pv and Rv, classified as Pootatuck (formerly Podunk) Variant silt

loam and Rumney (formerly Rippowam) Variant fine sandy loam. Both are nearly level soils occurring over stratified sands and silts on flood plains of the major streams and their tributaries.

Surface water quality of the Quinnipiac River as it passes the site is C/B and ground water quality of the site is C/B. This indicates both a surface and ground water classification of C with the intended goal of upgrading to B.

Class B water has as designated uses: recreational use: fish and wildlife habitat; agricultural and industrial supply and other legitimate uses including navigation. Discharge restricted to: same as allowed in A and cooling waters, discharges from industrial and municipal wastewater treatment facilities (providing Best Available Treatment and Best Management Practices are applied), and other discharges subject to the provisions of section 22a-430 CGS.

Class C water: Indicates unacceptable quality, the goal is Class B or Class A. Designated uses: same as for B. One or more of the Class B uses is not fully supported due to problems that can and will be corrected by normal DEP programs. A good example is the intermittent water quality problems caused by combined sewer overflows. Discharges restricted to: same as for classes B or A.

Source: *Protection Summary of the Water Quality Standards and Classifications*  
Connecticut Department of Environmental Protection.

## Potential Problems/ Impacts to Wetlands

- *Sediment Control* - Because of the single location of wetlands on the landscape and the general adherence to the 100 foot wetland buffer, the greatest potential problem as construction on this property begins, is related to erosion during construction. However, the erosion and sediment control

concerns as they effect the wetlands during construction seem to have been met through the use of a sediment basin. This structure will become the site's stormwater detention basin upon completion of the project. A failure of this could lead to sediment problems.

- *Buffer/Setback* - The only inconsistency to the 100 foot wetland buffer occurred at lot 45 where the buffer was reduced to 60 feet to accommodate a structure. Subsequent to the ERT field walk, the town Wetlands Commission voted to deny lot 45 for the lack of 100 foot buffer. As mentioned above, the commission also denied lots 19 and 43 for insufficient information about the potential vernal pool at the rear (east-north-east) on lot 19.

Because of the plans' adherence to the buffer/setback, the riparian area for the Quinnipiac River is well protected. The 100 foot buffer provides the river with good protection from sediments and attached contaminants, most dissolved nutrients and pesticides. In addition, 100 feet is often the minimum width requested by the DEP Fisheries Division.

It should be noted that if further investigation confirms the shallow depression wetland to be an active vernal pool, with no inlet or outlet, it is important to recognize that the pool relies on groundwater and surface water runoff for its hydrology. It is therefore recommended that awareness be heightened when considering the grading elevations for any future abutting lots.

- *Groundwater Recharge* - The increase in impervious surfaces from the build out will effect groundwater recharge on storms greater than the 10 year event. Due to the nature of the water quality of the river any recharge would benefit from the filtering influence it would obtain as it passes through these

subsurface sands and silts. Minimizing the runoff on site would be a good starting point at optimizing these effects.

## Suggestions/Considerations

- Overall the plan of development does a good job of avoiding direct impacts in wetlands and floodplain where no structures, septic leaching fields, or grading are proposed.

The change in impervious surface from pre-construction to post construction will be the largest change to the water regime on the site. Before construction, precipitation has a high potential for infiltration and groundwater recharge. Infiltrating water feeds the Quinnipiac and is filtered by the sands and silts on its underground path to the river.

However, the completed subdivision will add impervious cover to the land. Runoff from storms exceeding the 10 year flood event will rapidly be directed from the detention basin to the site's stormwater discharge point without the time delay benefit of infiltration.

Considerations to increase infiltration and reduce impermeable surface can be as straightforward as:

- ⇒ vegetating interior circles of the two proposed cul-de-sacs,
- ⇒ considering sidewalks on just one side of the street, and/or
- ⇒ narrowing the width of the road.

Traditionally, road width in many communities is a point not up for compromise, mostly for reasons of safety. But over the course of the last several years discussions and new studies have altered some traditional

thought, especially in low density developments such as this proposal represents. Along these lines, and for reasons of reducing impermeable surface, the Connecticut Nonpoint Education for Municipal Officials project - NEMO - cites a traffic study<sup>1</sup> in one of its technical papers. The study states that: "... as the street widens accidents per mile per year increase exponentially", and that "...the group of streets with the safest results occur between 22 and 30 feet in curb face width." While narrower streets may not fit with the town's minimum width regulations, certainly the consideration of any width reduction from thirty feet would seem to yield advantages of permeable surface with no compromise in traffic safety.

- Awareness and maintenance of the 100 foot wetland buffer by the homeowner should be insured for the long term by recording its presence on deeds as likely these will be used as yard space over the long term.

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<sup>1</sup> The report, authored by Dan Painter, which actually states that residential road widths of 24 feet are the safest, can be reviewed at <http://members.aol.com/Phswi/Swift-street.html> .

# Stormwater Management

The project proposed is a 62 acre, 47 lot subdivision with access from Birch Drive and Poplar Drive. The lots will be served by town water and drainage systems and on-site septic systems. Approximately 35 acres will be disturbed by construction. The plans state that no wetlands will be disturbed. The site is bordered by the Quinnipiac River and its wetlands to the north and east, Interstate 691 to the south and an existing residential subdivision to the west. Most of the existing drainage pattern for the site flows toward the Quinnipiac River, though the southern portion drains to I-691 right-of-way and under the highway through an existing culvert. The site topography ranges from grades of 2% to 50% with considerable portions of the site consisting of slopes of 20% or greater.

All lots will front on a proposed network of newly constructed roads, primarily extensions of the existing Birch and Poplar Drives. Some of the proposed drainage system consists of an extension to the Poplar Drive system.

