NORTHEAST NEIGHBORHOOD
SPECIFIC INVENTORY AND RESOURCE ANALYSIS

CITY OF FITCHBURG
DANE COUNTY, WISCONSIN

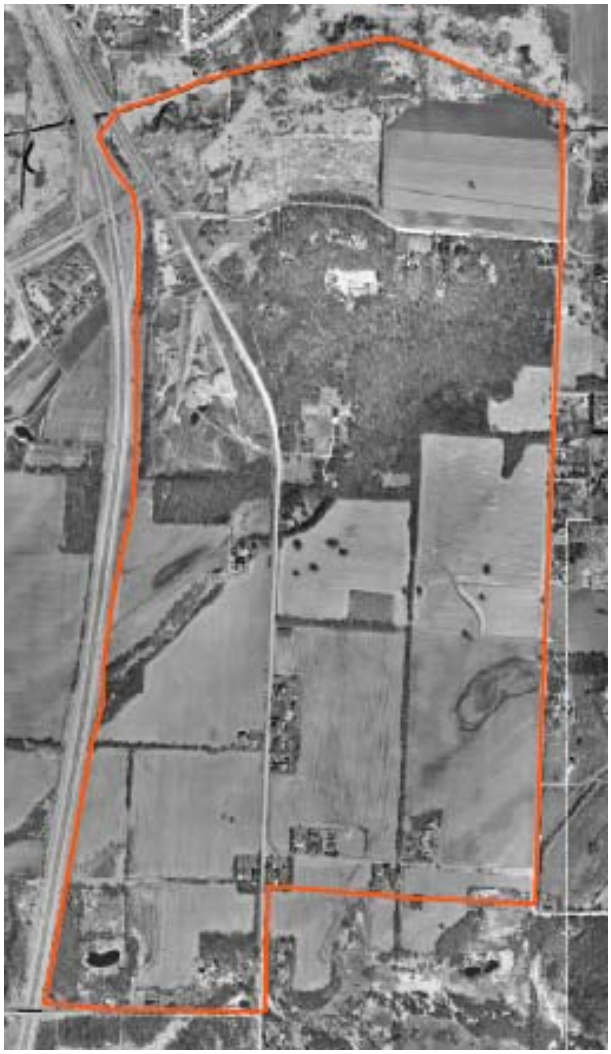
RUEKERT/MIELKE
W233 N2080 Ridgeview Parkway
Waukesha, Wisconsin 53188

Specific Inventory and Resource Analysis
Northeast Neighborhood
City of Fitchburg

Background

The Northeast Neighborhood was identified as a cohesive neighborhood with development potential through the Future Urban Development Area study (FUDA) in 2004 based on its proximity to the City of Madison, vehicle and bicycle transportation corridors, and the ability of the City to provide infrastructure for public services. Future development is possible in the Northeast Neighborhood only after the City adopts a neighborhood land use plan and approves the Urban Service Area.

The Northeast Neighborhood is located in the northeast portion of the City of Fitchburg, adjacent to the City of Madison, Town of Blooming Grove, and the Town of Dunn. Boundaries of the neighborhood include Larsen Road, Nine Springs Creek, USH 14, and the Lacy Road/Goodland Park Road corridor. It encompasses approximately 868 acres, or slightly under 1.4 square miles.



In 2005 a process began to study appropriate future land uses within the neighborhood. Natural and man-made limitations identified through the neighborhood planning process resulted in a more detailed analysis of the neighborhood including a conceptual storm water management study, an internal analysis of the water supply system, a traffic study, and this Specific Inventory and Resource Analysis.

This Specific Inventory and Resource Analysis is part of the overall planning process for the Northeast Neighborhood that includes the heavily wooded area in the northern portion of the neighborhood. The boundaries of the study area consisted of those properties within the wooded area on which the property owners granted access permission. Concerns that surfaced at the Public Hearing for the Northeast Neighborhood Land Use Plan became the genesis of this study. More specifically, this Specific Inventory and Resource Analysis is to address the potential for future development within the woodlot in the northern portion of the neighborhood and an identification of the heritage trees for the City of Fitchburg Parks Department.

