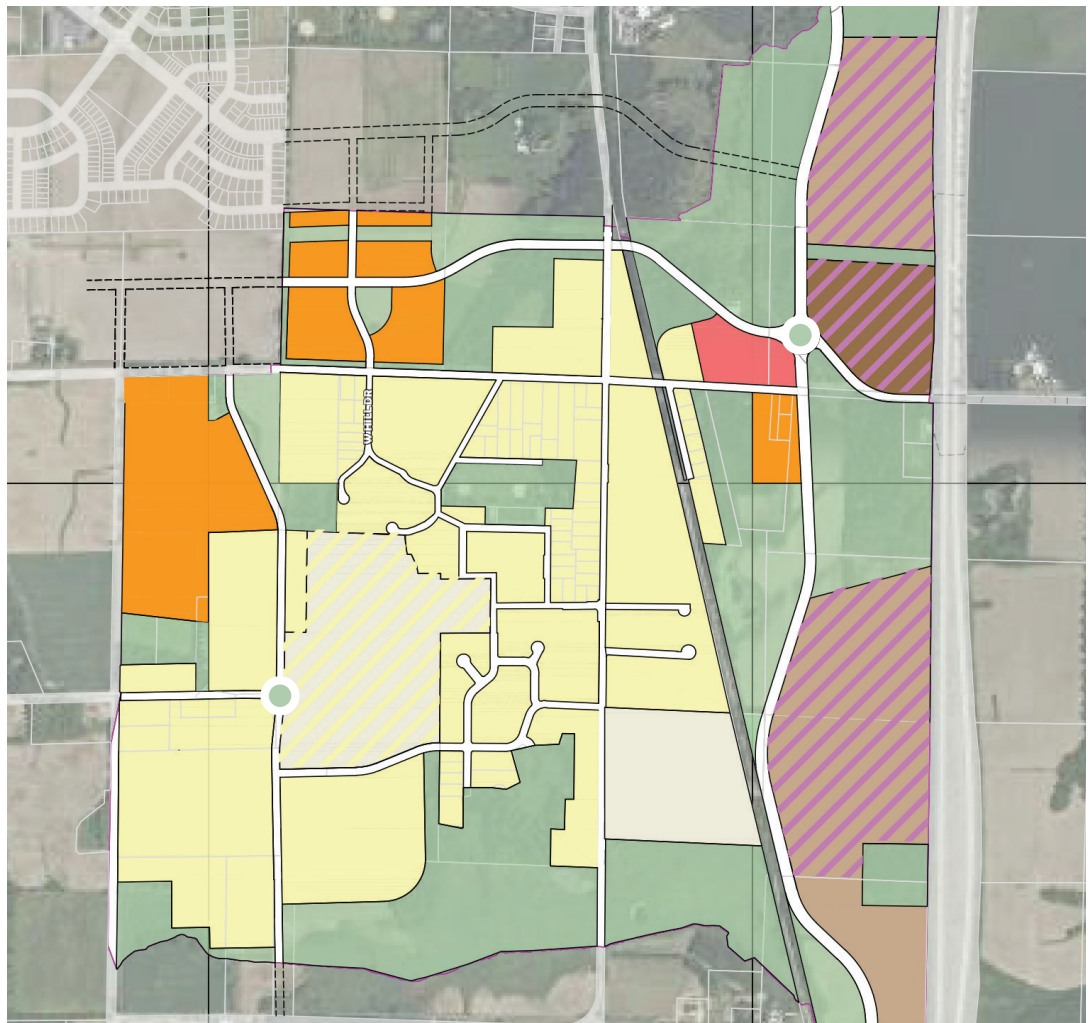




City of Fitchburg, WI
**GREENFIELD
NEIGHBORHOOD PLAN**



PLAN COMMISSION ADOPTION: SEPTEMBER 16, 2025

COUNCIL ADOPTION: SEPTEMBER 23, 2025



ACKNOWLEDGEMENTS

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**Note: Acknowledgements do not indicate endorsement or support by any individual Steering Committee members*

CONTENTS

Chapter 1: Introduction & Process 1

Chapter 1 discusses the plan's purpose, objectives, and summarizes the planning process, and public feedback.

Chapter 2: Vision, Goals, & Guidelines 15

Chapter 2 establishes the vision, strategies, design guidelines to guide the future growth of the Greenfield Neighborhood study area.

Chapter 3: Land Use 36

Chapter 3 looks at a variety of factors that impact the current and future development in the Greenfield Neighborhood, developing a series of land use diagrams to facilitate discussion about land use, design preferences, and general road pattern. This chapter provides the recommended land use concept for the neighborhood.

Chapter 4: Engineering 59

Chapter 4 reviews capacity of existing municipal infrastructure within the planning area, and identifies analysis of how to serve the preferred concept and proposed Future Land Use.

Appendix A: Implementation Action Plan

Appendix B: Relevant Plans & Development Review

Appendix C: Engineering Analysis

Appendix D: Maps

Public Engagement Documents: The City of Fitchburg website under the Planning & Zoning Department page provides background on this project, including access to all public engagement documents and summary information.

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CHAPTER 1

INTRODUCTION & PUBLIC INPUT

2 Purpose, Objectives & Process

This section outlines the overall purpose, objective and planning process for the Greenfield Neighborhood Plan.

6 Study Area & Regional Context

This section defines the geographic boundaries of the study area, and its significance in the larger regional context.

8 Public Input

This section provides a summary of the different public engagement activities that were conducted for the Greenfield Neighborhood. For meeting and engagement materials visit:

Public Engagement Documents: The City of Fitchburg website under the Planning & Zoning Department page provides background on this project, including access to all public engagement documents and summary information.

PURPOSE, OBJECTIVES & PROCESS

What is the intention of this Neighborhood Plan?

This plan is intended to be living, workable document for the City of Fitchburg to guide development, policy, and infrastructure budgets over the next 20-plus years. This plan will be used as a baseline to meet the community's vision (See Chapter 2). The entire plan becomes policy as part of Appendix A to the City's Comprehensive Plan. The Future Land Use Map in the Comprehensive Plan will be updated to reflect the Future Land Use Map in this plan.

