

Bloomington's **By Mail** **Expansion** **Cheshire, Connecticut**

KING'S MARK ENVIRONMENTAL REVIEW TEAM REPORT

Bloomington's By Mail Expansion 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 Wetlands and Watercourses Commission
Cheshire, Connecticut**

July 1997

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Acknowledgments

This report is an outgrowth of a request from the Cheshire Inland Wetlands and Watercourses Commission to the New Haven County Soil and Water 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 Thursday, February 20, 1997.

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I would also like to thank Jim Sipperly, environmental planner for the Town of Cheshire, and Richard Clegg, managing associate, Tom Ryder, biologist, Dave Bjerklie, senior hydrologist and R. L. Wiley, senior ecologist, of Dames & Moore, acting as the project consultants, 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 plans, reports and additional information. 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. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the Town. 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 making your land use decisions on this proposed building expansion.

If you require additional information please contact:

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Introduction

The Cheshire Inland Wetlands and Watercourses Commission (IWWC) has requested assistance from the King's Mark Environmental Review Team in conducting an environmental review of the proposed Bloomingdale's By Mail Expansion. Due to the timing of the ERT request and field review the IWWC had to close the public hearing for this project on February 18, 1997 and a decision was made consequently to deny the inland wetlands permit for expansion. The ERT report was not part of the public record and was not used in the decision making process. This ERT report will be filed with the town for future reference and can be used for any future applications for this parcel.

The project proposes to expand the existing Bloomingdale's By Mail distribution center by 244,000 sq. ft.. The 75 acre site is located in the Cheshire Industrial Park adjacent to the Ten Mile River. Approximately 10-12 acres are currently developed with a 275,000 sq. ft. structure and associated roadways and parking. The expansion area will provide the required stock storage and functional support to increase the existing annual distribution volume and will provide the opportunity for over 200 jobs in the next 3-5 years.

In addition to the building expansion the project will consist of a fire loop road around the facility, truck shipping and receiving areas and a 100,000 sq. ft. parking lot for approximately +200 cars.

Approximately 17 acres, or 23% of the site is comprised of wooded wetlands. The construction activity will encroach upon 3.38 acres or 20% of the total wetlands. A minimum of 1:1 mitigation is proposed as part of the development activity to provide "no net loss" result through on-site wetland creation. Approximately 3.4 acre feet of 100-year flood storage will be lost to construction fill areas. To off-set the loss, a minimum of 4.9 acre-feet of compensatory storage will be provided as part of the wetland creation activity.

Objectives of the ERT Study

The Cheshire IWWC is requesting assistance from an independent group to inventory the physical and biological characteristics of the site and to provide information on the values and functions of the wetlands and provide a review of the alternatives discussed and the mitigation proposed.

The ERT Process

Through the efforts of the IWWC 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 Town. Team members were able to review maps 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 reports; 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 February 20, 1997. 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.



0 2000 Feet



SCALE

LEGEND:

- Approximate Site Boundary

SOURCE: U.S.G.S. 7.5' Series Quad., Southington, Conn., 1968, photorevised 1992.



QUADRANGLE LOCATION

FIGURE 1
SITE LOCATION MAP
BLOOMINGDALES BY MAIL, LTD.
475 KNOTTER DRIVE
CHESHIRE, NEW HAVEN COUNTY, CONN.

DAMES & MOORE

Geology and Hydrology

Geology

The Bloomingdale's by mail facility is situated in the bottom of the Ten Mile River valley between the basalt (traprock) ridge of Peck Mountain on the east and the highlands formed by pre-Mesozoic crystalline metamorphic rocks on its west flank. Easily eroded Mesozoic sedimentary rocks of the so-called New Haven Arkose formation bedrock probably underlie the Ten Mile River valley (see Bedrock Geology Map GQ-200). However, loose, unconsolidated fine grained glacial lake sediments fill the floor of the valley to a depth of at least 90 feet (see Surficial Geology map GQ-146). These deposits were laid down in a temporary, probably ice-dammed glacial lake which flooded the Quinnipiac, Ten Mile and Judd Brook valleys as the last major continental ice-sheet retreated from the area some 14,000 years ago. As the lake was rather shallow and of limited extent the sediments underlying the Bloomingdale's site are dominantly red brown silts and sands. Varved clay-silt couplets which often characterize large glacial lake bottom sediments have not been seen in test borings at the site. A series of 10 to 100 foot near circular to elliptical closed topographic depressions along the river just east of the facilities are similar to features interpreted to be "pingos" - a pot-hole like feature commonly formed on fine grained lake-bottom sediments in areas of permanently frozen ground (i.e. permafrost) that suggest the lake drained while the climate was still arctic-like.

The fine grained compactable soils would be a challenge for the designers of the new facilities. However, the absence of significant cracks and settling in the present building suggests that careful engineering design can overcome such obvious foundation subsidence problems.

Hydrogeology

The topography on the site has seen many manmade changes over the years. Minor changes due probably to development, grading and drainage of the area for agricultural purposes show up as differences on USGS topographic maps between the 1890's and 1940's. A major dredging operation which completely altered the course of the Ten Mile River and which excavated the long linear ESE trending ditch in the rear of the present Bloomingdale's building was apparently undertaken sometime between 1968 (the date of a ground check new USGS topographic survey based on 1966 photos) and the 1970 air photos. Grading and construction of the Bloomingdale's facility in the late 1980s also changed the local landscape. The large pile of fill in the rear of the building apparently dates from this period. With the area being close to the ground water table each of these changes must have significantly altered the hydrology of proximal wetlands. In such a dynamic system suffering major changes in its physical setting it would be very difficult to predict the future of the local wetland ecology even if new activities were not being proposed.

References

Fritts, Crawford, 1963; Bedrock Geology of the Southington Quadrangle, USGS GQ-200

LaSala, Albert, 1961; Surficial Geology of the Southington Quadrangle, USGS GQ-146

Wetland Resources

Specific concerns listed by the Town of Cheshire as part of this review process that are relevant to the Team wetland specialist include: 1) a review of the wetland and floodplain soils found on the site, 2) a review of the assigned function and values of those wetlands, and, 3) the viability of the mitigation plan

Wetland and Floodplain Soil Review

The applicant's wetland delineation report states that the wetlands were delineated according to federal methodology which utilizes the three-parameter descriptive approach of soils, vegetation and hydrology. Precise information regarding the presence and location of particular soil mapping units as regulated by Connecticut Inland Wetlands and Watercourses Act ("the Act") was not referenced within the municipal application materials submitted to the Team for review. This oversight is critical as explained below.

While the application materials submitted are extensive and quite professional, the wetlands delineation report does not specifically list out the soil mapping units encountered as part of the intensive, site-specific survey conducted by the applicant's soil scientist. This type of information, while it may not be specifically required as part of an application check list, would have been extremely helpful in this case due to the fact that the wetland boundaries found on the accompanying site plans appear to represent only the hydric or truly "wetland" soils required by the federal methodology and not the "upland" or non-hydric alluvial/floodplain soils that most likely occur on this property which as explained below hold "equal weight" under the Act.

The Act defines "wetlands" to consist of "... any of the soil types designated as poorly drained, very poorly drained, alluvial and floodplain by the National Cooperative Soil Survey..." This means that areas of moderately-well or well-drained alluvial and floodplain soils that do not exhibit "wetland" characteristics also fall under the jurisdiction of the Act. Due to their nature, these "non-hydric" soils are always inter-related with active watercourses and because of their location provide several critical functions just as regulated hydric soils do.

The application materials do include a descriptive list and map of the soil series units as delineated within the Soil Survey of New Haven County, Connecticut(1979), however, this information was meant to be used as a general planning tool and not as a substitute for the intensive "site-by-site" soil survey. This descriptive list indicates that all regulated soils on this parcel are of the hydric, alluvial/floodplain variety and that they occupy a significant portion of this parcel. However, it is very likely that certain areas on this parcel located within the active floodplain of the Ten Mile River that were not mapped by the applicant's soil scientist as a wetland soil and not identified as such in the county soil survey may indeed be moderately-well or well drained alluvial/floodplain soils which are to be regulated under the Act.

Based on site plan elevations and the 100-year flood elevation stated within the application, the most likely locations for any upland floodplain soils in the proposed activity areas would be in the vicinity of wetland creation area "C" and the lower (southeasterly) portions of creation area "B." If true, this would mean that certain wetland creation activities would be taking place within a regulated area. This would require a significant revision to the applicant's wetland, or "regulated area" impact analysis.

Function Analysis Review

Most of the wetland functional analysis provided by the applicant is contained within the federal 404 application. No such analysis was found as part of the municipal application. While it has been stated that most site-specific functional value analysis techniques rely on varying amounts of subjective evaluation, certain wetland characteristics should automatically hold a high or above average value. Two of the most important of these characteristics are present on these sites: riparian wetlands/floodplains and what is most likely to be a vernal pool, both of which will be directly impacted as a result of the proposed activities.

In general, the applicant's functional analysis was very thorough and extensive, however it did not adequately emphasize the two above-mentioned characteristics and did not provide a clear, concise summary of its findings.

The value of vernal pools is well documented in literature which has been made part of the public record for this application hearing, it will not be repeated here. The most prominent pool is located within wetland area E/M and is proposed to be directly impacted, however, the possible presence of other vernal pools may not be detected until spring when obligatory wildlife species emerge. The presence of one or more wildlife species commonly associated with vernal pools which are listed as one of our state's endangered, threatened or special concern species would of course give any such wetland area a high rating in any wildlife, "uniqueness" or "noteworthiness" category.