Study Area with Forest Communities

SOURCE: Natural Resources Consulting, Inc.

The purpose of the Specific Inventory and Resource Analysis is to identify the environmental significance of the natural features within the woodlot, the potential impacts of development on these resources, and parameters or conditions that must be followed for development to occur in a manner that is sensitive to the natural environment.

The City of Fitchburg contracted with Ruekert-Mielke, a municipal consulting firm, to prepare the Specific Inventory and Resource Analysis for the woodlot within the Northeast Neighborhood. Ruekert-Mielke teamed with Natural Resources Consulting, Inc. (NRC) to complete the fieldwork and sampling that comprised the initial phases of the project. An overview of the natural resource inventory follows with an analysis regarding the appropriateness of future development within the study area. Please see Appendix A for the complete Northeast Neighborhood Specific Inventory and Resource Analysis, fieldwork, and sampling data.

The Specific Inventory and Resource Analysis includes an array of natural features to be studied and identified, including the trees, woody and herbaceous plants, slope and soil erosion capability, soil moisture and nutrient regime, landforms, native animal species, threatened or endangered species, ecological habitat, and any other significant features or resources.

Tree Inventory

A tree inventory was completed for the woodlot in the Northeast Neighborhood from a sampling of locations throughout the woodlot. The sampling locations consisted of areas roughly 50-feet in diameter where all trees with a diameter at breast height (dbh) greater than 4" were measured, analyzed, and documented. The tree inventory includes tree species, size, crown class, and an assessment of the health of each tree. The study area was divided into three separate tree communities that represent the entire woodlot. Each of the communities has specific characteristics that represent the growing conditions of the trees and plants. The three communities include a dry mesic forest, pine plantation, and disturbed mesic forest.

1. Dry Mesic Forest

Background Information

The majority of the study area has been identified as a dry mesic forest. The dry mesic forest is approximately 60 acres. A mesic upland forest typically grows on hilly or sloping areas on moderately moist soils with high nutrient content. A dry mesic forest then, is typically known as an upland forest that is slightly drier than a mesic forest, and that has a canopy that is more open than a typical mesic upland forest.

Analysis

Twenty sampling locations were established throughout the dry mesic forest community with 130 live trees studied and analyzed. A wide variety of trees were sampled in the species, size, and crown class; however, the canopy is dominated by large white, red, and bur oak trees ranging in size from three to 50 inches in diameter at breast height.

The most prevalent tree species indicated in the sampling of the dry mesic forest include black cherry, white oak, shagbark hickory, box elder, and black locust. Each of the five most prevalent tree species accounted for at least ten percent of the tree cover.

Of the 130 trees identified in the sampling, only fifteen percent of the trees where identified as non-native species. These species included black locust (10%) and common buckthorn (5%).

Overall, there is nearly an even ratio of the desirable and undesirable trees in the dry mesic forest community. In terms of development impact, for the purpose of this study a desirable tree is defined as a healthy non-invasive native tree that is worthy of preservation because it contributes to the environmental significance of the woodland community. Many of the desirable tree species have been indicated to be in good health, with some exceptions. The trees considered to be undesirable were those species identified as non-native or invasive, and those having unsightly characteristics including bent structure, many dead branches, and side sprouts.

Using the diameter at breast height, the trees can be placed into separate classes. Classes include trees from four to 14.9 inches, fifteen to 31.9 inches, and 32 inches and greater. Using the size classes, tree density is calculated for an average number of trees per acre. The four to 14.9 inch size class has a density equivalent to 102 trees per acre within the community. There are 28 trees per acre in the fifteen to 31.9 inch size class, and roughly one tree greater than 32 inches for every two acres.

2. Pine Plantation

Background Information

The pine plantation community is adjacent to the southeastern portion of the dry mesic forest community. A pine plantation typically consists of a single species or a variety of species of pine trees planted in distinct rows with distinct spacing. Pine plantations are typically planted, maintained, and harvested for profit; however, the pine plantation community in the Northeast Neighborhood does not appear to be a venture based on compensation due to the relatively small acreage (approximately four acres).

Analysis

The analysis of the pine plantation community consisted of two sample plots near the center of the community. Two pine tree species, red pine and white pine, where found in the community roughly distributed equally.