What is the process to amend/update this Plan?

Changes to this Neighborhood Plan requires adopting an ordinance to amend or update the Comprehensive Plan in accordance with the procedures listed in Chapter 5 of the Comprehensive Plan and pursuant to Wisconsin Statute 66.1001. The Neighborhood Plan update will be reviewed with all other amendments during the bi-annual amendment process each year. The Planning Department, Mayor, or three members of the Common Council are the only ones that may recommend modifications to be considered as a minor amendment to the Plan.

PURPOSE

The Greenfield Neighborhood Plan is a detailed strategy to accommodate growth, while protecting community values and the existing neighborhood's character.

The key focus is to guide future development proposals by landowners and/or developers that would provide housing options, provide economic and job opportunities, minimize environmental impacts, and balance transportation and service needs. The Greenfield Future Development Area (FUDA) was identified in 2004, Resolution R-35-04, for incorporation in the urban service area. This plan identifies areas of the Greenfield FUDA that are suitable for urban expansion. See the next page for more information on FUDAs.

The Greenfield Neighborhood is located in the eastern portion of the City of Fitchburg, and south of the existing Urban Service Area. The Capital Area Regional Planning Commission (CARPC) and the Wisconsin Department of Natural Resources (DNR) have regional approval authority over Urban Service Area (USA) amendments. This plan serves as the framework for the City's USA Amendments applications to CARPC and the Wisconsin DNR.

OBJECTIVES

1. Establish a preferred land use plan that balances growth, blends with the local character, and protects community interests.
2. Identify suitable areas for development within the Greenfield Future Urban Development Area (FUDA).
3. Identify the infrastructure improvements (water, wastewater, stormwater, etc.) needed to accommodate new development.
4. Project future traffic patterns and volumes to identify and mitigate traffic-related constraints on new uses in the planning area.
5. Evaluate adjacent transportation networks and include a street and path network to provide connectivity to adjacent transportation networks and within the neighborhood.
6. Enhance bike, pedestrian, and transit accessibility throughout the planning area.
7. Establish a plan for new development, including uses, within the constraints of public infrastructure systems.

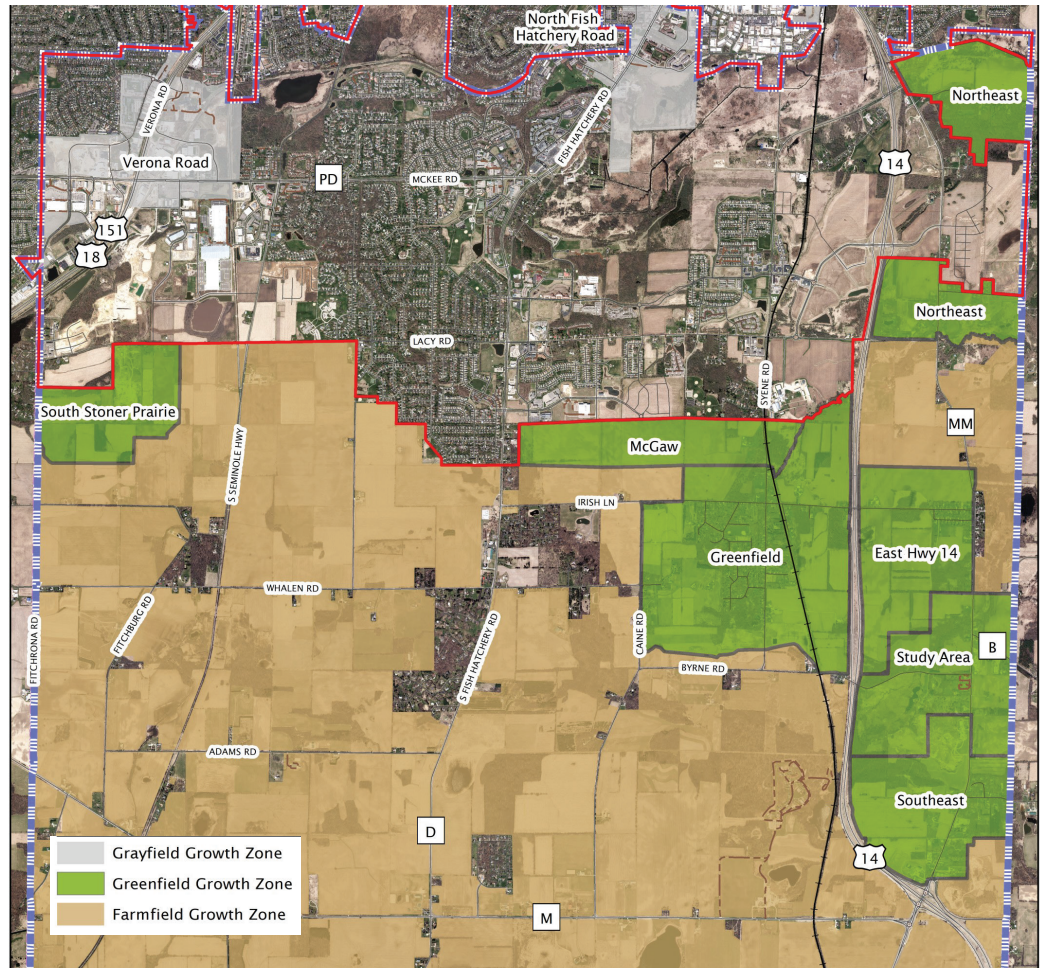
FUTURE URBAN DEVELOPMENT AREAS (FUDA)

Resolutions R-30-07 and R-89-07 created the City's future urban development boundary with goals of maintaining the coexistence of the urban and rural areas, creating attractive highly intensive transit oriented neighborhoods and improving the quality of older areas through maintenance and redevelopment, while maintaining the natural resources and high quality farmland that resembles the City's history.