Approximately 4 acres of drainage area and 3 catch basins will be added to this existing outfall. This outfall discharges directly to the Quinnipiac River. The majority of the remaining developed land will drain through a proposed stormwater system to a detention/sedimentation basin behind Lot 17.

Approximately 5.5 acres along the south side of the site will drain to the existing swale along I-691. Most developed land drains to these discharge areas. Some runoff from developed land and much runoff from undeveloped land is not collected in the proposed drainage system and will flow overland by sheet flow.

No full design plans were received. A stormwater management plan was submitted outlining the basics of erosion and sedimentation control for the site. However, a full erosion and sediment control plan must be submitted with the

registration for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities addressing all the issues of that general permit. Because of the size and slopes of this site, particular care must be taken in the design. The construction should be phased, where possible, to minimize the area of soil exposure at any given time. Gravel dam and haybale reinforcement of the silt fence should be considered in areas where length, steepness or area of slope present the possibility of high flows or concentrated flows. To prevent, as much as possible, the transport of sediment on the site, gravel and silt fence check dams may also be provided along the roadway shoulders and any diversion swales. Catch basins must also be protected during construction.

The general permit requires that sedimentation storage be provided for drainage areas greater than 2 acres during construction. The detention/sediment basin may serve in this capacity but details should be included on the plans indicating how drainage will be directed to this basin during construction and that adequate capacity is available. A detail of the sedimentation outlet structure must also be provided. A maintenance plan must be developed for this basin both during construction and for long-term post-construction operation. An energy dissipator should be shown at the drainage outlet to the I-691 right-of way at the southeast corner of the site. The existing outfall for the Poplar Drive drainage system needs to be reconstructed and a proper energy dissipator provided.

There are areas of slopes throughout the site that are particularly steep. The Guidelines for Soil Erosion and Sediment Control specify that reverse slope benches must be provided for all slopes steeper than 5 to 1 and higher than 5 feet. There are no slope benches indicated on the submitted plans. Special slope stabilization measures will also be necessary for the cut and fill slopes required to build houses, driveways and roads. These should all be indicated on the plans. The use of erosion control matting will probably be necessary on these slopes. A

schedule of construction and maintenance of the slopes should be provided including procedures for stabilizing the site and its slopes for the winter.

One way to reduce the impact of stormwater discharges is to reduce the discharge themselves. The town and applicant may want to investigate means of reducing runoff from the site. This could involve the elimination of curbing for portions of the roadway system, allowing sheet flow to disperse and infiltrate rather than discharge to the drainage system. One means of reducing runoff has already been employed by segregating and infiltrating roof runoff.

A registration for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities must be submitted at least 30 days prior to the start of construction. A Stormwater Pollution Control Plan must also be prepared and submitted at the same time because this site will disturb over 10 acres total. In general, erosion and sediment control measures utilized must be appropriate for a site of varying grades adjacent to a sensitive wetland and watercourse. Construction sedimentation basins or swales shall have a capacity of at least 134 cubic yards per acre drained. The detention/sedimentation basin may serve this function during construction as long as construction runoff can be directed to it. Otherwise, construction sedimentation basins will be required around the site to meet this requirement. Disturbed areas to be left bare for over 30 days will receive temporary seeding or heavy mulch. All disturbed areas must be seeded as soon as possible. No areas may be left bare by the end of the planting season. Care must be taken to properly stabilize seeded areas with mulch and/or geotextiles. This site will require considerable care in its design, construction and stabilization. However, properly constructed and maintained, the site should have minimal impact on the adjacent wetlands and watercourses.



# Soil and Water Conservation

## District Review

### **Soils Resources**

The tract of land is a 62 acre site located in the NNE corner of Cheshire. The site is bounded by I-691 to the south, the Quinnipiac River and State of CT land along its E/NNE borders and a low to medium density residential neighborhood to the west. The proposed subdivision plan involves 47 single family residences with an extension of Poplar and Birch Drive throughout the site. The information submitted in this report is based on the soil series descriptions and the mapping units descriptions which reflect the current soils mapping presented in the 1979 USDA Soil Survey of New Haven County and on field observations.

The site can be found on sheet #7 of the New Haven County Soil Survey.

### Mapping Units

#### Wetland Soils

1) Rv - Rumney Variant silt loam. Nearly level with slopes 0 to 3 percent, poorly drained soil on lower flood plain on rivers, major streams and their tributaries.

From late Fall to mid-Spring, this soil has a seasonal high watertable at a depth of 8 inches. Permeability is moderate in the surface layer and subsoil

and rapid or very rapid in the substratum. Runoff is slow. Subject to ponding for several weeks during winter.

This soil has a **poor potential** for community development. Limitations are due to the hazard of flooding and the seasonal high watertable. Difficulty in excavating this soil due to inflow of water table and instability of steep slopes. Septic and tank absorption fields will not perform adequately in this soil and the potential contamination of ground water from septic is high.

**2) Pv - Podunk Variant silt loam.** Nearly level 0 to 3 percent slopes, poorly drained soil is on lower flood plains of rivers, major streams and tributaries. Seasonal high watertable depth of 8 inches from late fall through spring and is subject to frequent flooding. Permeability is moderate in the surface layer and subsoil. Substratum permeability is rapid to very rapid. Runoff is slow. Ponding occurs during the winter.

Community development potential is poor. Limited mainly by the seasonal high watertable and flooding hazard. Saturated condition of the soil adversely effects the performance of septic systems.

### **Non Wetland Soils**

**1) HME - Hinckley and Manchester soils, 15 to 35 percent slopes.** This mapping unit consists of moderately steep to steep, excessively drained soils on outwash terraces. The soils have rapid permeability in the surface layer and subsoil and very rapid permeability in the substratum. Runoff is rapid. Soil water capacity is low and levels of acidity range from medium to very strongly acid.