All of the pine trees sampled fell into the first size class of between four and 14.9 inches in diameter at breast height. Seventeen trees were sampled and when calculated into density per acre there are 127 pine trees per acre.

3. Disturbed Mesic Forest

Background Information

The disturbed mesic forest is approximately two acres and is similar to a mesic forest based on the soil and growing conditions of a mesic forest. The distinguishing factor that alters a mesic forest to become a disturbed mesic forest is the lack of desirable tree species. These desirable trees, if ever present, have been harvested or died and undesirable trees have populated the community.

Analysis

There were only two species of trees identified in the disturbed mesic forest, box elder and silver maple. Both tree species are native, but are not considered to be desirable tree species because of weak growth structures, disease problems, and invasive tendencies. Of the trees found in the disturbed mesic forest community, only the silver maple tree, which has the dominant crown, is healthy. The box elder trees were noted to consist of stump sprouts and bent poor quality trees.

Of the thirteen trees sampled, all of the box elder trees had a diameter at breast height in the range of four to 14.9 inches and the silver maple tree measured 15.5 inches in diameter at breast height.

Heritage Trees

Heritage trees are estimated to be at least 200 years old. The City of Fitchburg is in the process of trying to identify locations of such trees within the City so that they can be preserved appropriately. White and bur oak trees are considered Heritage Oaks if the diameter at breast height is at least 38 inches. Pin, black, and red oak trees must have a dbh of 42 inches to be considered a Heritage Oak. Five Heritage Oaks meet these criteria in the study area. All five of the Heritage Oaks are located in the dry mesic forest community. In addition, a plains cottonwood tree and a silver maple tree with diameters greater than 50 inches have been identified as Heritage Trees.

Large, healthy oak trees that do not meet the Heritage Oak classification have also been identified as specimen trees. There are 23 large and healthy oak trees within the dry mesic forest community that are not classified as Heritage Oaks, but are considered worthy of being preserved and identified as specimen trees. These trees range from 27.5 inches to 38 inches in diameter at breast height. The locations of the Heritage and Specimen Trees are identified on Figure 4 of the attached woodlot inventory.

Herbaceous Plants and Woody Shrub Inventory

The understory of the woodlot offers a large expanse of area that is able to support a variety of herbaceous plants and woody shrubs. A preliminary review of the spring ephemeral vegetation was conducted in April and May, followed by further analysis in September to identify the species and surface cover of each species. The inventory area was determined by identifying four one-meter quadrants within each of the tree inventory sample plot radii. The shrubs and herbaceous plants were inventoried within each of the three woodland communities.

1. Dry Mesic Forest

   Of the understory within the dry mesic forest, more than 43 percent of the ground is bare and non-vegetated. More than four percent of the ground cover consisted of coarse woody debris. The most prominent herbaceous vegetation is non-native garlic mustard, covering more than 25 percent of the ground. Other notable native species include broad-leaf enchanter's-nightshade, wild geranium, and may-apple. Non-native species account for almost one-third of the total understory throughout the entire community. Some of the most prevalent species are garlic mustard, honeysuckle, and buckthorn

   The northwest portion of the woodlot is dominated by garlic mustard where it reaches an average percent cover of roughly 63 percent in specific sampling locations. It is noted that this is an area where the owner previously ran horses and the native plants were most likely eliminated as a result.

Along the northern portion of the community, the non-native and invasive shrubs make up approximately 64 percent of the cover in specific sampling locations. These shrubs include honeysuckle and buckthorn.

In the southern portion of the community, west of the pine plantation, the non-native, invasive shrub cover is minimal and the herbaceous understory vegetation is plentiful. This area of the community supports the highest density of native herbaceous vegetation including wild geranium, broad-leaf enchanter's-nightshade, and may-apple.

2. Pine Plantation

The understory of the pine plantation community is more than 56 percent bare ground and non-vegetated. Of the herbaceous vegetation, the non-native species only account for less than five percent of the total understory. The most dominant native species found in the pine plantation is the broad-leaf enchanter's-nightshade covering roughly 35 percent of the ground area.