FUDAs were categorized into 3 Growth Zones:

- **Greenfield:** Undeveloped lands, often in agricultural use, located at the edge of the City's developed areas outside of the Urban Service Area. As shown in Figure 1.1), Greenfield Neighborhood is identified as a greenfield growth zone.
- **Grayfield:** Lands that are already developed, or lands that are vacant and surrounded by development, inside of the Urban Service Area.
- **Farmfield:** Lands planned for agriculture outside of the urban service and not within a FUDA. This growth zone is intended to accommodate agriculture and associated development.

Figure 1.1: City of Fitchburg Growth Areas Map



Urban Service Area (USA) Expansion

In determining whether to undertake a neighborhood plan, the City considered the following factors:

- The need for the neighborhood and related urban service adjustment in relation to existing urban service areas, or other neighborhoods approved or anticipated with staged urban service entry.
- The maintenance of the approved average maximum annual growth rate of 75 acres per year

- The ability to meet the resource and service needs in different geographic locations
- The rate of completion of existing urban areas and neighborhoods
- Infill and redevelopment pace or opportunities presented.

HOW TO USE THIS PLAN

This plan is organized into four main chapters and four appendices.

Chapter One outlines the plan's purpose and objectives, and summarizes the planning process and public feedback. The proposed land use concepts, policies, and recommendations are based upon this process and the public feedback.

Chapter Two establishes the vision, strategies and actions to guide future growth in the study area. ***The information in this chapter supports review of future development proposals, as well as action steps to support the long-term development of this neighborhood.***

Chapter Three outlines the evaluation process used to determine the preferred land use for the study area. It also establishes key design parameters, including road and trail connectivity, parks and open space, land use density, etc., that can define the character of the Greenfield Neighborhood. This chapter provides the baseline for the Future Land Use (policy) Map in Chapter Two and is used to determine the utility needs discussed in Chapter Four.

Chapter Four offers background information that informed the design and decision-making process, including a review of the capacity of existing municipal infrastructure within the planning area. City actions to support infrastructure improvements are outlined in Chapter Two.

PLAN PROCESS

This Plan was developed over approximately 22 months, beginning in November 2023. The process included the following activities:

Background Research and Consistency

The planning process included a review of relevant plans to identify community goals, initiatives and recommendations that may impact the future development of the Greenfield Neighborhood. A detailed summary of this plan review is included in **Appendix B**.

Opportunities / Issues Identification

Identify limitations/constraints and opportunities that could impact the preferred land use pattern, utilities and infrastructure needs.

Land Use Scenario Planning

Based on the existing conditions and feedback, the process included initial land use bubble-diagrams, detailed concepts, and a preferred concept.

System Analysis and Infrastructure Needs

Evaluate the overall system based on a preferred concept, identifying improvements necessary to allow for development, inclusive of sanitary sewer, potable water, stormwater management, and mobility networks (vehicle, bike and pedestrians).

Outreach and Engagement Plan

Staff Meetings

MSA planners met with staff at every stage of the planning process to review and discuss draft materials. The City's planning, engineering, and economic development departments participated in these meetings.

Key Stakeholder Interviews

MSA and City planning staff met with a number of key stakeholders, including current landowners with large holdings, DNR, CARPC, and Friends

of Waubesa Wetlands. Each meeting covered a range of topics, including intentions for future investment in the neighborhood, preferences for changes in the study area, and any other issues of concern. Feedback from these interviews is briefly summarized in this chapter.

City Council & Other City Commissions

City staff presented planning process updates and plan draft material, and sought feedback on that material, from several City commissions including the following: Community and Economic Development Authority (CEDA), Plan Commission (PC), and Board of Public Works. Feedback received by the above commissions have contributed to this plan.

General Public Involvement

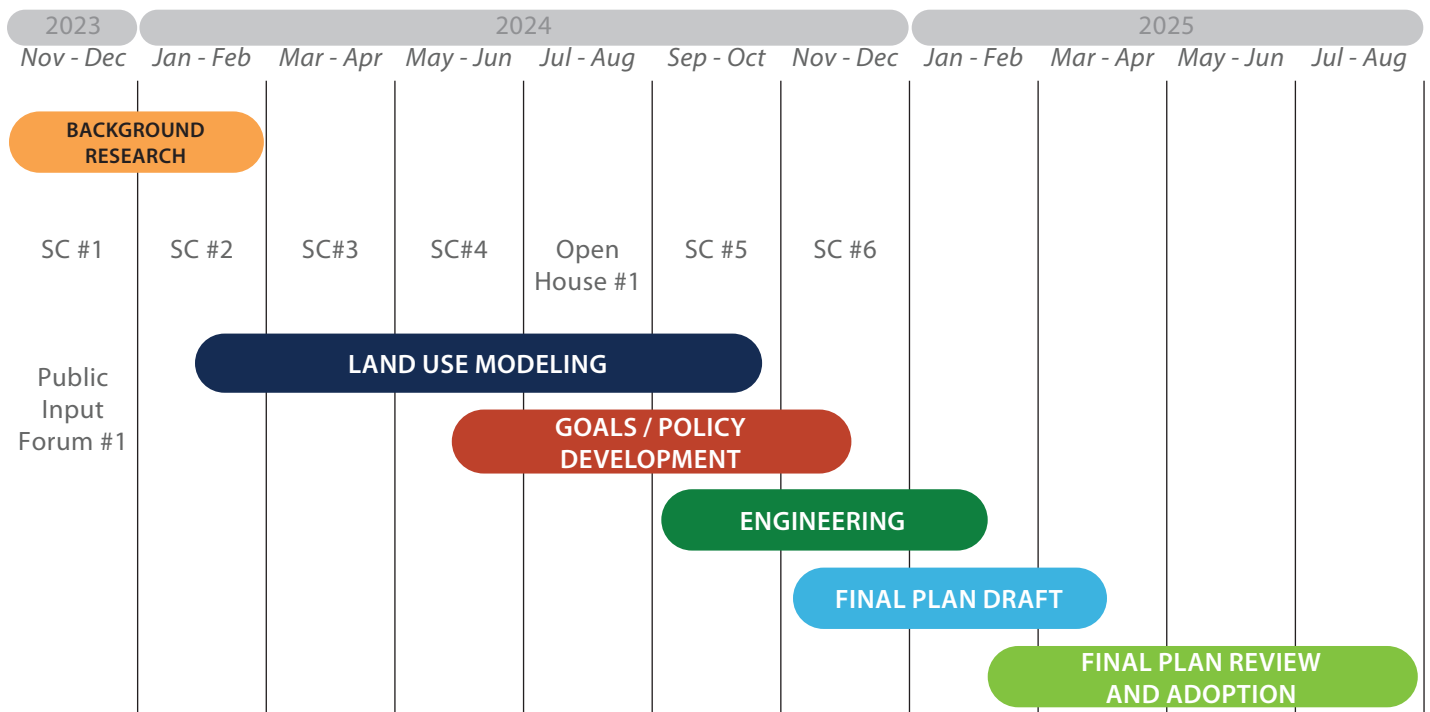
Steering Committee meetings and other City meetings discussing this project were properly noticed and open to the general public. The City also provided an opportunity to be notified of