Various definitions of a "riparian area" usually tend to be vague, however basing it on the presence of alluvial/floodplain soils is one good way to do it. This is why a more accurate delineation of Connecticut regulated soils, which would not only include hydric floodplain/alluvial soils, but would also include the "upland" alluvials, would have given a more accurate picture of the riparian nature of this parcel. The particular relationship between upland and hydric alluvial areas on this site is a case-in-point as to why Connecticut would regulate certain well-drained soils. Once the upland alluvial soils are combined with the hydric alluvial soils also present on site, the area tends to become a more holistic, highly functional natural system as it exists today.

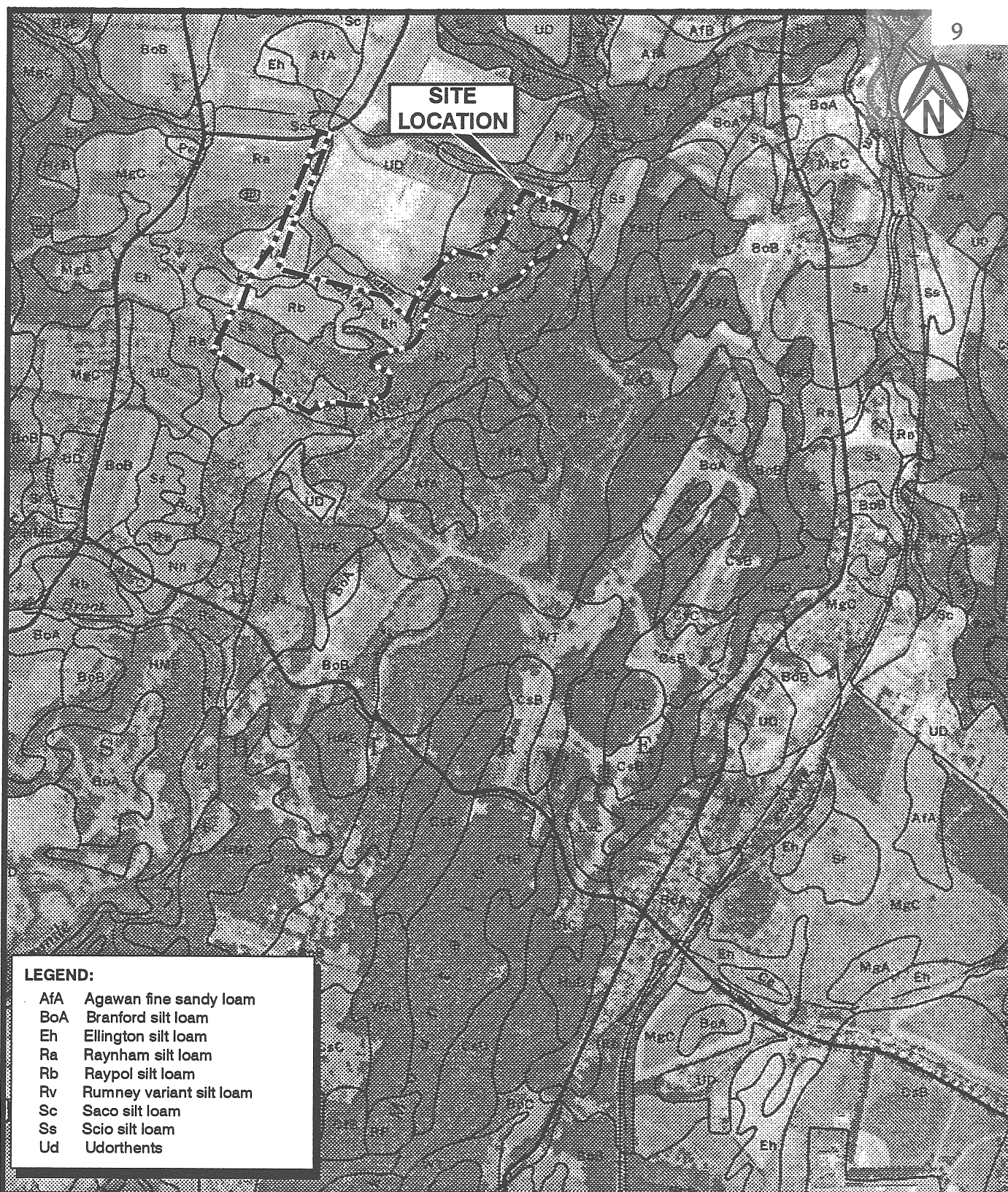
Mitigation

A major feature of the applicant's plan to mitigate their direct impact of 3.4 acres of wetland is the creation of approximately 4.0 acres of wetlands between the proposed addition and the Ten Mile River, a majority of which probably falls within the river's 100 year floodplain. The guidance that the DEP provides local wetland agencies on wetland mitigation is the following:

- Mitigation is a three step process:
 1. Avoid - by evaluating alternative designs and sites, applicants avoid wetlands.
 2. Minimize - by implementing special design features and construction practices impacts to wetlands that can not be avoided are minimized.
 3. Compensate - by offsetting remaining adverse wetland losses, project impacts may be fully mitigated.
- Compensation should not be used where wetlands losses or impacts are avoidable.
- Compensation may not be used to make unacceptable losses or impacts acceptable.
- Compensation strategies should be evaluated separately from the development proposal.
- When compensation is deemed appropriate, the nature of the compensation should be subject to the following hierarchy:
 1. restoration or enhancement of degraded wetlands;
 2. acquisition or preservation by deed restriction, easement or monetary contributions toward such acquisition or preservation;
 3. creation of new wetlands.

Whether the proposed wetland impacts are as the applicant states, unavoidable, largely depends on the alternatives analysis presented by the applicant which concludes that the particular function of the proposed facility dictates rigid design parameters that cannot be altered or relocated to avoid the currently proposed wetland impacts. A thorough review of this analysis, might best be taken up by someone in the field of industrial/commercial management techniques and is outside the scope of this review. However, given that, the acceptability of the loss of 3.4 acres of wetlands that range from moderate to highly valuable is certainly debatable. In addition, the fact that portions of the wetland creation areas themselves are most likely located within "upland" floodplain areas which are regulated under Connecticut's Inland Wetland and Watercourses Act, possess highly valuable functions in and of themselves, and provide an ecological link to other wetlands on the parcel, should be heavily considered as part of any permit decision involving this parcel.

As a conceptual plan, the wetland creation plan proposed is very comprehensive, however, given the above discussion, more precise information, primarily of a hydro-geological nature, should be provided in order to more assuredly predict the success of the plan.

**LEGEND:**

AfA Agawan fine sandy loam
 BoA Branford silt loam
 Eh Ellington silt loam
 Ra Raynham silt loam
 Rb Raypol silt loam
 Rv Rumney variant silt loam
 Sc Saco silt loam
 Ss Scio silt loam
 Ud Udorthents

0 1/4 Mile



SCALE

LEGEND:

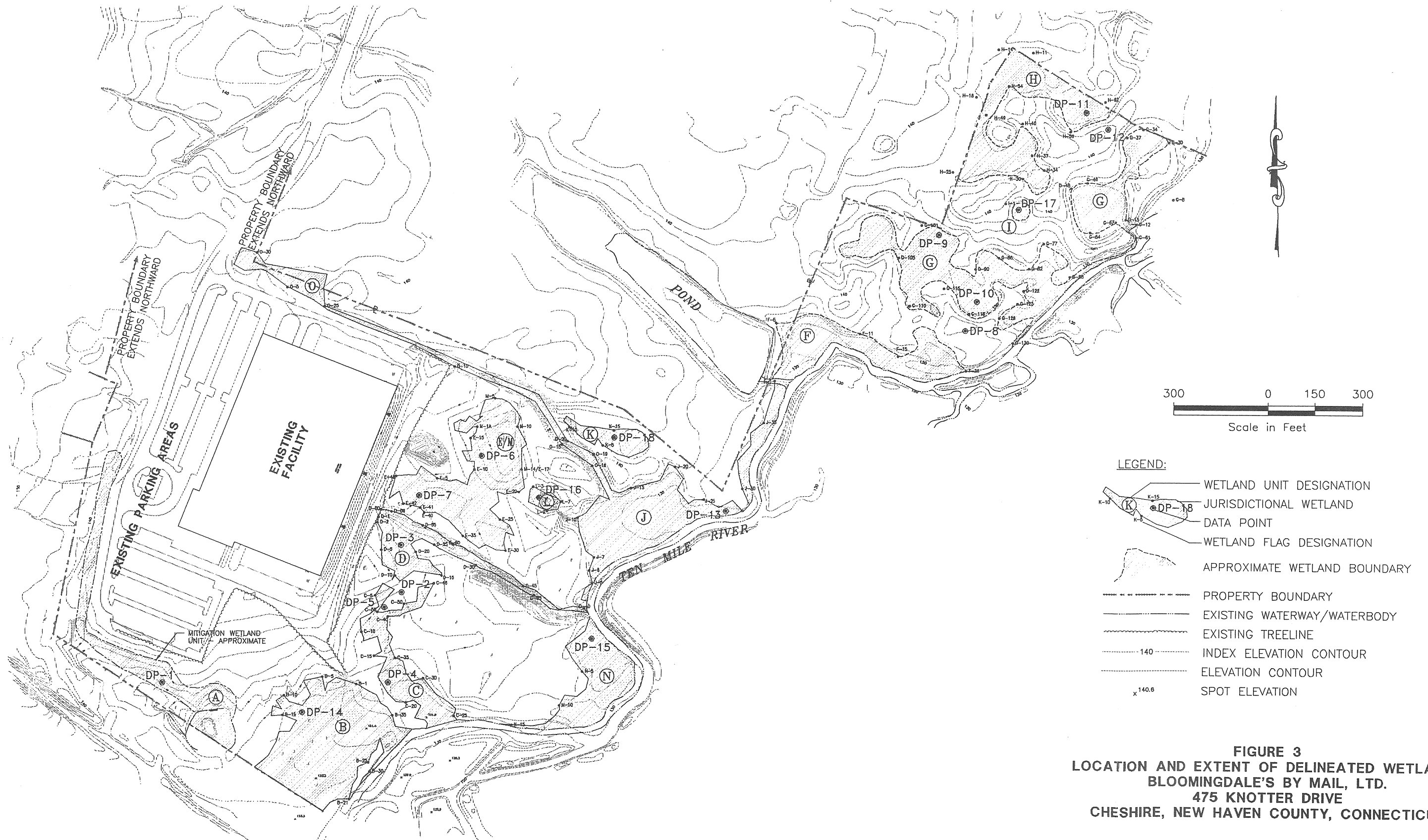
----- Approximate Site Boundary

SOURCE: Soil Survey of New Haven County, Conn., 1979.