The **potential for community development is poor** due to steep slopes and the instability of excavation side walls. The use of septic tank absorption fields

in this soil require carefully designed systems with particular attention paid to installation practices to insure that effluent breakouts do not occur downslope from the leaching system. Special care on the design and installation must be taken to prevent contamination of the ground water due to the very rapid permeability of the substratum.

**Erosion hazard in these soils is severe.** These soils should be kept in permanent vegetation. If disturbed, site activity should be kept to a minimum and employ intensive conservation measures to prevent excessive runoff, erosion and sedimentation during the construction period.

- Conservation measures to reduce erosion threats are necessary for all of these soils, but the severe erosion hazard increases with the increase in the C & E slope areas. Lots raising these concerns are as follow: #'s 3 through 47.

**2) MgC - Manchester gravely sandy loam, 8 to 15 percent slopes.** This is a sloping excessively drained soil on outwash terraces of stream valleys. The same concerns apply to this soil as noted in the aforementioned soil.

This soil has a fair potential for community development. It is limited mainly by steepness of slopes and its droughtiness. The minimization of land disturbance and reduction of landscaped areas is important to limit application of pesticides, fertilizers and herbicides which can readily be introduced to the ground water regime. Irrigation and sprinkling systems should be employed to conserve water and maintain viability of landscape materials. Permeability is rapid in the surface layer and subsoil and very rapid in the substratum.

**3) BoA - Branford silt loam, 0 to 3 percent slopes.** Nearly level, well drained soil on broad outwash terraces and narrow stream valleys. Permeability is

moderate to moderately rapid in the surface layer and subsoil and very rapid in the in the substratum.

This soil has a **good potential for community development**. Waste disposal systems will function satisfactorily with normal design and installation. The very rapid permeability in the substratum raises concern for adequate design of the system to prevent contamination of ground water.

This information applies to lots #40 and #42. Issues siting these lots revolve around the following:

- Lot #40 - No septic system shown contained on the lot. Need to locate.
- Lot #42 - 2 systems are shown but placement of the more easterly system has a State of CT access road over the top of it. The other system probably belongs on Lot #40.

## **Siting Concerns/Alternate Subdivision Configuration**

### **Road System**

Access to the subdivision through Poplar Drive could be better served by rerouting the road system through Aspen Drive over the already proposed utility easement and enlarging and enhancing the capabilities of the proposed stormwater detention to a multi-cell detention basin with greater stormwater renovation capabilities.

- This reduces the amount of impervious surface by approximately 200' along with added utilities and stormwater infrastructure.
- Eliminates unnecessary work in close proximity to the Quinnipiac River, such as the proposed 125' retaining wall, loss of several significant Beech trees and the general disturbance of a somewhat stabilized buffer.

- Reduced risk of direct introduction of hazardous waste spills adjacent and into the Quinnipiac River associated with increased traffic, accidents and risk of delivered heating fuel oils to residences.
- Enhanced line of sight and reduced potential for accidents on a fairly sharp curve.

### **Stormwater Renovation / Conveyance**

- Eliminates additional direct stormwater discharge and its associated NPS pollutants to the Quinnipiac River from this type of land use and reduces potential risks with this intense construction activity on these highly erodible soils.
- Enhanced detention basin which would handle all increased runoff from the proposed development and provide a higher level of treatment regarding raw water quality should be employed.
- The aforementioned attributes of the soils on site may offer an opportunity to soft side the road system, reduce concentrated flows and direct discharges, allow for greater infiltration and recharge while eliminating costs and maintenance of added stormwater infrastructure.

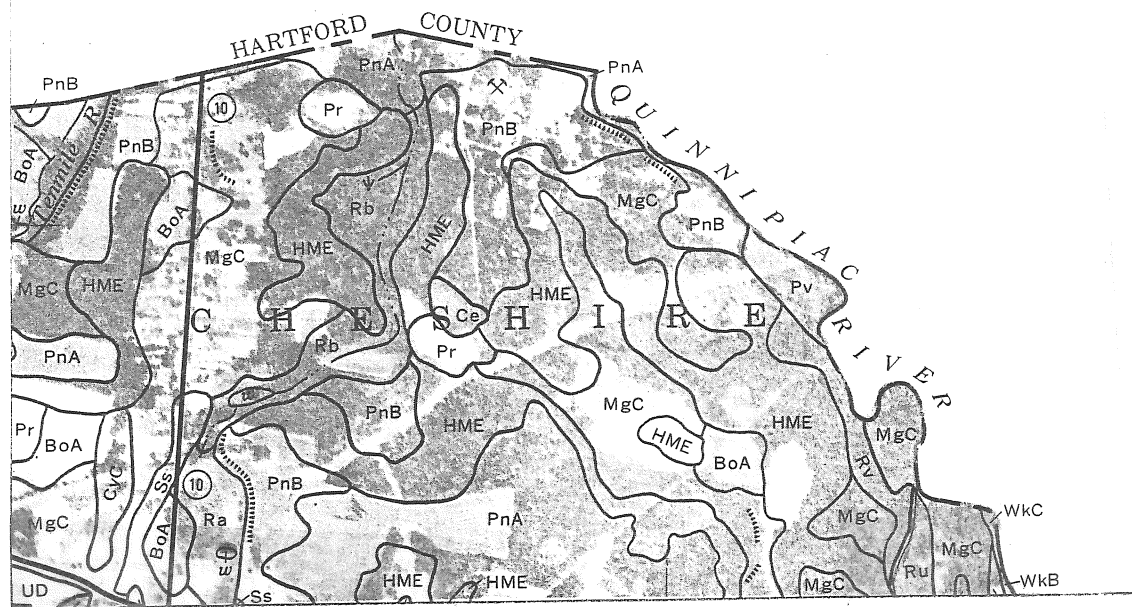
The Quinnipiac River is a high priority watercourse whose water quality had diminished over several decades. Only in recent years has it made strides in improving its raw water quality. Through reasonable and responsible development balanced by a conscious effort to preserve and protect our natural resources can we seek opportunities to maintain and possibly enhance this waterbody. This is one opportunity we should not miss.