events by signing up for notifications on the City’s website using the “Notify Me” feature for this neighborhood plan. Questions and responses were also provided through the neighborhood.plans@fitchburgwi.gov email.

The public was informed and provided opportunities to provide feedback on a number of occasions throughout the planning process, including the following:

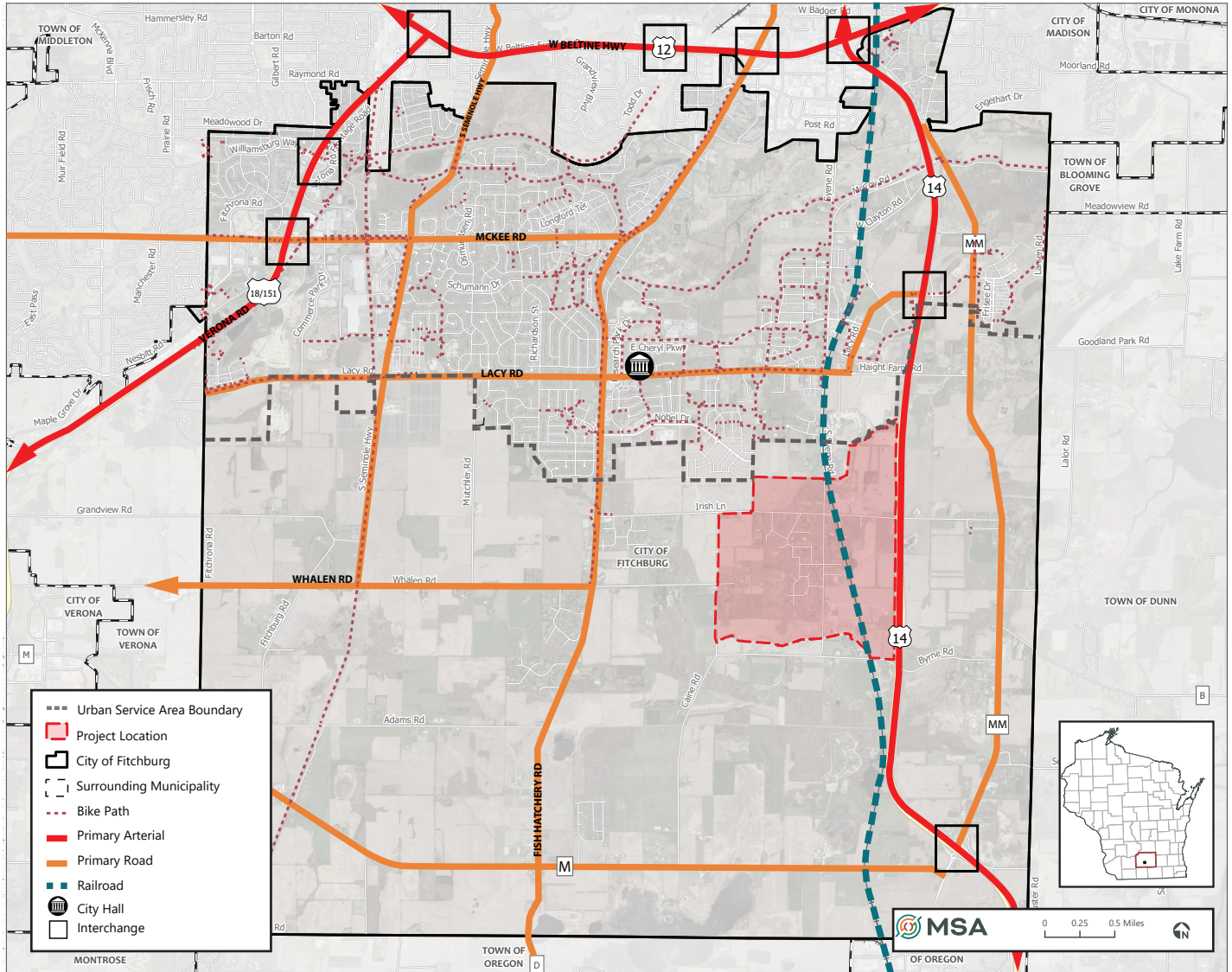
- Online Opportunity Mapping
- Two Neighborhood Meetings (*Visioning meeting and Concept Feedback meeting*)
- Online Survey
- Public Open Houses/Input Forums
- Developer Focus Group
- Steering Committee “Working” Meetings
- Plan Commission Meetings
- Public Hearing and Adoption Meetings

Table 1.1: Project Timeline



REGIONAL CONTEXT & STUDY AREA

Figure 1.2: Regional Area (Refer to Appendix D)



REGIONAL CONTEXT

Bordered by the Central Urban Service Area (USA) to the north, this neighborhood is one of eight “Greenfield Growth Zones” in the City of Fitchburg. The McGaw Neighborhood (208 Acres) to the north and the East Highway 14 Neighborhood (431 Acres) to the east are also designated growth zones.

Greenfield is well connected to local and regional transportation corridors. The neighborhood is

located near two major roadways: USH 14 to the east, and the Beltline Highway (USH 12/18) to the north (see Figure 1.2). The study area does not have direct access to USH 14. An active freight railroad corridor also passes through the study area just east of Syene Road, running parallel to USH 14. This corridor is currently used for freight transportation, but there may be potential for future passenger transportation.