FIGURE 2
SOILS MAP

BLOOMINGDALES BY MAIL, LTD.
475 KNOTTER DRIVE
CHESHIRE, NEW HAVEN COUNTY, CONN.

DAMES & MOORE



Wildlife Resources

Site Description/Wildlife Habitats

The 75 acre site contains a variety of habitats including forest, old field, and a variety of wetlands including deciduous or forested, forested floodplain, two small ponds, shallow seasonal pools and two channelized drainage ditches.

Wildlife habitat is said to be the complex of vegetative and physical characteristics that provide for all the requirements of wildlife, that is, food, shelter, resting, nesting and escape cover, water and space. For some species, this site provides for all their habitat needs, while for many others it provides for some of their needs while remaining needs are met on adjacent areas of habitat.

Generally, the greater the habitat diversity and degree of interspersed of various habitat types, (desirable wildlife habitat types) the greater the variety of wildlife there will be using an area. Many factors influence how valuable a certain area is for wildlife habitat though, including size, habitat types and qualities, location, degree of isolation, diversity within a habitat type and productivity of the habitats, etc.

Despite the small size of the site and the encroachment of the industrial park on the available wildlife habitat, the area provides a fair diversity of habitat types for a variety of wildlife species to utilize. The area currently provides moderate to very good wildlife habitat. The value of the site for wildlife is greatly increased due in part because the floodplain forest and the adjacent uplands on the site are connected to the larger area of available habitat (both wetland and forest land) that exists along the Ten Mile River.

The site is just one integral piece of the remaining habitat that is contiguous with the important floodplain habitat found along the Ten Mile River corridor. This corridor of floodplain forested habitat and the mix of forest land and fields that lie adjacent to it provides extremely important habitat because it provides food, cover, nesting and resting areas for a wide variety of birds, mammals, reptiles and amphibians. Wildlife species use river corridors to travel, migrate and forage along. The value of the corridor increases as the quantity of the adjacent intact habitat increases.

A wide variety of wildlife could be expected to utilize this area to serve all their needs while many more would find it a place to meet some requirements. Species which could utilize this area for some or all of their requirements include: deer, ruffed grouse, weasel, mink, raccoon, otter, fox, coyote, various hawks, owls, and an assortment of other birds including various warblers, sparrows and woodpeckers. A variety of reptiles and amphibians could also be expected to utilize the area.

It should be noted that a verified list of all the species using the area is not within the ability of this ERT review. A long term study of this site would be needed. Sampling techniques would need to include trapping, track surveys, bird call back surveys, etc. For all

but the most in-depth reviews it is usually sufficient to base species occurrence or use of a site on evaluation of habitat types in the field, cross referenced with a knowledge of a particular species habitat needs, range, etc. Species use noted in this report is based on an on-site evaluation, except where the species noted was actually observed at the site, as noted in this report.

The report submitted by Dames & Moore describes the available habitat in detail, therefore the Team wildlife biologist's comments are limited to brief descriptions about various habitats, and comments on the potential wildlife habitat functional values.

Forestland

Along the edge of the development and between the wetland areas behind the building, are some small areas of upland woodland or forest land. Between the old field and woodland border there are some areas of sapling size trees, resulting from regrowth after construction activities approximately ten years ago. There is some smaller sapling growth where areas of lawn are no longer being mowed. More mature trees are found covering the rest of this habitat type. Tree species include red maple, birch, aspen, elm and ash.

The areas of sapling size trees are especially useful to species like the woodcock and the ruffed grouse. Grouse and woodcock would make use of areas like this to feed and nest in, using adjacent areas to fill other habitat requirements. The upland forested area would be used by a variety of mammals like raccoon, fox and coyote in addition to a number of various birds like downy and hairy woodpecker, barred owl and Eastern phoebe.

Because the upland forest area is so limited on the site and so well interspersed with the delineated wetland areas, most of the species using the upland forested sites would be species using it along with the rest of the wetland complex in the area. The forested area and the red maple swamp provides habitat for species like the Eastern wood-pewee, least flycatcher, downy and hairy woodpeckers, and Eastern screech owl.

Because of the relatively young age of the trees on the site, there was not an over abundance of snag (dead trees) or cavity trees on the site. Snag trees are an important source of insects which serve as food for many species such as woodpeckers and chickadees. Den trees or trees with cavities can serve as a nesting or denning place for animals such as squirrels and raccoons. Any of these trees present on the site would be important to preserve for their wildlife value.

Old Field

Adjacent to the parking lot there is a small area of old field. While its usefulness is limited due to its small size, there are other areas of this habitat type in the area of the industrial park that can be used by species requiring this type of habitat. The area is dominated by a mix of grasses and herbaceous plants, shrubs, seedlings and saplings. Shrub species include various types of dogwood, autumn olive and blueberry. These shrubs provide berries for food and cover for nesting birds. Willow, aspen and red maple saplings interspersed with

the shrubs helps provide diversity and increase the value of these old field areas for wildlife. Woodcock could utilize these types of areas for roosting and feeding. Grouse make use of the catkins and buds of aspen which are high in protein. Birds like the catbird, mockingbird, American goldfinch and song sparrows can utilize these old field areas to nest in.

Old field habitat is fast disappearing in Connecticut due to development for homes and industry, coupled with the fact that if not periodically maintained it succeeds into forest land. It is an important habitat type for a variety of species, from snakes, small mammals and birds to predators that prey on small mammals including fox, coyote and red-tailed hawk.

Wetlands

Some question arose during the preliminary meeting as to the validity of the methods and criteria used to determine wetlands existing on the site. Since the actual acreage of wetlands being impacted is important in the decision making process, it is important to have these points clarified.

In general, the wetlands on the site are forested red maple swamp wetlands and floodplain forested wetlands. Within these generalized habitat types, there is at least one permanent pool and possibly two, and two large drainage ditches. Much of the wetland complex that exists on the area was formerly used as agricultural land, as evidenced by the still visible furrows and drainage ditches. During the last 40 to 60 years of non-use it has reverted back to red maple dominated wetlands interspersed with shallow pools. The portion of wetlands along the sewer line has a well developed shrub understory. In other areas of wetland, tussock sedge cover can be found.

There are four specific areas of wetlands as delineated by Dames & Moore that will be directly impacted and/or potentially eliminated by the project. These areas are designated as Area C, D, E/M and O.

Area C is dominated by a canopy of red maple and white oak along with other species like aspen and ash. In some areas there is an extremely thick growth of shrubs including spice bush, winterberry, swamp azalea and dogwood. In other areas the ground is fairly open with little shrub cover. Small pools are scattered in this wetland area, and there may even be some shallow pools in the areas currently mapped as upland.

These wetland areas with their thick shrub undergrowth can provide important nesting habitat for a variety of birds such as the cat bird, common yellow throat and song sparrow. This thick growth provides cover for species like the raccoon, fox and opossum.

The shallow pools found in this area probably do not function as vernal pools. Typical vernal pools share the following characteristics: 1) contain water for at least two months during the growing season; 2) they occur within a confined depression or basin and lack a permanent outlet stream; 3) they lack fish; 4) they dry out in most years. The pools or

puddles in this area were very shallow and probably don't hold water for more than a few weeks at a time. In addition, no evidence of amphibian use was found during a second site inspection conducted on April 3, 1997 by the Team wildlife biologist and Hank Gruner, an expert on reptiles and amphibians from the Connecticut Science Museum.

So, while they may not function as vernal pools, they still provide feeding habitat for a variety of reptiles and amphibians.

Area D is a wetland associated with one of two large drainage ditches on the site. The ditch is 3 to 10 feet deep and sections of the ditch have a heavy growth of willow, alder, honeysuckle and multiflora rose. Evaluated by itself, this area probably has limited value for wildlife, but if considered in conjunction with other habitat available on the site, it could be utilized by many of the same species using the site elsewhere. The steep sides of the ditch probably represent an impediment to the travel of some reptiles and amphibians traveling in the area, but not to larger species of wildlife.

Area E/M is a forested wetland with a dense understory of sweet pepperbush in some areas. Part of the area has sedge tussocks and what appear to be seasonal pools of water. The pools may provide habitat for some reptiles and amphibians. This wetland would also provide habitat for a variety of species utilizing the entire area.

Area O contains the large drainage ditch, but it also contains two small ponds, (they are believed to be in Area O) connected by a meandering ditch. The more westerly pond has a thick growth of shrubs and trees around the perimeter and scattered tussock sedge hummocks. Based on the presence of tussock sedges in the upper pool and the fact that while surveying the area on April 3, 1997 a very large snapping turtle was found there, it probably contains water year round. Snapping turtles can not generally overwinter in a pond unless it has water in it year round. In addition, wood frog egg masses were found in this pond. Wood frogs are considered an obligate pool breeder, that is, they require vernal pools to breed in. According to Gruner, while the pond may not actually dry up during the year and meet all the requirements of a "typical vernal pool" the presence of the wood frog eggs indicates that it is functioning like one. The westerly pond is important breeding habitat for the wood frog and possibly other species including the spotted salamander, the spring peeper, the Eastern American toad, gray tree frog, pickerel frog, Fowler's toad and the green frog.