Figure 4.

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N

## Soils Map

Scale 1" = 1320'



# 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 two State Listed plant species that have been historically reported from the general vicinity of the proposed project. Both plants are listed as State Species of Special Concern (R.C.S.A. Sec. 26-306), and were last documented from the turn of the the last century. *Carex tuckermanii*, a sedge, was collected from "wet alluvial ground, banks of the Quinnipiac River"; *Hemicarpha micrantha*, Dwarf bulrush, was collected from the "Quinnipiac River at Clark's Shop". This species is typically found growing on moist sandy soil. It is recommended that suitable habitat within the project area should be identified and searched by a botanist familiar with these species. Surveys to determine if the state listed species are present should be conducted in July/August when the species are identifiable.

A report summarizing the results of the botanical surveys should be sent to Nancy Murry, DEP-G&NHS, NDDB. The report should include habitat descriptions, with a general map of habitats, vascular plant species list and a statement listing the botanist qualifications.

Our records also indicated that the Quinnipiac River is an important riparian habitat for State Special Concern *Clemmys insculpa* (Wood turtle). Wood turtles require riparian habitats bordered by flood plains, woodlands or meadows. Their summer habitat includes pastures, old fields, woodlands, power line cuts and railroad beds bordering or adjacent to streams and rivers. They hibernate submerged in tangled tree roots along the river banks or in deep pools from November 1 to April 1. This species has been negatively impacted by the loss of suitable habitat.

Please be advised that the Wildlife Division has not made a field inspection nor have they seen detailed timetables for work to be done. The time of year when this work will take place will affect these species if they are present on the site when construction is scheduled. It is suggested that any work be done during the species' dormant period which is November to April. Consultation with the Wildlife Division should not be substituted for site specific surveys that may be required for environmental assessments.

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.

If you have further questions concerning the Natural Diversity Data Base please call (860) 424-3592 or the Wildlife Division at (860) 642-7239.



# Aquatic Resources

*(Note: The Team fisheries biologist reviewed this proposal at the request of the Cheshire Inland Wetlands Commission and submitted a letter to them dated March 22, 2001 (see Appendix). His field review was conducted on March 8, 2001. This section is based on that field review and letter.)*

## Site Description

The 47 lot Sherwood Acres residential subdivision is proposed for development on a 62.3 acre parcel located easterly along a 2000 + foot reach of the Quinnipiac River. Through this reach, the river is contained in a channel which is roughly 75 feet in top of bank width and has flow depths of 2.5 feet. The low to moderate grade channel creates surface flow predominated by moving pool interspersed by riffle. Stream substrate is composed of cobble, gravel, coarse sand, and sand-silt fines.

Despite extensive development in the watershed, a somewhat narrow yet dense band of hardwoods and woody shrubs predominate as riparian vegetation thereby providing the Quinnipiac River with a near shore canopy cover. Physical in-stream habitat is provided by the water depth in pools, undercut banks, and fallen or overhanging riparian vegetation.

Point and non-point discharges coupled with consumptive and non-consumptive water diversion associated with extensive watershed development have impacted Quinnipiac River water quality. The Department of Environmental Protection classifies the Quinnipiac River mainstem within the bounds of the proposed Sherwood Acres residential subdivision as *Class C/B* surface waters. Designated uses for surface water of this classification are certain

fish and wildlife habitat, certain recreational activities, agricultural, industrial and other legitimate uses including navigation; swimming may be precluded. Surface waters so designated are presently not meeting one or more designated uses due to pollution. Although not currently meeting water quality criteria, the goal for *Class C/B* surface waters may be *Class A*, or *B*, depending upon uses designated for the watercourse.

## Aquatic Habitats and Resources

As mentioned previously, the site of the proposed Sherwood Acres residential subdivision is bounded easterly by the Quinnipiac River. The river reach contains the physical characteristics of a coldwater stream. Fish surveys of the Quinnipiac River within the vicinity of East Johnson Avenue ( 1/8 mile downstream of Interstate 691) have been conducted by the Inland Fisheries Division (the "Division"). The surveys confirmed the presence of a diverse coldwater stream fish community of the following species: native brook trout (*Salvelinus fontinalis*), wild brown trout (*Salmo trutta*), blacknose dace (*Rhinichthys atratulus*), common shiner (*Luxilus cornutus*), tessellated darter (*Etheostoma olmstedii*), and white sucker (*Catostomus commersoni*).

The Division liberates adult brook, brown and rainbow trout into the Quinnipiac River for recreational angling. However, trout stocking has been suspended in the river from the Meriden-Cheshire town line northerly through Plainville due to the detection of PCB (polychlorinated biphenyl) contamination in a number of fish species including trout. The Connecticut Department of Public Health and the Department of Environmental Protection have issued an advisory that fish from the Quinnipiac River northerly of the Meriden-Cheshire town line not be consumed.

The Division is currently in the process of implementing a new trout management plan for streams and rivers in Connecticut. In this plan, the Division has identified a number of watercourses with particularly good potential for improvement of the trout populations and fisheries. One of the watercourses in which the Division is considering more intensive trout management is the portion of the Quinnipiac River currently under the fish consumption advisory. PCB contamination notwithstanding, the elimination or upgrade of wastewater effluent discharging to the river have improved water quality which has resulted in a marked increase of the wild trout population and a subsequent increase in recreational angler usage.