STUDY AREA

The Greenfield Neighborhood is approximately 975 acres, mostly privately-owned.

The study area (**Figure 1.3**) is bounded by:

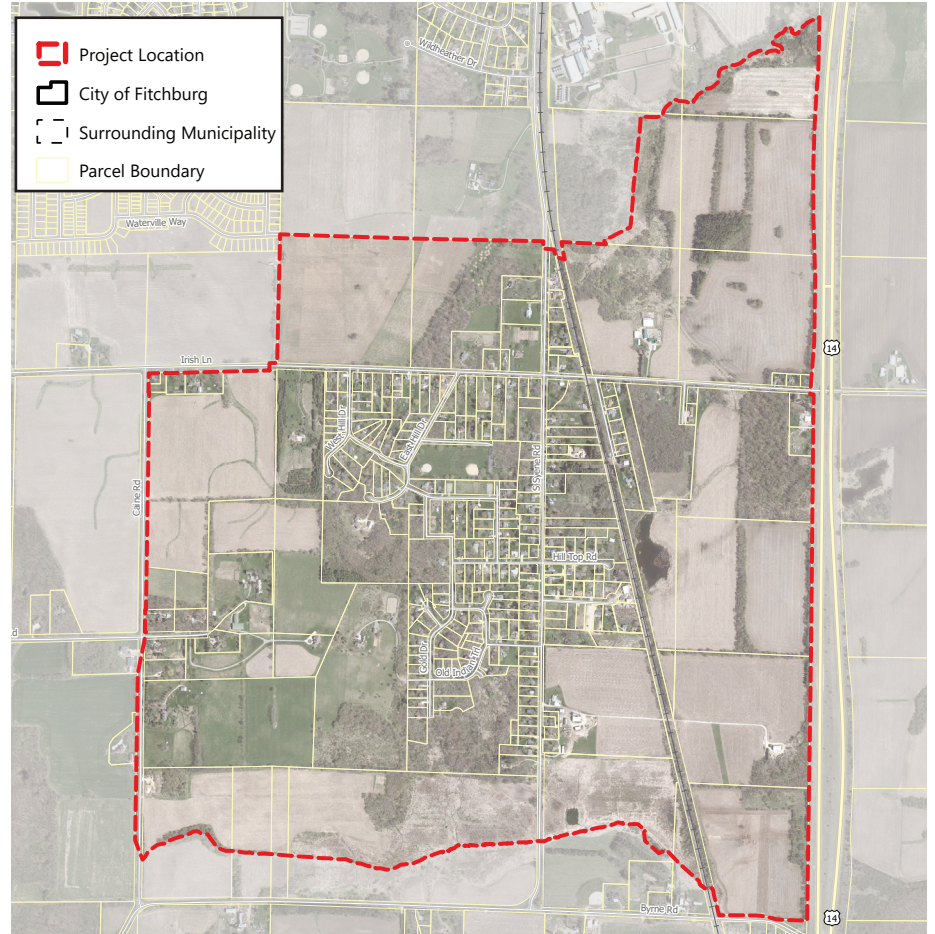
- Farmstead and agricultural lands (planned for in the City's McGaw Neighborhood) to the north.
- Caine Road to the west.
- USH 14 to the east.
- Murphy Creek (and Byrne Road) to the south.

All lots adjacent to the site are farmland, rural residential, open space, and woodland. This neighborhood provides a transition to more urban developments to its north, in both the City of Fitchburg and the Madison Metro area.

The Greenfield Neighborhood benefits from its proximity to business uses and other future land uses (residential, business, parks and open space) to the northeast.

- **School District:** Oregon Schools
- **Aldermanic District:** 3 & 4
- **Existing Parks:** Greenfield Park, the Curry Court natural area and the Gold Addition.

Figure 1.3: Study Area (Refer to Appendix D)



The planning area includes an existing residential neighborhood with over 241 low-density homes on private septic. Some homes are connected to City Water and private septic; none of the homes are on City Sanitary. The Plan looks to improve connectivity and stormwater management within this neighborhood and establish opportunities for new housing choices should a landowner or developer propose new development in the study area.

It is near McGaw Park and Quarry Hill Park, which provide for a variety of recreation opportunities beyond the City parks within the study area.

Despite the absence of bike paths or lanes within the study area, the neighborhood is near an extensive network to the north, such as the Capital City Trail, connecting to nearby communities.

PUBLIC INPUT

Below is a detailed summary of the engagement activities conducted from November 2023 to December 2024, providing opportunities for elected officials, property owners and other stakeholders to offer valuable input and to the betterment of the final plan. The City's website (under Planning & Zoning Department) provides access to all public engagement documents and summary information.

STEERING COMMITTEE MEETINGS

When the Steering Committee evaluated land use options they emphasized the importance of blending new development with the local and surrounding character of the neighborhood. The meetings focused primarily on the need to develop carefully, while considering impacts on the existing community. Improving bike and pedestrian safety, along with addressing current and future traffic issues, was a significant concern. The meetings highlighted the residents' priority for enhancing social interaction and cohesion within the neighborhood, fostering a stronger sense of community.

Several members of the steering committee, advocated for a balanced development approach, respecting the desires of property owners who wish to develop their land. However, many residents advocated for no development. When evaluating land use options, Options "A" and "B" were preferred compared to Option "C" which was deemed too dense, particularly for the southern portion of the neighborhood. Among the options presented, there was no clear consensus on the road network. The residents noted their concerns regarding the addition of the interchange, finding it unnecessary with the availability of County Road MM as an alternative. During Steering Committee Meeting #4, the committee and residents shared their feedback on the goals, suggesting edits to the concepts and language.

Other themes discussed during the meetings include: wetlands, stormwater management, road extensions, potential off-road paths, land uses, residential densities, local topography, SmartCode, Agrihood and nuisance, and preserving the local neighborhood character.