The easterly pond is smaller and is surrounded by larger, more mature trees, but with fewer shrubs. The lower or more easterly pond may not hold water on a year round basis, as evidenced by a lack of developed wetland vegetation growing in and around it. It is approximately 1 foot deep and the bottom was covered with leaves, not aquatic weeds. There were no signs of any fish life. This pool meets all the characteristics of a typical vernal pool. Wood frog egg masses were found in this pond also during the April 3, 1997 field visit. As stated before, wood frogs are an obligate vernal pool breeder (they require vernal pools). According to Gruner, this vernal pool could provide habitat for the spotted salamander also.

The two pools together can provide habitat for a variety of species, including painted, spotted and snapping turtle, wood frog, green frog, Eastern American toad, spotted salamander and red spotted newt. The more westerly pool also provides hibernation and foraging habitat for turtles like the spotted turtle and snapping turtle, (which were observed during the field visit).

This pond complex provides important habitat for a variety of wildlife species, but provides very critical habitat for reptiles and amphibians like those mentioned above. The ponds in Area O provide excellent wetland wildlife habitat. It must be noted though that the value of these pools would be greatly reduced if the surrounding upland-wetland complex were removed. Species using the pools for breeding, feeding and resting in, require the adjacent upland-wetland complex to meet the rest of their habitat requirements. Without these areas to serve as foraging habitat, dispersal areas and resting areas, the value of the pools is greatly reduced. The surrounding complex of wetlands and uplands provide the needed year round habitat for the species that may utilize these ponds, for various parts of their life cycle. For example, species like the wood frog, spring peeper, and American toad, utilize the ponds for breeding but spend the majority of their time in the upland forest-wetland complex.

So, while the value of the wetland areas C, D, and E/M as individual areas could be rated as fair to moderate (with the area where the ponds are as being rated high, (Area O), it is their additive value when considered as a total upland-wetland complex that makes them valuable. The value of the sum of all the habitats on the site is greater than any one of its parts.

While the direct impact from construction activity will be limited to sections of the above mentioned wetland areas, there will be indirect impacts to the floodplain forested wetland that exists along the Ten Mile River. Although there is an area of habitat between the wetlands delineated as D and E/M that has been delineated as upland forest, from a functional standpoint for wildlife habitat, much of this area could be considered part of the floodplain forest of the Ten Mile River. It is crucial to have adjacent upland habitat in order to maintain the value of the remaining wetlands.

The Ten Mile River supports a population of wood turtles (*Clemmys insculpta*), a species which is currently being proposed for listing as a state listed Species of Special Concern. One specimen was found at the site in 1996 (by Sigrun Gadwa and verified by Hank Gruner) and an additional specimen was found on April 3, 1997 during the field inspection that the Team wildlife biologist and Hank Gruner conducted. According to Gruner (personnel communication) the river habitat itself is critical for mating, hibernation and spring and fall activity. The surrounding wetland and upland habitat is important for summer foraging and nesting sites. Turtles may range 500 meters or more from the river habitat to forage.

Floodplain forest is an extremely valuable habitat type, mainly due in part to the seasonal influx of nutrients the ecosystem receives from seasonal flooding. This floodplain habitat type provides a wide variety of vegetation types and a great degree of structural diversity.

Some areas contain thick shrub growth providing abundant food and cover, interspersed with downed trees and logs along the river edge providing cover and resting places for various species of wildlife. The mix of groundcover, shrubs, and standing and downed trees provides a highly diversified wildlife habitat due to both vegetative and structural diversity. This mix of biological, physical and chemical characteristics combine to provide extremely valuable wildlife habitat.

Rivers and their adjacent habitat provide travel corridors for a wide variety of species to travel to new territories, hunt for prey or forage along. Birds often make use of these richly vegetated areas during spring migration to find an abundance of insects and cover before dispersing into nesting territories for the summer.

The floodplain forested area with its larger trees and the adjacent forested area is probably utilized by a number of birds including neo-tropical migrants (a group of birds that winter in the America's and nest in the U. S. and many of which show declining populations) because it is contiguous with a larger area of available habitat on the other side of the river and to the north and south of the site. While nesting use at the site by neo-tropical migrants might be limited, it is no doubt an important area of stopover habitat for neo-tropical migrants and other birds. But some species of birds mentioned before would also use the area for nesting.

This highly diversified floodplain habitat provides habitat for species like the wood duck, yellow throat, snapping turtle, painted and spotted turtle, green frog, mink and otter, along with many other species which would utilize this habitat in conjunction with neighboring habitats in the area.

Proposed Mitigation Plan

In general, while some types of wetland functions can be replicated, such as water storage, the value of wildlife habitat is not a function that has been duplicated with much success. It is extremely difficult to reproduce a wetland that has the same biological, physical and chemical characteristics as the wetland destroyed. Wetlands develop, evolve and change over a long time period, and along that dynamic continuum provide for the needs of different wildlife species for varying time periods.

The proposal is to replace the wetlands lost by creating wetlands in areas that are currently uplands. While this will result in "no net loss" of wetlands, it results in a net loss of currently functioning valuable wetland wildlife habitat. As planned, new wetlands would be created in the existing upland areas, but much of the value of the remaining wetlands value will be minimized or lost altogether due to the loss of adjacent uplands. This is because, as stated before, most species of wildlife utilizing wetlands require adjacent uplands during various phases of their life or during different seasons.

It takes many years for mitigated areas to begin to function like existing wetlands because it takes time for plants to take hold, new plants to colonize from other areas and for

populations of microscopic lifeforms to take hold. It may take years for a mitigated area to function like that which existed, if it ever does.

Wildlife Habitat Impacts

As with any development of an undeveloped area, the impact on wildlife habitat will be negative. The impact at this site will be extensive because of the large scale of expansion of the facility into the wetland/upland mosaic and its proximity to the Ten Mile River. A large portion of this small area of remaining habitat in this location along the Ten Mile River will be lost when the building is expanded, a new parking lot is created, vehicle access lanes are created and areas are seeded into lawn.

As more and more of the habitat occurring on the site at this point is eliminated or impacted the less useful it makes any remaining habitat, whether it be areas of wetlands or woodland. Over the last 50 or 60 years, much of the available habitat along the Ten Mile River has been developed and/or encroached upon. While no one project may seem like a large impact, it is the cumulative impact of all the projects that continues to erode the available habitat and increase the value of the habitat that remains.

In addition to the direct impact caused by the construction of the building etc., on the site there will be the impact caused by the wetland mitigation work. Functioning upland forested habitat will be disturbed to create new wetlands. While creation of these new wetlands will result in no net loss of wetlands, there will be a loss in total usable wildlife habitat. There will be a net loss of total available wildlife habitat. The remaining wetlands will be negatively impacted because valuable usable upland habitat will be changed into wetlands, whose value will be questionable. It will take many years for the value of the newly created wetlands to be determined and evaluated.

In the opinion of Hank Gruner, preserving a mosaic of upland and wetland habitats along the Ten Mile River is critical to the conservation of the wood turtle in this area. Although the species is not a state listed Species of Special Concern at this time, experts are extremely concerned about populations of this species in the state and their long term viability. The main threat to this species as with most others, is habitat loss. Obviously preserving the habitat of the species helps to ensure the viability of the species.

There will be several indirect impacts to the area caused by the expansion. Increased runoff from the additional impervious surfaces will end up in the wetland. If the water quality is compromised by contamination from chemicals such as oils from the parking lot and/or lawn fertilizers this could negatively affect the water quality of the Ten Mile River. This could negatively impact both the wildlife and fisheries resource (which wildlife may use for food).

Even though a buffer of 100 feet is proposed to be left along the Ten Mile River most species utilizing the riparian habitat use habitat far in excess of 100 feet from the river. In the case of wood turtles, as stated before, they may range up to 1500 feet or more from the river. This example illustrates how important preserving adjacent habitat to riparian

corridors is. In addition, there will be the impact of increased human disturbance even closer to the riparian habitat corridor of the Ten Mile River.

The other major impact will be the further encroachment of development on the remaining floodplain corridor habitat along the Ten Mile River. All of the habitat on the site is made more useful to wildlife due to the fact that it lies adjacent to the riparian habitat corridor of the Ten Mile River. This area of habitat has already been highly impacted by development up and down its course. Comparison of the most recent topographical map with one done in the 1950's shows that only a portion of the wildlife habitat once available is now available for use by wildlife.

Recommendations

There are few recommendations that can be made that would significantly lessen the impact that this project will have on this site. This is mainly because the site is so close to the Ten Mile River and so much of the now available habitat at the site will be impacted, both directly and indirectly.

It is strongly recommended that all possibilities for an alternative construction plan be considered, including adding a second story to the building, adding onto the north side of the building and even reducing the space that the new parking will use.

Other than a design alternative which further minimizes the impact to the existing habitat there are few on site mitigation measures or enhancements that can be carried out since so much of the site will be used for new construction, parking, roads, etc.

Implementation of the mitigation plan will result in a "no net loss" to wetlands, but the wetlands that will be created will be of questionable value for a long time to come and their construction will remove the important upland component so important to most wetland wildlife species. The merits and impacts of this plan should be carefully considered.