Proposed Division plans for this river reach include the implementation of catch and release angling, the use of barbless single-hook flies or lures and a closed season for fishing from October 1 through December 31. The river reach would be classified as a Trout Management Area and be similar to the one currently established on the Tankerhoosen River, Vernon where these regulations and management activities have been found to be effective for providing high-quality, wild trout fishing.

## Impacts

Historic land use practice at this site has allowed the preservation of riparian vegetation along the Quinnipiac River. Plot plans depict the site development as encroaching to within 50 feet of the river. The alteration of riparian habitat such as the removal of vegetation associated with these encroachments can ultimately impact the habitats and resources of the Quinnipiac River. Numerous studies have proven that riparian vegetation acts as a "filter" to prevent sediments, nutrients, fertilizers, and other non-point source pollutants from upland sources from entry into surface waters. Such non-point source pollutants can degrade habitat and water quality.

Additionally, the removal of riparian vegetation can impart the following effects: decrease stream bank stability thereby increasing siltation and habitat degradation; eliminate or drastically reduce the supply of large woody debris provided to the streams waters - such material provides critical physical habitat features for numerous species of aquatic organisms; reduce a substantial proportion of food for aquatic insects which in turn constitutes a reduction in a significant proportion of food available for resident fish; stimulate excessive algal growth on the streambed; and decrease the riparian corridor's ability to serve as a "reservoir" in storing surplus runoff for gradual release back into the streams during summer and early fall low flow periods.

Residential dwellings, driveways and roadways constructed on the site will create a significant amount of impervious surface. Studies demonstrate that on sites with 10-20% impervious surface coverage, 38% of fallen precipitation is lost to evapotranspiration, 21% to shallow soil infiltration, 21% to deep soil infiltration and 20% to off-site runoff. In comparison, precipitation falling on sites with a natural ground conclude with losses of 40% to evapotranspiration, 25% to shallow soil infiltration, 25% to deep soil infiltration and 10% to off-site runoff.

Of concern with the alteration of the hydrologic cycle specific to the Sherwood Acres residential subdivision are the potential loss of groundwater recharge and the quality and quantity of stormwater runoff to the Quinnipiac River. On sites maintained with significant amounts of natural ground cover, a considerable percentage of fallen precipitation infiltrates into the soil and contributes to groundwater recharge. Ground-water is part of the local water table which is connected to surface waters such as the Quinnipiac River. The local water table provides seepage to the river during dry periods and maintains a base flow essential to biological and habitat integrity. A significant reduction or loss of groundwater recharge can lead to a lowering of the water table and a reduction of river base flow during extended dry weather periods.

Based upon published studies, it can be estimated that roughly 20% of the precipitation falling on impervious surfaces of the Sherwood Acres residential subdivision has the potential to result in off-site runoff to the Quinnipiac River. Materials that accumulate on paved surfaces during dry periods are washed into watercourses by rainfall runoff or snowmelt. Petroleum products, heavy metals, sand and salt are the most common of the pollutants originating from impervious surfaces such as parking areas and roadways. Although the discharge of these materials may not directly contribute to episodic kills of aquatic life because of dilution in stormwater, the continued discharge over time is anticipated to degrade habitat and water quality. This will ultimately diminish the Quinnipiac River's ability to support a diverse aquatic species assemblage. Stormwater runoff from impervious surfaces during summer months can result in an unnatural change in river water temperatures which is commonly referred to as thermal pollution. Literature reports of studies in Maryland which found urban runoff raising the summer water temperature in streams as much as 20° Fahrenheit. It was reported that water temperatures rose 9° Fahrenheit in some streams after "treatment" of stormwater runoff in detention or retention structures.

Fish and other aquatic species are responsive to changes in water temperatures. A rise in water temperatures can inhibit the over-summer survival of coldwater insect and fish species such as trout, alter fish migratory patterns or off-set critical life functions (e.g. spawning, egg incubation, juvenile development) of aquatic insects and fish. As water warms, it's ability to hold dissolved oxygen becomes lessened. A decrease in dissolved oxygen levels can cause fish kills.

The land use change resulting from development of the proposed Sherwood Acres residential subdivision is not only anticipated to promote localized impacts to the Quinnipiac River but is likely to contribute to the cumulative impacts associated with urbanization on a watershed wide scale. The literature reports of studies in Maryland which noted incremental deterioration in stream

water quality and physical habitat with increased percentages of impervious surface within the watershed. Watersheds with 10-15% impervious surface coverage were found to cause slight degradations of physical stream habitat with significant impacts occurring as the percentage of impervious surface progresses from 25-50% total watershed coverage.

Recent studies by the U.S. Geological Survey indicate a trend in higher peak flows within the Quinnipiac River. A similar impact was noted in Maryland streams with watersheds containing 25% or greater coverage of impervious surface. Higher peak flows in the Quinnipiac River can induce river bank failure, produce excessive channel scour or sediment deposition and interfere with certain life critical activities of aquatic species (including both fish and insects) such as spawning, egg incubation or juvenile development.

## Recommendations

In an effort to eliminate the potential for impacts to the Quinnipiac River, it is recommended that the following measures be incorporated into the design of the proposed Sherwood Acres residential subdivision:

- Maintain at a minimum a 100 foot vegetated riparian buffer zone along the Quinnipiac River. Research has indicated that vegetated riparian buffer zones of this minimum width prevents damage to aquatic ecosystems that are supportive of diverse species assemblages. Please refer to the attached documentation presenting Division policy and position regarding vegetated riparian buffers for additional information.
- Detention-infiltration/water quality basins should not be created within the riparian buffer. Areas within the buffer altered by prior land use should be reestablished to a condition similar to that found in undisturbed riparian

buffer habitat. Vegetation selected for re-establishment within the riparian buffer shall be native and non-invasive.