STAKEHOLDER INTERVIEWS

The process included interviews with property owners, the Oregon School District, Capital Area Regional Planning Commission (CARPC), Wisconsin Department of Transportation (WisDOT), the Friends of Waubesa Wetlands, as well as a group of local homebuilders and development specialists (through a focus group).

Property Owners

The interviews highlighted the intentions of various neighborhood property owners regarding future development.

- The owner of the **southeast neighborhood** property intends to continue farming and, if development were to occur in the future, prefers open space rather than a cluster of apartments. Follow up conversation by City staff indicated landowner's openness to agribusiness should the land redevelop.
- The **southwest neighborhood** property is currently leased out for farming, but the owner is open to selling in the future. Their preference is for low-density residential development, though may be interested in medium-density if it aligns with the character of the area.
- One **northwest neighborhood** property owner does not plan to sell for development and prefers the greatest flexibility in how the land is developed.
- Another **northwest neighborhood** property owner is interested in developing with low to medium density eventually, but does not have a timeline to do so.

Oregon School District

During the interview, it was noted that the current school projections do not account for future growth in the study area through 2035. Recent growth has been a bit short of their projections. Forest Edge Elementary (K-6) in the Terravessa Neighborhood could face capacity issues by 2035. However, strategies are in place to manage this potential issue, including the construction of a new middle school for grades 5-8, which would allow Forest Edge and Rome Corners to serve grades K-4.

CARPC

Discussion covered how this plan can be part of the Urban Service Area amendment application either as a single application, or in a phased amendment.

WisDOT

Discussion covered the potential for this neighborhood, including interest of an interchange within the study area with potential connection to CTH B. Per the discussion with WisDOT, there was no determination if USH 14 can be reviewed based on future “urban” conditions, allowing for

one-mile spacing of interchanges. Additional discussions will be necessary to consider a future interchange- likely through a transportation study recommended as an implementation item in this Plan.

Friends of Waubesa Wetlands

Discussion covered the importance of the Murphy and Swan Creeks, and impacts of farming and development on these creeks that feed into the Waubesa Watershed. There is interest in protecting existing wetlands, restoring wetlands, and groundwater recharge.

PUBLIC OPEN HOUSES

Open House #1 - Kick-Off

A public open house was held on 12/04/2023 for both Greenfield and South Stoner Neighborhoods. Approximately 80 people attended the meeting. Some residents emphasized the importance of preserving the agricultural heritage in and around the established Greenfield Neighborhood. Additionally, meeting attendees shared significant concerns regarding stormwater issues affecting

Open Houses (07/31/2024)



their homes, protecting wetlands, existing and future traffic along the major roadways that bound and cut through the neighborhood, and any future requirement to connect to City sanitary service.

Open House #2 - Goals & Strategies Review

This meeting took place on 07/31/2024, where the public participated in three engagement activities: goals and strategies voting, map input (**Figures 1.4 and 1.5**), and concerns pyramid. In addition to the feedback from the activities (presented below), general feedback from attendees had major concerns with the interchange, potential requirement for existing landowners to connect to the City sanitary sewer system, existing, and future flooding and the amount of development proposed.

Concerns Pyramid themes:

- **Highest Concern:** No new development, need to preserve the neighborhood as it is.
- **Moderate to High Concern:** Increased traffic pattern and businesses at Syene and Irish Lane intersection, preserving farmland and highway interchange.
- **Moderate Concern:** Commercial land use on the west, and storm flooding.

Common maps themes:

- **Road Connections and Extensions:** opposition to connecting or extending roads; concerns about disrupting the existing established neighborhood and increasing traffic, especially with potential interchange identified.
- **High-Density Housing:** will change the neighborhood’s character and increase flooding risks.
- **Business Development:** particularly near residential neighborhoods west of the railroad, causing increased traffic and noise.
- **Environmental and Flooding:** The need to address the current drainage and flooding

Figure 1.4: Public Input Map - Option A - Open House #2
(Refer to Appendix D)

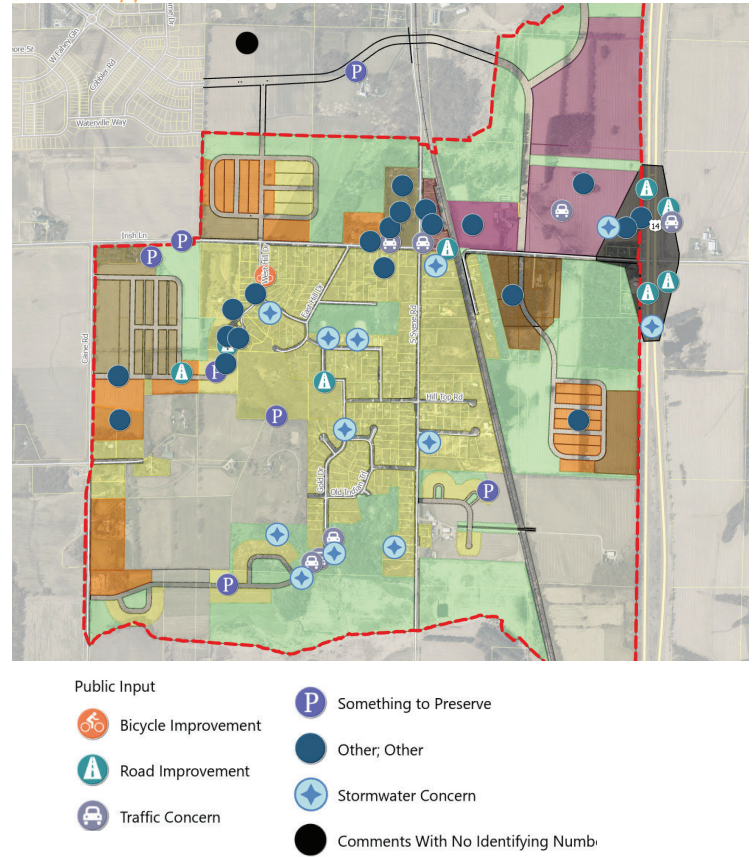
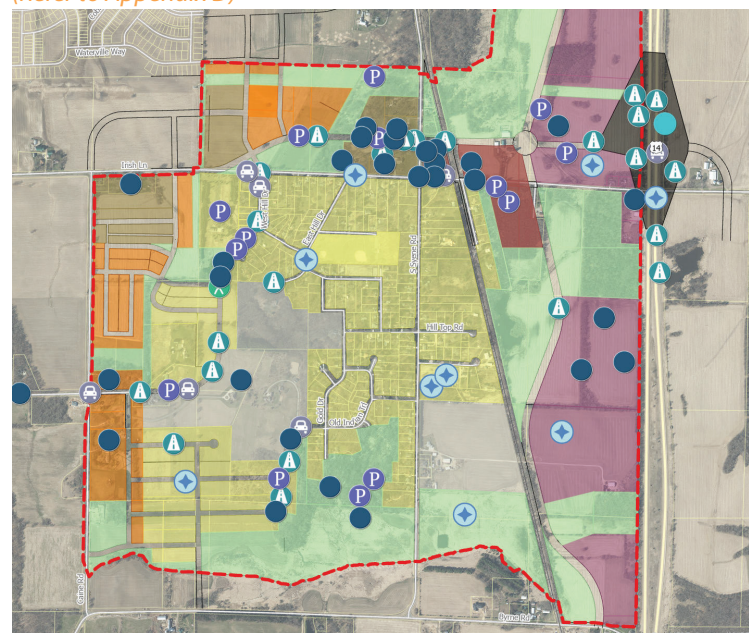