3. Disturbed Mesic Forest

The disturbed mesic forest is known as a community where quality trees have been harvested or died and undesirable native trees populated the disturbed areas. The area covered by understory herbaceous plants is nearly divided evenly with roughly 28 percent of both native and non-native species. Almost 44 percent of the total ground area is non-vegetated or covered with coarse woody debris.

Slope and Soil Erosion Capability

Physically, future development is dependent upon the slope of the land and the ability of the soil to remain stable and resist erosion. Generally the majority of the study area slopes downward from southwest to northeast; however, the southeastern portions of the woodlot slope downward towards the southeast.

Based on the characteristics of the soil classes, the study area consists of slopes ranging from steep (12 to 20 percent slopes) to areas nearly level. The soils in the study area that are typically the steepest are found in the western portion of the woodlot. These steep areas transition into more gentle slopes, eventually leading to nearly flat lands in the northeast corner of the study area.

Coinciding with the slope characteristics of the soils are the soil erosion capabilities. The soils found on steep slopes are also known to be erosion hazards. Similar to the transition of slope characteristics, the soils in the western portion of the study area are highly susceptible to erosion, lessening in susceptibility as the slopes decline.

Soil Moisture and Nutrient Regime

The water capacity and fertility characteristics of the soils in the study area appear to be directly related to one another. Typically where water capacity is high the soils are very fertile, and where there is a moderate amount of water capacity the soils are moderately fertile. The only exception in the study area is in the Wacousta soils in the far northeast corner of the study area where the water capacity is high but the fertility is low. Other conditions that may affect these Wacousta soils are the land being nearly flat, the water table seasonally at the surface to less than a foot below the surface, and water permeating the soil at a moderately slow rate. Hydric soils and soils that may have hydric inclusions have been identified near the wetland in the dry mesic forest. The soils near the wetlands are also known to have a very shallow depth to groundwater. Seasonally the depth to groundwater is less than one foot from the surface. See Table 1 on the following page for more detail of the soil characteristics.

Table 1: Soil Characteristics

	Location	Typical Slope	Fertility	Water Capacity	Permeability	Depth to Water Table	Erosion	Primary Concerns
Dodge	South-central	6-12%	High	High	Moderate	More than 5 feet	Severe hazard	Erosion control, improvement of organic matter, cultivating surface layer, fertility
Kidder	Far west	12-20%	Medium	Medium	Moderate		Very severe hazard	Erosion control, improvement of organic matter, cultivating surface layer, fertility
McHenry	Western	12-20%, 6-12%	Medium	Medium	Moderate	More then 5 feet	Very severe hazard	Erosion control, conserving moisture, improvement of organic matter, cultivating surface layer, fertility
Military	Extreme south-central	6-12%	Medium	Medium or low	Moderate	More than 5 feet	Severe hazard	Root zone restricted due to soil depth, erosion control, water capacity
Sable	North-central	0-3%	High	High	Moderate	Less than 1 foot	None	Hydric soil
St. Charles	Central and north-central	0-15%	High	High	Moderate	Between 3 and 5 feet	Moderate	Erosion control
Troxel	Far north-central	1-4%	High	High	Moderately slow	Between 3 and 5 feet	Moderate	Gullying, flood control, erosion and maintenance of the organic matter content, cultivating surface layer
Virgil	North central	1-4%	High	High	Moderately slow	Above 1 to 3 feet	Moderate	Erosion control, moderate wetness
Wacousta	Far north-east	Level	Low	High	Moderately slow	1 foot or less	None	Hydric soil

Native Animal Species

Native animals are obviously not confined only to the boundaries of the study area. Therefore, testimonials and site observations were used to identify the animal species in the study area. These animal species include white-tailed deer, raccoon, gray squirrel, American robin, gray catbird wild turkey, common crow, blue jay, white-breasted nuthatch, and downy woodpecker.

Based on the unconfined nature of wildlife and the seasonal migrations that wildlife endure, the study area offers habitat typical for many other common animal species. A list of additional species that could inhabit the study area full-time or seasonally is included in Appendix A.