- Detention-infiltration/water quality basins should be constructed to accommodate the 1.25" storm event to alleviate temperature related impacts to the Quinnipiac River. Super enriched topsoil should be placed in the basin to immobilize certain pollutants and to ensure greater denitrification. The basin should also be vegetated with a variety of plant species which are known to have a high capacity for nutrient uptake. The plant species shall be native and non invasive. The basin should have irregular shape to increase the surface area available for planting. The irregular shaped basin would also blend better into the landscape.
- The discharge from detention-infiltration water quality basins to the Quinnipiac River should be conveyed through rock lined channels rather than culvert pipes. The channels should be sinuous and the rock be of a heterogeneous mix of sizes. Channels designed in this manner will dissipate water velocities, create a turbulence which will increase the discharge water's dissolved oxygen and will allow for additional water infiltration into the soil.
- Establish comprehensive erosion and sediment control plans with mitigative measures (detention-infiltration/water quality basins, haybales, silt fence, etc.) to be installed prior to and maintained through all phases of site development. Land clearing and other disturbance should be kept to a minimum with all disturbed areas being protected from storm events and be restabilized in a timely manner.
- Limit regulated activities adjacent to riparian buffer zones to historic low precipitation periods of the year. Reduced precipitation periods of summer to

early fall provide the least hazardous conditions when working near sensitive aquatic environments.

## Literature Reviewed

MacBroom, James Grant, *The River Book*. Connecticut Department of Environmental Protection, DEP Bulletin 28, 1998. (Hartford, CT)

Maryland Department of Environmental Resources - Programs and Planning Division, *Low Impact Design Strategies - An Integrated Design Approach*. June 1999. (Prince George's County, MD)

Quinnipiac River Watershed Partnership - Low Flow Water Allocation Work Group, *Preliminary Assessment of Water Withdrawals and Stream Flows in the Quinnipiac River Watershed*. July 2000. (Hartford, CT)



# Subsurface Sewage Disposal

The Team sanitarian was unable to attend the May 8, 2001 site evaluation. The following comments are based upon a cursory review of the December 31, 2000 Kratzert, Jones and Associates, Inc. subdivision plans, and soil test results from the Chesprocott Health District.

- The subdivision plans identify soil test locations (deep test pits, percolation tests), however, no soil test results are on the plans. This office (Department of Public Health, Environmental Engineering, Division of Environmental Health) recommends all subdivision plans include soil test results.
- The Chesprocott Health District soil testing concluded that suitable soils were identified on each lot, however, they noted that additional soil testing would be required if the septic systems are ultimately located in untested areas or if the septic system area is cut or filled. This office concurs that additional soil testing will be needed in these cases.

Some lot layouts call for deep cuts (10' to 15') in the proposed sewage disposal system area. This office recommends that in these instances the proposed sewage disposal systems be relocated to areas with suitable soils that do not call for disturbance, or additional deeper testing be conducted to verify suitable soils are available below the cut elevations. This should be required prior to P& Z approval of the lots as subdivision lots. All proposed subdivision lots should have suitable soils for subsurface sewage disposal facilities identified and available. Identifying suitable soils and then calling for them to be removed as part of the development plan is not sufficient.

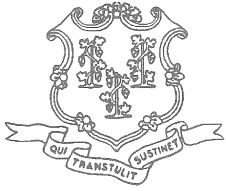
- The subdivision plans should stipulate the basis of design for each of the proposed subsurface sewage disposal systems. This would include noting the number of bedrooms and percolation rate each of the leaching systems were laid out for as well as identifying the type of leaching system provided. Minimum leaching system spread (MLSS) calculations or a note indicating MLSS not applicable should be stipulated for each lot.
- The subdivision plans should identify feasible foundation drain locations or specify the lots where slab on grade construction is necessary. Feasible water service locations should also be identified.
- The lots that require engineered septic systems should be identified.
- This office is available to discuss the above noted comments on the sewage disposal facilities for the proposed Sherwood Acres Subdivision.

# Archaeological Review

A review of the State of Connecticut Archaeological Site files and maps show no known archaeological sites listed for the project area. However, our files do indicate two sites in close proximity to the south and west of the property. One prehistoric Native American campsite and one historic industrial site associated with the Barite Mines of Cheshire. The Indian camp archaeological site represents hunting and gathering camps utilizing the natural resources of the wetland systems. Of particular archaeological sensitivity are the northeast areas associated with the Quinnipiac River. The knolls consisting of well-drained soils adjacent to the wetland provide highly sensitive areas for the prehistoric Native American sites.

The Office of State Archaeology (OSA) strongly recommends an archaeological reconnaissance survey for undisturbed portions of the project area especially along the river. This survey should be conducted in accordance with the Connecticut Historical Commission's "Environmental Review Primer for Connecticut's Archaeological Resources." This recommended survey should be accomplished prior to any construction activities. The OSA is prepared to offer any technical assistance to the applicant in conducting this survey and working with Cheshire in the preservation of the town's archaeological resources.

# Appendix



# STATE OF CONNECTICUT

## DEPARTMENT OF ENVIRONMENTAL PROTECTION



Jack Pasquale, Chairman  
Inland Wetlands and Watercourses Commission  
Town of Cheshire  
84 South Main Street  
Cheshire, CT 06410

March 22, 2001

***RE: Sherwood Acres Residential Subdivision***

The Inland Fisheries Division (the Division) has recently been made aware of a proposal by David and Honey Florian for the development of a single family residential subdivision on property located southerly of Birch Drive and Poplar Drive, Cheshire. The proposal has been submitted to the Cheshire Inland Wetlands and Watercourses Commission and is reported to be under current review.