Figure 1.5: Public Input Map - Option B - Open House #2
(Refer to Appendix D)



as well as the environmental impact of new developments, particularly on wetlands and existing drainage systems.

- **Buffers and Preservation:** strong desire for buffers between new developments and existing established neighborhood.

NEIGHBORHOOD MEETINGS

Neighborhood Meeting #1

During the first neighborhood meeting, held on 01/04/2024, it was evident that all groups preferred 'Limited' or 'No Growth' options to ensure the viability of the local family farms. There was a strong overall support for lower density housing options, reflecting the community's desire to maintain a more rural character. The attendees suggested locating intense development east of Syene Road, particularly in the northeast quadrant. Preserving wetlands and flood-prone areas as greenways or open spaces was a priority, along with maintaining a parkland buffer from

development to the north, specifically around the proposed Moraine Edge Park area. There was a clear preference for homes that blend with the natural character of the area, avoiding standardized designs. Finally, the residents highlighted the need for community and civic spaces.

Neighborhood Meeting #2

At the second meeting on 04/22/2024, the attendees shared their concerns regarding the development timeline, with a perception that it may occur in the next few years rather than one to two decades from now. Stormwater was a major issue raised by the public, particularly the water flowing into Greenfield Park from the Caine Road farm hills. The discussion stressed the importance of carefully locating development within Greenfield to minimize the impact on the existing established neighborhood, as residents shared their preference for some suitable areas for development. Residents noted the importance of ensuring that new

Neighborhood Meetings (04/22/2024)



ONLINE MAPPING TOOL

The online mapping tool was active from November 2023 to January 2024. The map (**Figure 1.7**) shows a significant amount of concern regarding traffic speeds, particularly on Irish Lane, emphasizing the need for improved traffic management and safety measures. Other concerns include the pressing need for enhanced stormwater management, especially to address issues arising from snowmelt. Preserving the ecological health of wetlands and protecting farmland are also top priorities for the community. Some residents expressed concerns that many open spaces would be converted into active parks. Overall, the community stressed the need to

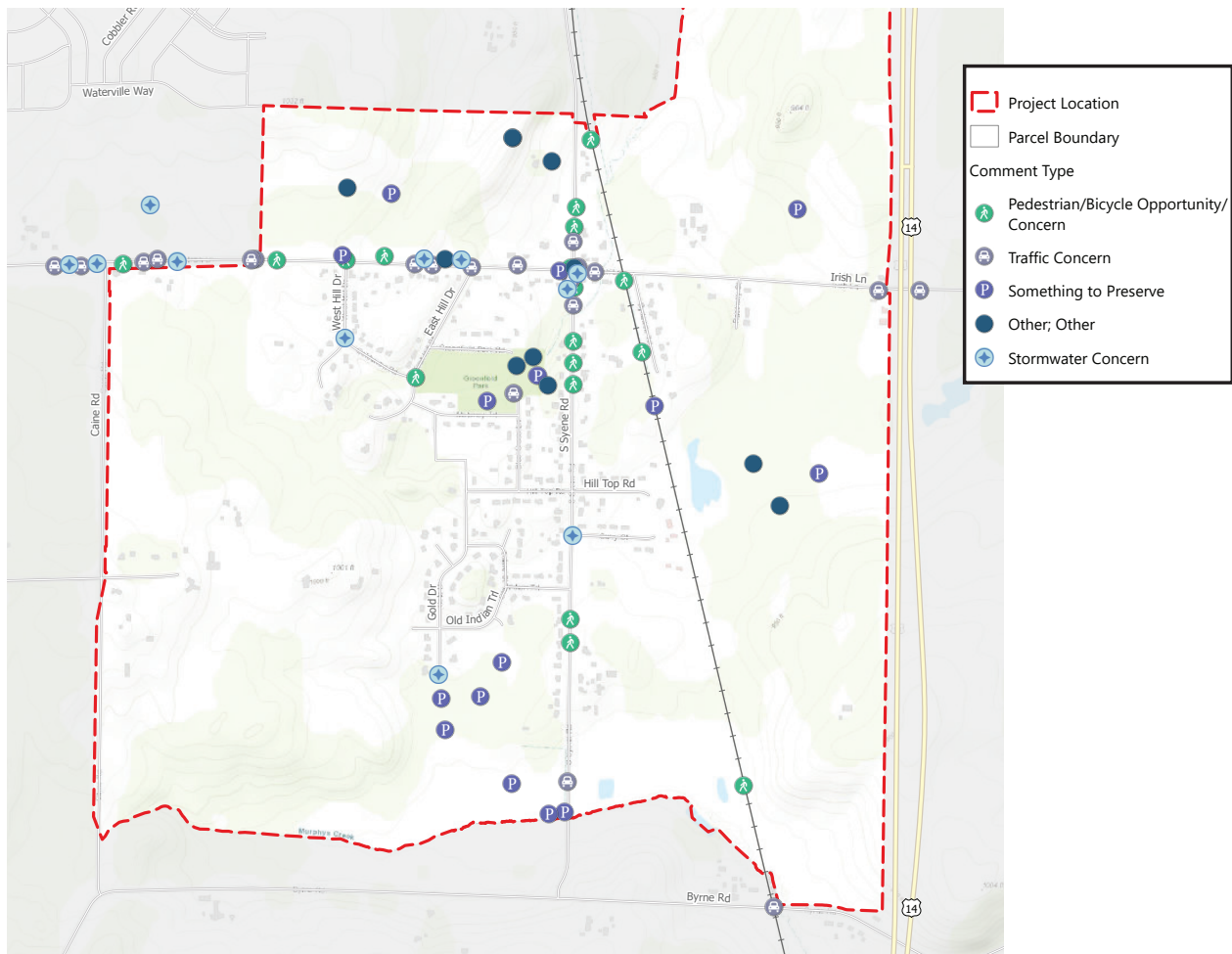
maintain the local character while expanding parks and preserving open space and wildlife habitat.