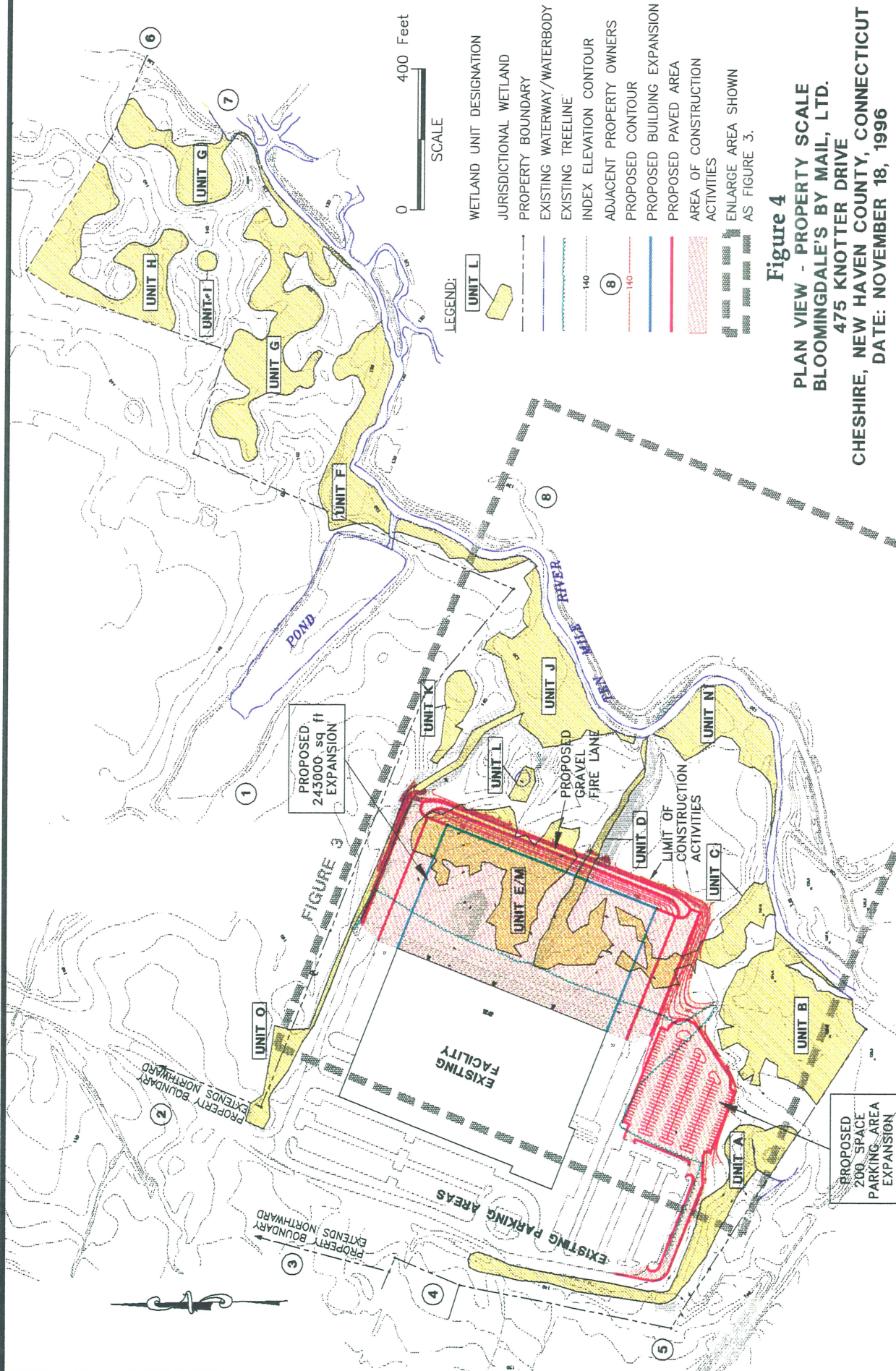
The old silt fence near the pond (former mitigation site) should be removed. Vertical impediments such as this can hinder or even prevent the movements of reptiles and amphibians using the pond and than traveling to the surrounding upland areas for foraging, etc.

Conclusion

Although the proposed development site is relatively small, it provides very, very important wildlife habitat due to the wetlands on the site and its relationship as an area of habitat within and adjacent to the very important Ten Mile River corridor.

Because of the importance of wetlands to wildlife and the fact that wetlands are limited in quantity and continue to dwindle on an almost daily basis in the state of Connecticut, it is

always preferable to choose the option or path of development that least impacts wetlands. In general, the value of wetlands increases as the quantity of the resource diminishes.



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Aquatic Resources

Site Description

A reach of the Ten Mile River, approximately 3/4 mile in length, forms the eastern property bound of the Bloomingdale's By Mail Facility. Through this reach, the Ten Mile River has a channel approximately 30 feet in top of bank width and normal flow depths averaging 2.5 feet. A meandering, low gradient channel creates surface flow predominated by moving pool. Stream substrate is composed of gravel, coarse sand, and sand-silt fines. Undercut banks, and fallen or overhanging vegetation provides in-stream cover. Riparian vegetation is comprised of dense hardwood and woody shrub growth.

Aquatic Resources

The Ten Mile River reach at the Bloomingdale's By Mail site is an excellent example of a low gradient, transitional cold to cool-water stream. Although physical habitat of the stream is preserved by a broad wetland floodplain, water quality has been impacted by commercial, industrial, and residential development within the watershed. Based upon a 1987 report, the Department of Environmental Protection classifies the Ten Mile River as "Class Bc" surface waters. Designated uses for surface water of this classification are recreational use, fish and wildlife habitat, agricultural and industrial supply, and other legitimate uses including navigation. The use of the subscript "c" in the Class Bc rating identifies the surface water as suitable for cold water aquatic species including spawning, growth, and passage.

As previously mentioned, this reach of the Ten Mile River reflects a transition from a cold-water to cool-water riverine complex. Such a transition has been noted in the finfish species composition. A formal finfish resource inventory of the Ten Mile River had been conducted by the Fisheries Division in 1990. That survey focused on a 450 foot reach of the Ten Mile River within the vicinity of West Johnson Avenue, Cheshire. Survey results (see Appendix A) revealed a finfish population composed of the following cold-water species: brown trout, fallfish, tessellated darter, white sucker, and American eel. Also present were redbfin pickerel, bluegill sunfish, pumpkinseed sunfish, and redbreast sunfish; these species are commonly associated with cool water streams. Although the survey site was approximately 1 mile downstream, the river reach at the Bloomingdale's location is of similar in-stream and riparian habitat and presumably would contain a similar finfish population.

Being within a highly urbanized area, the Ten Mile River is a significant recreational fishing resource. In an effort to meet angler demand, the Fisheries Division provides a supplemental stocking of trout with approximately 650 adult sized brown and rainbow trout released annually.

Impacts

Site plans indicate that an undisturbed riparian buffer of no less than 100 feet will be maintained between the proposed facility expansion and the Ten Mile River. Provisions for a buffer of this width eliminates the potential for direct physical alteration of riverine habitat.

Research has indicated that undisturbed, vegetated riparian buffers of this width are essential in maintaining the integrity of aquatic ecosystems. In recognizing the critical role of riparian habitats, the Fisheries Division has established a position and developed policy recommending preservation of riparian buffers of no less than 100 feet along perennial streams and 50 feet along intermittent streams. Copies of the Division's Policy Statement and Position Statement relating to riparian buffers may be found in Appendix A for further reference.

While the proposed facility expansion will not encroach upon the Ten Mile River and will not directly alter its habitats or resources, such significant site development may contribute to indirect impacts. Of primary concern is the management of stormwater runoff. Although 4.1 acres of floodplain wetland are to be recreated for the loss 3.38 acres, there will be a nearly direct discharge of stormwater runoff to the Ten Mile River. This stormwater management strategy has reportedly been developed to decrease on-site stormwater detention time and enable the discharge of stormwater runoff to the river prior to proximate peak storm flow thereby reducing flooding in the Ten Mile River basin.

Though this stormwater management system may alleviate flooding concerns, runoff from expanded impervious surfaces may lengthen the duration and intensify river flood flows. This can ultimately alter river flow dynamics in a manner promoting:

- accelerated scour and collapse of river banks eliminating the habitat afforded by undercut banks and bank vegetation.
- increased in-stream sediment transport which can cause a depletion of oxygen within the water column, disrupt aquatic insect and finfish respiration and gill function, reduce finfish egg survival, and reduce aquatic insect production.
- sediment deposition which in turn reduces water depths and results in a reduction of habitats utilized by aquatic insects and finfish for cover, foraging, or reproduction.

The nearly direct discharge of stormwater runoff may also cause aquatic habitat degradation due to:

- the influx of pollutants from developed areas (such pollutants include gasoline, oil, heavy metals, road salts, fine silts, and coarse sediments).
- nutrient enrichment or herbicide runoff from manicured lawns.

Recommendations

Key to the protection of Ten Mile River habitats and resources lies in design of the site's stormwater management system. Although it is believed that the current system design may promote adverse impacts to the riverine ecosystem, Division staff admittedly lack the ability to determine it's site specific efficacy and defers comment to the Environmental Review Team member(s) with such expertise. Should it be determined that the stormwater management system is of adequate design to treat runoff in a manner protective of the Ten Mile River, it is recommended that it be installed and be completely functional prior to proposed site expansion.

Equally critical to overall river health is an assurance that the recreated floodplain will serve the same function as that found to occur naturally. Again, Division staff defer comment to the expertise of the most appropriate Environmental Review Team member(s).

Stormwater Management

The project is a proposed 243,838 square foot expansion of an existing 292,000 square foot building. Two hundred additional parking spaces are proposed and approximately 3.3 acres of wetlands will be filled. Approximately 4.1 acres of wetland mitigation are proposed. The site borders on the Ten Mile River.

Existing drainage from the front (west side) of the site is collected in a drainage system and discharges to a swale and conservation area to the west and south. Part of the drainage from the north side of the site flows to the same system and the rest flows by leak-offs and sheet flow to a swale north of the building flowing east. Drainage from the south side parking is collected by a drainage system with two discharges to the conservation area to the west and to the south of the building. Roof drainage is collected by two pipes which discharge to a riprap pad and level spreader in the wetlands southeast of the existing building approximately 250 feet from the Ten Mile River. There is a large drainage ditch east of the building running east through the wetlands to the river.