Threatened or Endangered Species

The State of Wisconsin Department of Natural Resources (DNR) Bureau of Endangered Resources completed a review of the Study Area and proximity with the Natural Heritage Inventory (NHI) to identify potentially endangered flora and fauna. Three endangered resources have been documented in the area including wetland communities identified as calcareous fen, shrub-carr, and southern sedge meadow. Based on the common species found in each of the three separate wetland communities and the inventory of understory species in the study area, it does not appear as though any of the three endangered wetland communities are located in the study area.

Historical records of rare species known to occur in the vicinity of the study area showed a possible existence of eleven rare plant species if appropriate habitat still exists. A comparison of the plant species database and the inventory of understory species in the study area shows that none of the rare plant species were identified in the study area. The DNR notes "the lack of additional known occurrences does not preclude the possibility that other endangered resources may be present." Also, "absences of an NHI occurrence in a specific area should not be used to infer absence of rare species." Therefore, simply because the rare and endangered species were not identified in the understory inventory does not definitively mean that there are not any rare or endangered species in the study area.

Ecological Habitat

The ecological habitat, or the interaction between vegetation and animals, is not unique to the study area. The woodlot within the Northeast Neighborhood offers a relatively large tract of moderate quality habitat; however, the study area in conjunction with the Nine Springs E-Way corridor to the north offers a plentiful and diverse habitat for wildlife.

Habitat diversity within the study area is deteriorating due to the encroachment of non-native species, which will affect the numbers of species the habitat can support. Future restoration and maintenance of the habitat will help with maintaining the diverse wildlife species currently living or visiting the study area.

The dry mesic forest community within the study area has a mature oak canopy with a moderate quality floristic community that is being intruded upon by non-native plant species. Great

restoration potential exists for the habitat, but it could prove challenging due to the invasive plant species and segmented land ownership. There are many landowners within or abutting the study area that could affect the overall quality of the habitat. The pine plantation and disturbed mesic forest communities have been categorized as having low quality floristic communities.

Any other Features or Resources

A wetland is located in the northeastern portion of the dry mesic forest community. The wetland boundaries were delineated by the Wisconsin Wetland Inventory (WWI) in addition to an analysis of the aerial photo by Natural Resources Consulting, Inc. The exact boundaries of the wetland are slightly different between the two studies; however, a perennial natural spring identified in the northern portion of the dry mesic forest community may contribute to the base flow of a perennial/intermittent waterway extending northeast into the wetland area.

Future Development

The purpose of the Specific Inventory and Resource Analysis is to determine the potential for future development within the woodlot located in the northern portion of the Northeast Neighborhood. Based on the natural resources data presented in this study, it appears that there are limited development opportunities in the woodlot; however, development opportunities are discussed for each community separately.

1. Dry Mesic Forest

   The dry mesic forest community consists of a mature overstory canopy with moderate floristic quality of the understory vegetation. Also found in the dry mesic forest community are soils that are characteristically steep with significant hazards related to erosion. This community is also subject to storm water flows, leading to flooding in the lower elevations thereby increasing the potential for erosion on the hillsides. Existing vegetation cover currently partially stabilizes the soil and buffers the effects of significant rain events. Future development in the dry mesic forest will also disturb this buffer and decrease soil stability.

   Installing streets and utilities through the dry mesic forest community will lead to major disturbances in the ecological habitat. Erosion issues would require increased engineering and structural components to create stabile roadways and utility connections, thereby increasing development costs and potentially causing a strain on Fitchburg's economic condition.