I have been given the opportunity to review the plot plans prepared for the residential subdivision referred to as Sherwood Acres. The plans indicate that a subdivision of 47 lots is proposed for the 62.3 acre site. The residences of the subdivision will be serviced with municipal water and will utilize individual septic systems for wastewater disposal. Roadway stormwater runoff will be split with a portion of the runoff directed to existing drainage systems at Poplar Drive to the north and Interstate 691 to the south. The remainder of the runoff, which will drain the greatest area of the site, will be directed to a detention basin prior to discharge into the Quinnipiac River.

The site of the proposed Sherwood Acres residential subdivision is bounded easterly by a 2000  $\pm$  foot reach of the Quinnipiac River. The river reach contains the physical characteristics of a coldwater stream. Fish surveys of the Quinnipiac River within the vicinity of East Johnson Avenue (1/8 mile downstream of Interstate 691) have been conducted by the Division. The surveys of confirmed the presence of a diverse coldwater stream fish community of the following species: native brook trout (*Salvelinus fontinalis*), wild brown trout (*Salmo trutta*), blacknose dace (*Rhinichthys atratulus*), common shiner (*Luxilus cornutus*), tessellated darter (*Etheostoma olmstedii*), and white sucker (*Catostomus commersoni*).

The Division liberates adult brook, brown and rainbow trout into the Quinnipiac River for recreational angling. However, trout stocking has been suspended in the river from the Meriden-Cheshire town line northerly through Plainville due to the detection of PCB (polychlorinated biphenyl) contamination in a number of fish species including trout. The Connecticut Department of Public Health and the Department of Environmental Protection have issued an advisory that fish from the Quinnipiac River northerly of the Meriden-Cheshire town line not be consumed.

The Division is currently in the process of implementing a new trout management plan for streams and rivers in Connecticut. In this plan, the Division has identified a number of watercourses with particularly good potential for improvement of the trout populations and fisheries. One of the watercourses in which the Division is considering more intensive trout management is the portion of the Quinnipiac River currently under the fish consumption advisory. PCB contamination notwithstanding, the elimination or upgrade of wastewater effluent discharging to the river have improved water quality which has resulted in a marked increase of the wild trout population and a subsequent increase in recreational angler usage.

Proposed Division plans for this river reach include the implementation of catch and release angling, the use of barbless single-hook flies or lures and a closed season for fishing from October 1 through December 31. The river reach would be classified as a Trout Management Area and be similar to the one currently established on the Tankerhoosen River, Vernon where these regulations and management activities have been found to be effective for providing high-quality, wild trout fishing.

I have apprehensions with the land use change occurring with the proposed Sherwood Acres residential subdivision as it relates to the Quinnipiac River from the aspects of encroachment into the river's riparian habitat and the alteration of the site's hydrologic characteristics. Historic land use practice at this site has allowed the preservation of riparian vegetation along the Quinnipiac River. Plot plans depict the site development as encroaching to within 50 feet of the river. The alteration of riparian habitat such as the removal of vegetation associated with these encroachments can ultimately impact the habitats and resources of the Quinnipiac River. Numerous studies have proven that riparian vegetation acts as a "filter" to prevent sediments, nutrients, fertilizers, and other non-point source pollutants from upland sources from entry into surface waters. Such non-point source pollutants can degrade habitat and water quality.

Additionally, the removal of riparian vegetation can impart the following effects: decrease stream bank stability thereby increasing siltation and habitat degradation; eliminate or drastically reduce the supply of large woody debris provided to the streams waters-such material provides critical physical habitat features for numerous species of aquatic organisms; reduce a substantial proportion of food for aquatic insects which in turn constitutes a reduction in a significant proportion of food available for resident fish; stimulate excessive algal growth on the streambed; and decrease the riparian corridor's ability to serve as a "reservoir" in storing surplus runoff for gradual release back into the streams during summer and early fall low flow periods.

Residential dwellings, driveways and roadways constructed on the site will create a significant amount of impervious surface. Studies demonstrate that on sites with 10-20% impervious surface coverage, 38% of fallen precipitation is lost to evapotranspiration, 21% to shallow soil infiltration, 21% to deep soil infiltration and 20% to off-site runoff. In comparison, precipitation falling on sites with a natural ground conclude with losses of 40% to evapotranspiration, 25% to shallow soil infiltration, 25% to deep soil infiltration and 10% to off-site runoff.

Of concern with the alteration of the hydrologic cycle specific to the Sherwood Acres residential subdivision are the potential loss of groundwater recharge and the quality and quantity of stormwater runoff to the Quinnipiac River. On sites maintained with significant amounts of natural ground cover, a considerable percentage of fallen precipitation infiltrates into the soil and contributes to groundwater recharge. Ground-water is part of the local water table which is connected to surface waters such as the Quinnipiac River. The local water table provides seepage to the river during dry periods and maintains a base flow essential to biological and habitat integrity. A significant reduction or loss of groundwater recharge can lead to a lowering of the water table and a reduction of river base flow during extended dry weather periods.

Based upon published studies, it can be estimated that roughly 20% of the precipitation falling on impervious surfaces of the Sherwood Acres residential subdivision has the potential to result in off-site runoff to the Quinnipiac River. Materials that accumulate on paved surfaces during dry periods are washed into watercourses by rainfall runoff or snowmelt. Petroleum products, heavy metals, sand and salt are the most common of the pollutants originating from impervious surfaces such as parking areas and roadways. Although the discharge of these materials may not directly contribute to episodic kills of aquatic life because of dilution in stormwater, the continued discharge over time is anticipated to degrade habitat and water quality. This will ultimately diminish the Quinnipiac River's ability to support a diverse aquatic species assemblage.