Under the proposed drainage scheme for the expansion, runoff from the new parking area to the south will be discharged through a VortechTM grit chamber to the existing riprap pad for the roof discharge. Drainage for the perimeter driveway will flow through leak-offs to the conservation area to the south. Drainage from the north side of the expansion will discharge to leak-offs and to the existing swale flowing to the east. Roof drainage for the expansion will discharge to a new riprap pad which will flow into the existing drainage ditch flowing east to the river.

All the stormwater from the site discharges either to vegetated swales and conservation areas or through a grit separator to a level spreader and wetlands. Both means of discharge should provide adequate sediment and pollutant removal prior to reaching any watercourse. The "pre-final" plans also indicate the use of silt fence and vegetated filter strips for erosion control measures to protect the surrounding wetlands from sedimentation during construction. A riprap construction entrance pad should be shown on the plan to prevent off-site tracking of soils. Proper construction sedimentation basins and soil stockpile areas should also be shown on the final plans in conformance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The entire site is very level so sediment transport and erosion should be easy to prevent. The area of proposed disturbance is being held to a minimum. The most significant disturbance on the site is the proposed wetlands mitigation activity between the building and the river to the east which will be reviewed by the DEP Inland Water Resources Division.

A registration for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities must be submitted at least 15 days prior to the start of construction. A Stormwater Pollution Control Plan must also be prepared and kept on site at that time.

It appears that the existing facility falls under Standard Classification Code (SIC) 5961, "Catalog and Mail-Order Houses." If this SIC code is correct, the facility is required to submit a registration and follow a Stormwater Management Plan to comply with the General Permit for the Discharge of Stormwater Associated with Commercial Activity. This general permit covers commercial facilities with over 5 acres of impervious surface (including roof area). The existing operation appears to be out of compliance with this general permit and must submit a registration form and fee immediately to come into compliance. Despite the lack of compliance with the Commercial Stormwater General Permit, the site was generally kept in an orderly condition including the receiving and shipping areas. Once a Stormwater Management Plan is in place and followed, this should assure that no future problems will develop.

Planning Review

Location

The site is located in the Cheshire Industrial Park off Knotter Drive in northern Cheshire. The Ten Mile River forms the eastern boundary of the property as it flows in a northeasterly direction. Extensive wetlands lie between the river and the current Bloomingdale's facility. To the north are other industrial uses. To the east, directly across the river, is the Moss Farms subdivision. To the south and west residential uses are buffered by an eleven acre parcel owned by the Cheshire Land Trust.

Seventeen acres of the site is wooded wetlands. The proposed construction activity would encroach upon 3.38 acres, or 20% of the total wetlands. A minimum of 1:1 mitigation is proposed through on-site wetland creation.

Relationship to Local and Regional Plans

The proposal is located in an industrial zone, and appears to be in keeping with the Cheshire 1993 Plan of Development and Conservation. The future land use map of the 1977 Plan of Regional Development shows roughly half of this area as clustered residential (.5 units per acre net or less, minimum one acre lot size). The other half is shown as a natural area, with proposed protected open space along the Ten Mile River corridor. It appears that the proposed expansion of this facility would fall on the proposed open space protection area.

Comments and Recommendations

This expansion is not expected to have an adverse effect on traffic. Highway access to 1-84 and I-91, and improvements to West Johnson Road make this area suitable for industrial uses.

Although it was not proposed, permanent protection of a buffer strip along the Ten Mile River would be complimentary to the town-owned parcel directly across the river and would be in keeping with the open space goals of the Regional Plan of Development.

Appendix A

Fisheries Division

- Stream Survey Data of the Ten Mile River - July 19, 1990

Fisheries Division

- Policy Statement:
 - Riparian Corridor Protection
- Position Statement:
 - Utilization of 100 Foot Buffer Zones to Protect Riparian Areas in Connecticut

STREAM NAME : TEN MILE RIVER SITE #: 2015
 SITE DESCRIPTION: UPSTREAM OF WEST JOHNSON RD, MILLEDALE.
 STOCKED, MEANDERING MEADOW, DEEP HOLES
 SAMPLE LENGTH : 150. SAMPLE DATE: 07/19/1990

PHYSICAL		CHEMICAL		MEAN	STD
AIR TEMP.	:31.0 (C)	DISSOLVED OXYGEN (mg/l). . .	:	7.6	0.32
WATER TEMP.	:26.0 (C)	pH	:	7.0	0.06
VELOCITY.	: 0.225 (m/s)	COND (uS/cm3). . .	:	216.0	1.73
DISCHARGE	: 0.437 (m3/s)	ALKALINITY .(mg CaCO3 eq/l):	:	60.3	0.64

	MEAN	STD	
WIDTH.	: 7.2	1.4	(m)
DEPTH.	: 64.4	43.86	(cm)
DOMINANT SUBSTRATE TYPE. . .	: 1	POOL/RIFFLE RATIO . . .	: 2000.00
TYPE THREE SUBSTRATE . . .	: 0.00 (%)	AIR/WATER TEMP. RATIO:	: 1.19
EMBEDDEDNESS OF TYPE THREE :	31.67 (%)		
OVERHEAD CANOPY.	: 53.00 (%)		
INSTREAM SHELTER	: 838.04 (m2)		

SPECIES	BIOLOGICAL	POPULATION SIZE (Number/ha)	STANDARD ERROR (Number/ha)
<i>Etheostoma olmstedii</i>		250	2.04
<i>Anguilla rostrata</i>		18	4.63
<i>Semotilus corporalis</i>		9	3.09
<i>Esox americanus</i>		64	4.63
<i>Lepomis gibbosus</i>		18	4.63
<i>Lepomis auritus</i>		111	5.85
<i>Lepomis macrochirus</i>		37	5.29
<i>Catostomus commersoni</i>		287	6.38
<i>Salmo trutta</i>		9	9.27

DEPARTMENT OF ENVIRONMENTAL PROTECTION
INLAND FISHERIES DIVISION

POLICY STATEMENT
RIPARIAN CORRIDOR PROTECTION

I. INTRODUCTION, GOALS, AND OBJECTIVE

Alteration and exploitation of riparian corridors in Connecticut is a common event that significantly degrades stream water quality and quantity. Inasmuch as riparian ecosystems play a critical role in maintaining aquatic resource productivity and diversity, the Inland Fisheries Division (Division) recognizes that rigorous efforts are required to preserve, protect, and restore these valuable resources. Consequently, a riparian corridor protection policy has been developed to achieve the following goals and objective:

Goals

Maintain Biologically Diverse Stream and Riparian Ecosystems, and

Maintain and Improve Stream Water Quality and Water Quantity.

Objective

Establish Uniform Riparian Corridor Buffer Zone Guidelines.

II. DEFINITIONS

For the purpose of implementing a statewide riparian corridor protection policy, the following definitions are established:

Riparian Corridor: A land area contiguous with and parallel to an intermittent or perennial stream.

Buffer Zone: An undisturbed, naturally vegetated area adjacent to or contained within a riparian corridor that serves to attenuate the effects of development.

Perennial Stream: A stream that maintains a constant perceptible flow of water within its channel throughout the year.

Intermittent Stream: A stream that flows only in direct response to precipitation or which is seasonally dry.

III. RIPARIAN FUNCTION

Naturally vegetated riparian ecosystems perform a variety of unique functions essential to a healthy instream aquatic environment. The delineation and importance of riparian functions are herein described. Vegetated riparian ecosystems:

- * Naturally filter sediments, nutrients, fertilizers, and other nonpoint source pollutants from overland runoff.

- * Maintain stream water temperatures suitable for spawning, egg and fry incubation, and rearing of resident finfish.
- * Stabilize stream banks and stream channels thereby reducing instream erosion and aquatic habitat degradation.
- * Supply large woody debris to streams providing critical instream habitat features for aquatic organisms.
- * Provide a substantial food source for aquatic insects which represent a significant proportion of food for resident finfish.
- * Serve as a reservoir, storing surplus runoff for gradual release into streams during summer and early fall base flow periods.

IV. RIPARIAN CORRIDOR BUFFER ZONE GUIDELINES

Recognizing the critical roles of riparian corridors, the Division provides buffer zone guidelines that are designed to bring uniformity and consistency to environmental review. The guidelines are simple, effective, and easy to administer. The following standard setting procedure should be used to calculate buffer zone widths.

Perennial Stream: A buffer zone 100 feet in width should be maintained along each side.

Intermittent Stream: A buffer zone 50 feet in width should be maintained along each side.

Buffer zone boundaries should be measured from either, (1) edge of riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or (2) in the absence of a riparian wetland, the edge of the stream bank based on bank-full flow conditions.

The riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition. All activities that pose a significant pollution threat to the stream ecosystem should be prohibited.

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths and allowable development uses within these areas, local authorities should be encouraged to adopt the more restrictive regulations and policies.

Date

12/13/91

James C. Moulton
Acting Director

POSITION STATEMENT
UTILIZATION OF 100 FOOT BUFFER ZONES TO PROTECT RIPARIAN AREAS
IN CONNECTICUT
BY
BRIAN D. MURPHY
TECHNICAL ASSISTANCE BIOLOGIST
INLAND FISHERIES DIVISION

I. INTRODUCTION

One tenet of the Inland Fisheries Division Policy on Riparian Corridor Protection is the utilization of a 100 foot buffer zone as a minimum setback along perennial streams. The adoption of such a policy is sure to be controversial. Laymen, developers and natural resource professionals alike will ask questions such as: Why was a standard setting method adopted? What's magical about 100 feet? Will 100 feet be sufficiently protective, or will it be overly protective? In response, this paper outlines the ramifications of adopting a riparian corridor policy including the use of a 100 foot buffer zone.

II. STANDARD SETTING VERSUS SITE SPECIFIC BUFFER ZONES

There are two approaches for determining buffer zone width; standard setting and site specific. Standard setting methods define an area extending from the streambank edge or highwater mark to some landward fixed point boundary. Site specific methods utilize formulas that incorporate and consider special site specific land characteristics, hence, the calculation of a variable width buffer zone. In both case, buffers are employed to define an area in which development is prohibited or limited.