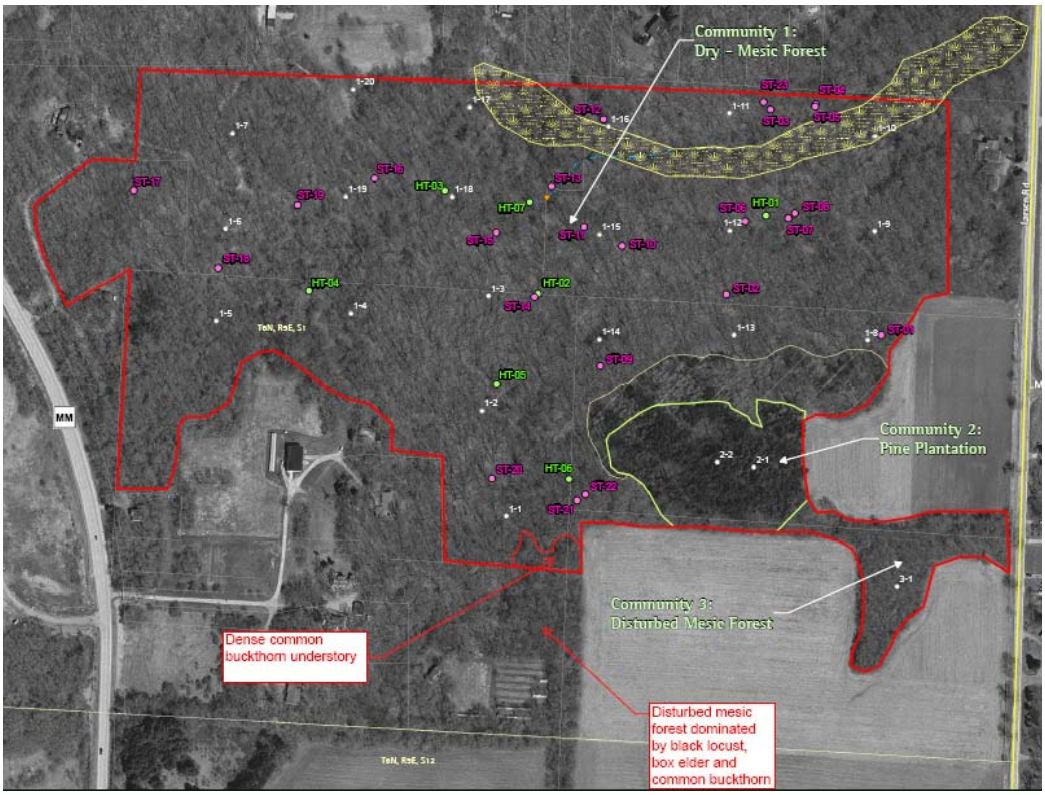
   The dry mesic forest community should remain natural area with an emphasis on restoring and maintaining the woodlot. Property owners throughout the dry mesic forest community should independently create a plan that focuses on restoring and maintaining the woodlot. It appears that the boundaries of the dry mesic forest may extend beyond the limits of the delineated community and the study area. While restoring and maintaining the dry mesic forest community, the characteristics of the dry mesic forest

community that extend from the study area should also be preserved and enhanced on the previously developed properties.

Future restoration projects to protect the dry mesic forest community could include passive recreational opportunities. The passive recreational opportunities could include trails, overlooks or vistas, signs or markers identifying the Heritage Trees, etc. Passive recreation will allow visitors to view the natural environment along with the wildlife within the woodlot.

Fieldwork for an addendum to the original site evaluation was completed on October 7, 2008 for the wooded area south of the Dry Mesic Forest near the center of the Northeast Neighborhood as shown on the following map. This area adjacent to the tilled agricultural fields is identified as a disturbed mesic forest dominated by black locust, box elder, and common buckthorn – all undesirable tree species and subcanopy. Future development and disturbance should be limited to the areas of disturbed mesic forest to preserve the dry mesic forest community to the greatest extent.

Addendum Evaluation



SOURCE: Natural Resources Consulting, Inc.

2. Pine Plantation

   The pine plantation community lacks the mature tree canopy and floristic quality found within the understory of the dry mesic forest. Based on the soil characteristics of the pine plantation community, the soils are relatively steep, but not quite as steep as the dry mesic forest. Erosion is a hazard that persists through the pine plantation community.

   Development in the pine plantation community is possible based on the low quality of the existing vegetation. Developing the pine plantation community would cause limited impacts to the floristic diversity. The soil characteristics may be more of a limiting factor for development. All future development in the pine plantation community will require extreme erosion controls.

3. Disturbed Mesic Forest

   The disturbed mesic forest community, similar to the pine plantation community, does not have the mature tree canopy or floristic understory quality of the dry mesic forest community. Soil characteristics indicate that there is a low to moderate hazard relating to erosion. A portion of the disturbed mesic forest community is located on a soil that has characteristics of a hydric soil.