Stormwater runoff from impervious surfaces during summer months can result in an unnatural change in river water temperatures which is commonly referred to as thermal pollution. Literature reports of studies in Maryland which found urban runoff raising the summer water temperature in streams as much as 20° Fahrenheit. It was reported that water temperatures rose 9° Fahrenheit in some streams after "treatment" of stormwater runoff in detention or retention structures.

Fish and other aquatic species are responsive to changes in water temperatures. A rise in water temperatures can inhibit the over-summer survival of coldwater insect and fish species such as trout, alter fish migratory patterns or off-set critical life functions (e.g. spawning, egg incubation, juvenile development) of aquatic insects and fish. As water warms, it's ability to hold dissolved oxygen becomes lessened. A decrease in dissolved oxygen levels can cause fish kills

The land use change resulting from development of the proposed Sherwood Acres residential subdivision is not only anticipated to promote localized impacts to the Quinnipiac River but is likely to contribute to the cumulative impacts associated with urbanization on a watershed-wide scale. The literature reports of studies in Maryland which noted incremental deterioration in stream water quality and physical habitat with increased percentages of impervious surface within the watershed. Watersheds with 10-15% impervious surface coverage were found to cause slight degradations of physical stream habitat with significant impacts occurring as the percentage of impervious surface progresses from 25-50% total watershed coverage.

Recent studies by the U.S. Geological Survey indicate a trend in higher peak flows within the Quinnipiac River. A similar impact was noted in Maryland streams with watersheds containing 25% or greater coverage of impervious surface. Higher peak flows in the Quinnipiac River can induce river bank failure, produce excessive channel scour or sediment deposition and interfere with certain life critical activities of aquatic species (including both fish and insects) such as spawning, egg incubation or juvenile development.

In effort to eliminate the potential for impacts to the Quinnipiac River, I ***strongly recommend*** the following measures be incorporated into the design of the proposed Sherwood Acres residential subdivision:

1. Maintain at a minimum a 100 foot vegetated riparian buffer zone along the Quinnipiac River. Research has indicated that vegetated riparian buffer zones of this minimum width prevents damage to aquatic ecosystems that are supportive of diverse species assemblages. Please refer to the attached documentation presenting Division policy and position regarding vegetated riparian buffers for additional information.

Detention-infiltration/water quality basins should not be created within the riparian buffer.

Areas within the buffer altered by prior land use should be reestablished to a condition similar to that found in undisturbed riparian buffer habitat. Vegetation selected for reestablishment within the riparian buffer shall be native and non-invasive.

2. The detention basin should be constructed to accommodate the 1.25" storm event to alleviate temperature related impacts to the Quinnipiac River. Super enriched topsoil should be placed in the basin to immobilize certain pollutants and to ensure greater denitrification. The basin should also be vegetated with a variety of plant species which are known to have a high capacity for nutrient uptake. The plant species shall be native and non-invasive. The basin should have irregular shape to increase the surface area available for planting. The irregular shaped basin would also blend better into the landscape.

3. The discharge from detention basin to the Quinnipiac River should be conveyed through a rock lined channel rather than a culvert pipe as currently proposed. The channel should be sinuous and the rock be of a heterogeneous mix of sizes. A channel designed in this manner will dissipate water velocities, create a turbulence which will increase the discharge water's dissolved oxygen and will allow for additional water infiltration into the soil.

4. Establish comprehensive erosion and sediment control plans with mitigative measures (detention-infiltration/water quality basins, haybales, silt fence, etc.) to be installed prior to and maintained through all phases of site development. Land clearing and other disturbance should be kept to a minimum with all disturbed areas being protected from storm events and be restabilized in a timely manner.

5. Limit regulated activities adjacent to riparian buffer zones to historic low precipitation periods of the year. Reduced precipitation periods of summer to early fall provide the least



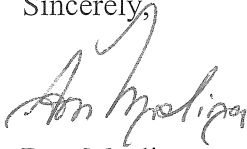
hazardous conditions when working near sensitive aquatic environments.

All those involved with development of the Sherwood Acres residential subdivision should be advised that the Department of Environmental Protection (DEP) may have regulatory jurisdiction with the activities proposed in addition to adhering to the regulations of the Town of Cheshire. They should contact the DEP Bureau of Water Management Permitting, Enforcement and Remediation Division (860) 424-3705 and the Inland Water Resources Division (860) 424-3706 for a determination of permit needs.

On behalf of the Division, I appreciate the opportunity to have expressed concerns and to have offered mitigative recommendations for the site development as proposed for the Sherwood Acres residential subdivision. Trustfully the comments and recommendations offered through this brief correspondence will prove of value to the Cheshire Inland Wetlands and Watercourses Commission.

Please feel free to contact me should concerns or questions arise.

Sincerely,



Don Mysling  
Senior Fisheries Biologist  
Bureau of Natural Resources-Inland Fisheries Division  
Habitat Conservation and Management Program

*Literature Reviewed*

MacBroom, James Grant, *The River Book*. Connecticut Department of Environmental Protection, DEP Bulletin 28, 1998. (Hartford, CT)

Maryland Department of Environmental Resources – Programs and Planning Division, *Low Impact Design Strategies – An Integrated Design Approach*. June 1999. (Prince George's County, MD)

Quinnipiac River Watershed Partnership - Low Flow/Water Allocation Work Group, *Preliminary Assessment of Water Withdrawals and Stream Flows in the Quinnipiac River Watershed*. July 2000. (Hartford, CT)

*Attachment*

CC: R. Jacobson, Inland Fisheries Division  
M. Kasinkas, Cheshire Environmental Planner  
Files {MiscPermits: Florian}

# **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 Soil and Water 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 Soil and Water 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.