A major advantage of standard setting methods is that they are easy to delineate and administer, thereby improving the consistency and quality of environmental assessments. Furthermore, valuable staff time would not be required to determine site specific buffer zones along each and every watercourse of concern.

The exact width of a buffer zone required for riparian corridor protection is widely disputed (Bottom et al. 1985 and Brinson et al. 1981). Buffer width recommendations found in the literature vary from as little as 25 feet to as great as 300 feet (Palfrey et al. 1982). The 100 foot buffer is widely accepted in Connecticut having been adopted by numerous inland wetland and conservation commissions as an appropriate minimum setback regulation for streambelts. In addition, Division staff have been recommending the utilization of the 100 foot buffer zone to protect streambelts since the early 1980's. Scientific research has not been generated to dispute the adequacy of utilizing 100 foot buffer zones to protect Connecticut's riparian corridors. In fact, to ensure that riparian functions are not significantly altered, recent scientific information points towards maintaining buffer zones that would be at a minimum, 100 feet in width (see section III).

Site specific methods define buffer widths according to the character and sensitivity of adjacent streamside lands. These buffer widths, also referred to as "floating buffers," consider physical site characteristics such as slope, soil type, and vegetative cover. The advantage of site specific methods is that buffer widths are designed using site characteristics and not an arbitrary predetermined width. Unfortunately, there is no "one" universally accepted formula or model and none have been developed for use in Connecticut. Most formulas are based on the degree to which sediment can be removed or filtered by natural vegetation, thus, the primary useage is sediment control. Other weaknesses of site specific techniques are (1) all areas must be evaluated on a case-by case basis and, (2) the subjectivity of different techniques (i.e. if the evaluation technique is inadequate, the buffer width will also be inadequate).

Additionally, these formulas only concentrate on one specific riparian function at a time and do not take into account multiple riparian functions, especially those of inland fisheries values as discussed in Section III. Consequently, site specific formulas approach riparian function on a single dimension rather than taking a more realistic, holistic approach.

In the absence of a scientific model to determine buffer widths suitable to protect Connecticut's riparian corridors, the utilization of a standard setting method is environmentally and politically prudent.

III. RIPARIAN FUNCTION

To assess the efficacy of a 100 foot buffer zone, the literature was searched to identify studies which have applied a quantitative approach to buffer width determination. Literature was searched for studies which both support and dispute the 100 foot zone. The following is a summary "by riparian function" of quantitative studies which assess buffer widths.

Sediment Control

Width, slope and vegetation have been cited as important factors in determining effectiveness of buffer zones as sediment filters (Karr and Schlosser 1977). Wong and McCuen (1981), who developed and applied a mathematical model to a 47 acre watershed, found that a 150 foot zone along a 3% slope reduced sediment transport to streams by 90%. Mannering and Johnson (1974) passed sediment laden water through a 49.2 foot strip of bluegrass and found that 54% of sediment was removed from the water. Trimble and Sartz (1957) developed recommendations as to width of buffer areas between logging roads and streams to reduce sediment load. They determined a minimum strip of 50 feet was required on level land with the width increasing 4 feet for each 1% slope increase. Buffer widths as determined by Trimble and Sartz (1957) have been characterized as evaluated guesses rather than empirically defined widths (Karr and Schlosser 1977). Rodgers et al. (1976) state that slopes greater than 10% are too steep to allow any significant detention of runoff and sediment regardless of buffer width. After a critical review of the literature, Karr and Schlosser (1977) determined that the size and type of vegetative buffer strip needed to remove a given fraction of the overland sediment load cannot be universally quantified. Existing literature does suggest that 100 foot riparian buffers will assist with sediment entrapment, although efficacy will vary according to site conditions.

Temperature Control

Brown and Brazier (1973) evaluated the efficacy of buffer widths required to ameliorate stream water temperature change. They concluded that angular canopy density (ACD), a measure of the ability of vegetation to provide shading, is the only buffer area parameter correlated with temperature control. Results show that maximum angular canopy density or maximum shading ability is reached within a width of 80 feet. Study sites were 9 small mountain streams in Oregon that contained a conifer riparian vegetative complex. Whether or not maximum angular canopy density is reached within 80 feet in a typical Connecticut deciduous forest riparian zone is doubtful. Tree height in Connecticut riparian zones is smaller than in Oregon (Scarpino, personal communication), therefore buffers greater than 80 feet in width would be required for temperature maintenance in Connecticut.

Nutrient Removal

Nutrient enrichment is caused by phosphorous and nitrogen transport from, among other things, fertilized lands and underground septic systems. Most research on nutrient enrichment has focused on overland surface flow. Karr and Schlosser (1977) report that 88% of all nitrogen and 96% of all phosphorous reaching watercourses in "agricultural watersheds" were found to be attached to sediment particles; thus, successful nutrient removal can be accomplished through successful sediment removal. There are conflicting reports on the ability of buffer widths to remove nutrients with most research being tested on grass plots. Butler et al. (1974) as cited by Karr and Schlosser (1977) found that a 150 foot buffer width of reed canary grass with a 6% slope caused reductions in phosphate and nitrate concentrations of between 0-20%. Wilson and Lehman (1966) as cited by Karr and Schlosser (1977) in a

study of effluent applied to 300 m grass plots found that nitrogen and phosphorous concentrations were reduced 4 and 6%, respectively. Studies on subsurface runoff as cited in Clark (1977) found high concentrations of nitrates at 100 feet from septic systems with unacceptable levels at 150 feet. Clark (1977) recommended that a 300 foot setback be used whenever possible, with a 150 setback considered adequate to avoid nitrate pollution. Environmental Perspective Newsletter (1991) states that experts who commonly work with the 100 foot buffer zone set by the Massachusetts Wetlands Protection Act are increasingly finding that it is insufficient since many pollutants routinely travel distances far greater than 100 feet with nitrate-nitrogen derived from septic systems moving distances of greater than 1000 feet. Research indicates that the adoption of 100 foot buffer widths for Connecticut riparian zones will assist with the nutrient assimilation; albeit, complete removal of all nutrients may not be achieved.

Large Woody Debris

The input of large woody debris (LWD) to streams from riparian zones, defined as fallen trees greater than 3 m in length and 10 cm in diameter has been recently heralded as extremely critical to stream habitat diversity as well as stream channel maintenance. Research on large woody debris input has mainly been accomplished in the Pacific Northwest in relation to timber harvests. Murphy and Koski (1989) in a study of seven Alaskan watersheds determined that almost all (99%) identified sources of LWD were within 100 feet of the streambank. Bottom et al. 1983 as cited by Budd et al. (1987) confirm that in Oregon most woody structure in streams is derived from within 100 feet of the bank. Based on research done within old-growth forests, the Alaska region of the National Marine Fisheries Service, recognizing the importance of LWD to salmonid habitat, issued a policy statement in 1988 advocating the protection of riparian habitat through the retention of buffer strips not less than 100 feet in width (Murphy and Koski 1989). All research findings support the use of a 100 foot buffer zone in Connecticut for large woody debris input.

Food Supply

Erman et al. (1977) conducted an evaluation of logging impacts and subsequent sediment input to 62 streams in California. Benthic invertebrate populations (the primary food source of stream fishes) in streams with no riparian buffer strips were compared to populations in streams with buffer widths of up to 100 feet. Results showed that buffer strips less than 100 feet in width were ineffective as protective measures for invertebrate populations since sediment input reduced overall diversity of benthic invertebrates. Buffer strips greater than 100 feet in width afforded protection equivalent to conditions observed in unlogged streams. The ultimate significance of these findings is that fish growth and survival may be directly impacted along streams with inadequate sized riparian buffer zones. All research supports the feasibility of implementing a 100 foot buffer zone in Connecticut to maintain aquatic food supplies.

Streamflow Maintenance

The importance of riparian ecosystems in terms of streamflow maintenance has been widely recognized (Bottom et al. 1985). In Connecticut, riparian zones comprised of wetlands are of major importance in the hydrologic regime. Riparian wetlands store surplus flood waters thus dampening stream discharge fluctuations. Peak flood flows are then gradually released reducing the severity of downstream flooding. Some riparian wetlands also act as important groundwater discharge or recharge areas. Groundwater discharge to streams during drier seasonal conditions is termed low flow augmentation. The survival of fish communities, especially coldwater salmonid populations is highly dependent upon low flow augmentation (Bottom et al. 1985). Research, although documenting the importance of riparian zones as areas critical to streamflow maintenance, has not investigated specific riparian buffer widths required to provide the most effective storage and release of stream flows.

IV. OTHER POLICY CONSIDERATIONS

Measurement Determination

The proposed policy states that buffer zone boundaries should be measured from either the edge of the riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or in the absence of a riparian wetland, the edge of the streambank based on bank-full flow conditions. This boundary demarcation is absolutely necessary to ensure that all riparian wetlands are protected. For example, if all measurements were to start from the perennial stream edge and extend landward for a distance of 100 feet, many riparian zones that contain expansive wetlands greater than 100 feet in width would be left unprotected.

Also, since boundary demarcation includes wetland delineation, the ultimate width of the buffer will vary according to site specific features. Consequently, buffer width determination as stated by Division policy is a "hybridization" of both standard setting and site specific methods. This hybridization of methods is advantageous since it acknowledges the sensitivity of streamside wetlands.

Home Rule

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths, local authorities would be encouraged to adopt the more restrictive regulations and policies. This feature incorporates flexibility to acknowledge the importance of local "home rule" regulations or policies already in accepted practice. Conversely, towns and cities without accepted policies and regulations could choose to enact the Division policy.