   Future development in the disturbed mesic forest community would have limited impacts to the floristic diversity within the community. Development on the Sable Series of soils will require further site investigation to ensure the water content of the soil and the groundwater depth are suitable for development. All future development in the disturbed mesic forest community will require erosion control methods to eliminate disturbance to surrounding areas.

Conclusion

Development in the woodlot area would reduce the quality and quantity of habitat available for wildlife. Deer, turkey, and other species with a low tolerance for human activity will be inclined to move to other available habitat in the general area. Therefore, future development should be prohibited in the dry mesic forest community and efforts should be made to preserve the high quality tree canopy and diverse understory flora.

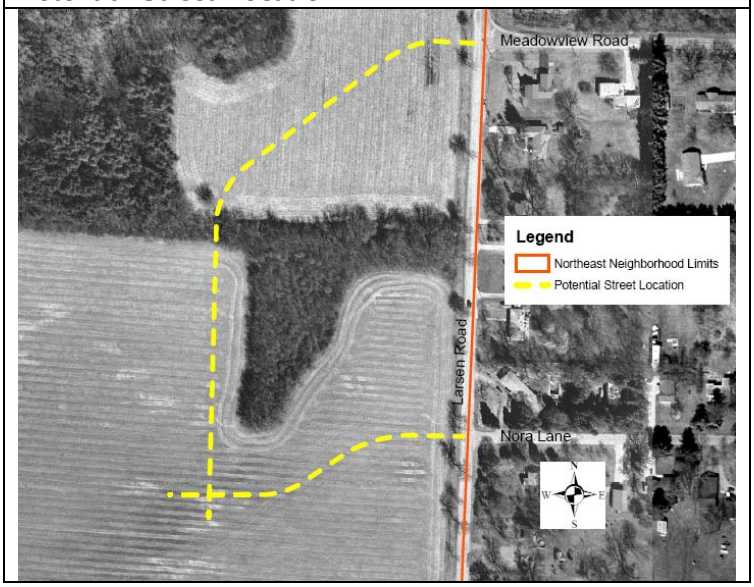
According to the DNR the Waubesa Wetlands, which is one of the highest quality and most diverse wetlands in southern Wisconsin, is located within two miles of the project site. A DNR representative noted, “Because the State Natural Area is not directly adjacent to your development project, I do not expect any impacts to the SNA as a result of project related disturbance.”

Future development must include buffer areas to preserve the significant natural resources found within the Northeast Neighborhood including the wetlands, woodlot, and Heritage Trees. Creating buffers around the Heritage Trees is vital to the health of their root systems. Each

Heritage Tree should be evaluated by a licensed arborist, and preservation and buffering plans should be individually developed for each tree.

A street pattern accompanied by utilities would be needed with future development to allow for the transportation needs of the development. Based on the information provided and previously stated, there should not be any development in the dry mesic forest community; however, based on the lower quality tree canopy and understory vegetation in the other two woodland communities in the project area, a limited street network that intersects Meadowview Road and Nora Lane extending into the Northeast Neighborhood is feasible, so long as significant buffering of the dry mesic forest community is included as a component of the development. Due to the shape, size, and characteristics of the pine plantation and disturbed mesic forest communities, the road network could traverse these communities without causing major disturbances. From the southern edge of the pine plantation and disturbed mesic forest communities the road network could extend through the Northeast Neighborhood to County Trunk Highway MM, Goodland Park Road, and Larsen Road.

Potential Street Location



Overall, based on the natural resources inventory and analysis, development should be prohibited in the dry mesic forest community. Future development of the pine plantation and disturbed mesic forest communities should be limited to low impact residential development. The significant natural resources and habitat within the dry mesic forest community, including the mature tree canopy and understory vegetation, the natural spring, Heritage Trees, wetlands, and wildlife habitat should be preserved. Extending buffer areas from those resources, and including erosion and storm water controls, to development in adjacent areas are also necessary to prevent negative impacts from the development. The land adjacent to the woodlot must also be developed with low impact residential uses as a transition to more intensive land uses.