Allowable Uses in Buffer Zones

The Division policy states that "the riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition and that all activities that pose a significant pollution threat to the stream ecosystem should be prohibited." In essence, the buffer zone becomes an area where no development should be allowed. For this policy to be effective, there should be no exceptions, a blanket restriction of all uses would be recommended. Further clarification and more precise definitions of allowable uses will, however, be required in the future if the policy evolves into a departmental regulation.

Recently, the Connecticut Supreme Court has ruled that local agencies can prohibit specific development within buffer zones. The *Lizotte v. Conservation Commission of the Town of Somers*, 216 Conn.320 (1990) decision ruled that the construction or maintenance of any septic system, tank, leach field, dry well, chemical waste disposal system, manure storage area or other pollution source within 150 feet of the nearest edge of a watercourse or inland wetland's seasonal high water level can be prohibited (Wetlands Watch 1990). If this decision is a precursor of the future, Connecticut courts will continue to support the use of buffers, especially those which restrict or prohibit detrimental activities.

V. CONCLUSIONS

The following actions are required to preserve, protect, and restore Connecticut's riparian corridors:

1. The Inland Fisheries Division needs to adopt and implement the proposed policy so that staff can use it as a guideline to assist cities, towns, developers and private landowners with making sound land use decisions. This policy will act to solidify a collective position concerning riparian corridor protection.
2. While the proposed policy in its "current form," represents a recommendation from the CTDEP Inland Fisheries Division, the ultimate goal of the Division should be to progressively implement this policy as either a CTDEP regulation or State of Connecticut statute.

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Appendix B

DEP Natural Resources Center

- Natural Diversity Data Base Correspondence

RECEIVED FEB 18 1997



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



NATURAL RESOURCES CENTER
79 Elm Street, Store Level
Hartford, Connecticut 06106-5127
Natural Diversity Data Base

February 13, 1997

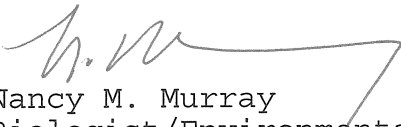
Elaine Sych
Connecticut Environmental Review Team
PO Box 70
Haddam, CT 06438

Dear Elaine:

Here is a copy of my letter to Mr. Sipperly, Town of Cheshire, regarding the Bloomingdale's By Mail Facility. As we discussed during our phone conversation, field surveys to relocate the State Listed species reported by Mr. Wiley need to be done at appropriate times of the year. I would appreciate receiving a copy of your final report when it is available.

Please contact me if you have any questions or comments regarding this matter.

Sincerely,


Nancy M. Murray
Biologist/Environmental
Analyst III

NMM/dmd

Enclosure



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



NATURAL RESOURCES CENTER
79 Elm Street, Store Level
Hartford, Connecticut 06106-5127
Natural Diversity Data Base

February 4, 1997

James Sipperly
Town of Cheshire
Environmental Planner
84 South Main Street
Cheshire, CT 06410

Dear Mr. Sipperly:

In September 1996, the Natural Diversity Data Base responded to a request from Thomas S. Ryder, Dames and Moore, regarding endangered species at the Bloomingdale site in Cheshire. According to our records, we did not have any reports of state or federal endangered, threatened or special concern listed species. I have attached copies of these correspondences.

As stated in our response letter:

"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 Natural Resources 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."

No-one from the DEP's Natural Diversity Data Base has conducted botanical surveys of the area in questions.

In January 1997, you provided us with a map of the Bloomingdale site indicating that the Town of Cheshire - Wetlands Commission is reviewing an application to fill 3.8 acres of wetlands and 4 acre feet of floodplain forest at this site. You also provided a copy of "Table 2 Plant Species List Bloomingdales By Mail, Ltd. Cheshire, New Haven County, CT September 18-21, 1996." This list was prepared by Robert Wiley. Four of the

species on this list are on the Connecticut State Endangered, Threatened and Special Concern list (R.C.S.A. Section 26-306). They are: *Acalypha virginica*, Virginia Copperleaf; *Aster prenanthoides*, Crooked-stem Aster; *Smilacina trifolia*, Three-leaved Solomon's-seal; and *Streptopus amplexifolius*, White Mandarin. Information about the State status, habitat, documented distribution in Connecticut*, and time of year these species are recognizable is summarized in the following chart.

<u>Species Name</u>	<u>State Status</u>	<u>Habitat/Documented Distribution in CT</u>	<u>Time of Year</u>
<i>Acalypha virginica</i>	Special Con (Historic)	dry soils, fields, thickets/Groton, Windham, Glastonbury, Mansfield, New Fairfield, Stratford, Wilton, Franklin, New London, and Sprague	Aug-Oct
<i>Aster prenanthoides</i>	Special Con (Historic)	damp thickets, rich woods, shores and bottomlands/Trumbull, New London, Waterford, and Bristol (questionable nativeness)	Aug-Oct
<i>Smilacina trifolia</i>	Threatened	bogs, mossy woods and peaty shores/Cromwell, East Hartford, Norfolk, Salisbury, Southbury, Stafford, and Thompson	May-Aug
<i>Streptopus amplexifolius</i>	Threatened	moist woods and thickets/Salisbury, North Canaan, Canaan, and Granby	May-Aug

*Documented distribution in Connecticut means that voucher specimens have been deposited in one of the major regional herbariums (museum for plant collections). These voucher specimens represent historic and extant populations.

According to information provided by Christie Porter, Dames and Moore Group, in a correspondence dated January 24, 1996 (correct date 1997) and a phone call on January 24, 1997 between Stacey Kingsbury, DEP, and Robert Wiley:

James Sipperly
Page 3
February 4, 1997

1. the area Mr. Wiley surveyed is northeast of the actual construction site;
2. specimens were not collected; and
3. the exact locations of where the four state listed species were observed were not recorded.

The proposed activities will require permits from DEP's Inland Water Resources Division. Therefore, we need to ensure that State listed species will not be negatively affected (C.G.S. Section 26-310) by the proposed activities. I recommend that the areas to be affected by the proposed construction be surveyed at appropriate times of the year by a botanist familiar with the Connecticut flora. Such surveys should be summarized in a report that includes description of existing site conditions, a list of vascular plant species observed, a map with locations of state or federally listed species, habitat descriptions and associated species of areas of state or federal listed species, and credentials of person doing the work. This information should be sent to me so it can be reviewed by DEP Natural Resources Center staff. If any State or Federal listed species are found, an assessment of potential impacts that would result from proposed activities should be included.

The locations of where Mr. Wiley observed the four state listed plants in the area northeast of construction site should be relocated. This information should also be sent to me for evaluation. As part of this evaluation, we would like to field check the locations so the identification of the species can be verified. Once verified, the information would be added to the Natural Diversity Data Base.

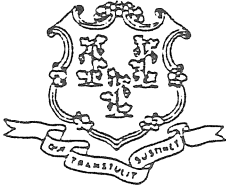
In addition to the four species that are on State Endangered Species list, three species on the plant species list prepared by Mr. Wiley have never been reported from the state. They are: *Carex frankii*, *Sedum telephioides* and *Smilax ecirrhata*. The identification of these species should be verified as they would be additions to the State flora.

If you have any questions regarding this matter please contact me at (860)424-3589.

Sincerely,

Nancy M. Murray
Biologist/Environmental
Analyst III

NMM/dmd
Enclosures
cc: Sally Snyder, DEP-IWRD



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



NATURAL RESOURCES CENTER
79 Elm Street, Store Level
Hartford, CT 06106
Natural Diversity Data Base

October 3, 1996

Thomas S. Ryder
Dames and Moore
7101 Wisconsin Ave.
Suite 700
Bethesda, MD 20814-4870

re:Bloomingtons by Mail, LTD.
(Cheshire, CT)

Dear Mr. Ryder:

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided and listed above. 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 biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources 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 substitutes 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.

Please contact me if you have further questions at 424-3592. Thank you for consulting the Natural Diversity Data Base. Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

Sincerely,

Dawn M. McKay
Biologist/Environmental Analyst



DAMES & MOORE

7101 WISCONSIN AVENUE, SUITE 700, BETHESDA, MARYLAND 20814-4870
(301) 652-2215 FAX: (301) 656-8059

7861

September 26, 1996

Connecticut Department of Environmental Protection
Natural Diversity Database
79 Elm Street, Store level
Hartford, Ct 06106

Re: Threatened/Endangered Species Inquiry

Attention: Natural Diversity Database

Dames & Moore is currently conducting a site characterization to support an application for an Individual Permit from the Army Corps of Engineers for wetland impacts. The site is a 75 acre area containing approximately 35 acres of wetland. The wetlands of concern are dominated by mature and earlier successional forest. The site is thought to be zoned as industrial and contains a few separated multi-acre buildings. The goal of the project, to expand one of the buildings, would impact these wetlands and bring the building to within 100 ft of the Ten Mile River.

As part of our investigation, we are requesting any information that you may have on the presence of state or federally-listed endangered or threatened animal and plant species within or near the project area. We are also requesting information on Natural Heritage Areas, colonial nesting bird sites and historic waterfowl staging and concentration areas on and in the immediate vicinity of the property. Enclosed is a topographic map with the area of concern outlined to assist in your evaluation.

Thank you for your time and assistance. If you require additional information, please call me at (301) 652-2215.

Sincerely,
DAMES & MOORE

Thomas S. Ryder
Wildlife Biologist

OK 9/25/96



0 2000 Feet



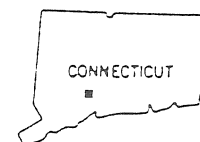
SCALE

LEGEND:

--- Approximate Site Boundary

SOURCE: U.S.G.S. 7.5' Series Quad., Southington, Conn., 1968, photorevised 1992.

FIGURE 1
SITE LOCATION MAP
BLOOMINGDALES BY MAIL, LTD.
475 KNOTTER DRIVE
CHESHIRE, NEW HAVEN COUNTY, CONN.



QUADRANGLE LOCATION

DAMES & MOORE

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.