OTHER PUBLIC COMMENTS

Other comments received through emails and calls recognized the need for gentle density rather than sprawl to ensure economic sustainability.

Many residents expressed opposition to new development. While additional biking and pedestrian options are welcomed, residents shared concerns about the impact of development on the neighborhood's character, culture, and sense of identity.

Figure 1.6: Public Input Map (Refer to Appendix D)



PETITION AND CITY RESPONSE

On December 2nd, 2024, the City of Fitchburg received a petition regarding the Greenfield Neighborhood Plan. On the same day, the Greenfield Steering Committee and project staff received a letter from the Friends of Waubesa Wetlands. Both were received the day before the scheduled December 3, 2024 Greenfield Steering Committee meeting to discuss utilities, stormwater, and traffic. Below is a summary of the key requests and recommendations.

The Friends of Waubesa Wetlands

Recommendations are listed below:

- Maximize wetland preservation and restoration using Joanne Kline's map.
- Ensure zero increase in runoff with a 100% stormwater stay-on goal.
- Retain ample open space for native vegetation and wildlife.
- Explore installing a USGS monitoring station at Murphy's Creek and Lalor Road.
- Consider recycling wastewater to reduce demand for new high-capacity wells.
- Use adaptive implementation to phase development projects, assess each phase, and make necessary adjustments.

The Greenfield Neighborhood Petition

On December 2nd, 2024, the City of Fitchburg received a petition regarding the Greenfield Neighborhood Plan signed by 181 Fitchburg residents. The petition requests the following:

- Assess development impacts on water resources with expert input before designating land for development.
- Avoid curb, gutter, sewer, and sidewalk installations to prevent drainage issues and disruption.
- Create low-density residential buffers with height restrictions near single-family homes.
- Maintain essential street connections for connectivity and emergency access.
- Reduce Business Park and High/Medium-High Density Residential areas to preserve farmlands.
- Preserve existing agricultural lands to maintain the community's historical nature.

The petitions and staff memo addressing these items are viewable on the Planning & Zoning page on the City's website.

CHAPTER 2

PLAN VISION, STRATEGIES & GUIDELINES

16 Vision, Goals & Strategies

This section presents the long-term vision for the Greenfield Neighborhood Plan, and states the goals and strategies to reach this vision.

27 Future Land Use Map

This section presents the Future Land Use Map and its relationship to the existing comprehensive plan.

28 Placemaking & Design Guidelines

This section presents strategies to guide the development of a unique place that will draw from the City of Fitchburg and the broader region.

VISION, GOALS & STRATEGIES

This section establishes goals and strategies to guide the development of the Greenfield Neighborhood. These supplement the design guidelines and land use strategies in this chapter.

VISION STATEMENT

Greenfield Neighborhood will balance residential and economic growth while preserving the local character and quality of life of its current and future residents.

Neighborhood goals are divided into the following categories and further explained on the following pages:



Housing: *Additional housing options will be provided in the neighborhood, but will be strategically placed, designed and buffered to be compatible with the existing Greenfield Neighborhood.*



Economy: *Employment and goods/services will be strategically located and connected to reduce the dependency on longer automobile travel and to provide local and convenient options near the neighborhood.*



Mobility: *Support future regional transportation connections that limit impacts on Greenfield's local streets as the region continues to grow. Implement safe, convenient and attractive streets for everyone regardless of age, ability or mode of transportation (pedestrian, bike, automobile, transit).*



Quality of Life: *Create and maintain open spaces accessible to all residents for recreation and neighborhood character preservation.*



Sustainability: *Create an economically and environmentally sustainable development pattern, protecting existing natural features. Consider the historical significance of the neighborhood, especially opportunities to preserve farm fields and implementation of low-impact development techniques for infrastructure design.*



1. HOUSING GOAL & STRATEGIES

Goal 1 – Additional housing options will be provided in the neighborhood, but will be strategically placed, designed and buffered to be compatible with the existing Greenfield residents.

Strategy #1.1

Encourage a variety of housing types, forms, price points, and tenures in the neighborhood, locating the least dense housing next to existing residential lots.

Incorporating diversity of housing types with varying density and massing can be achieved through careful design considerations. Design guidelines/standards can help achieve compatibility between uses. Consider amending the comprehensive plan to allow for two unit buildings in low and medium density districts to encourage more variety within the same density ranges.

Strategy #1.2

Encourage well-designed developments that mitigate any potential conflicts while providing a mix of housing types within a subdivision/plat.

Building forms and site layout should be compatible with the design guidelines established in this Plan. This approach helps to address potential conflicts by setting guidelines that balance the needs and characteristics of various housing options, promoting a cohesive and inclusive community.

Strategy #1.3

New development adjacent to the existing established Greenfield neighborhood should include mitigation techniques to maintain the general local character of this neighborhood.

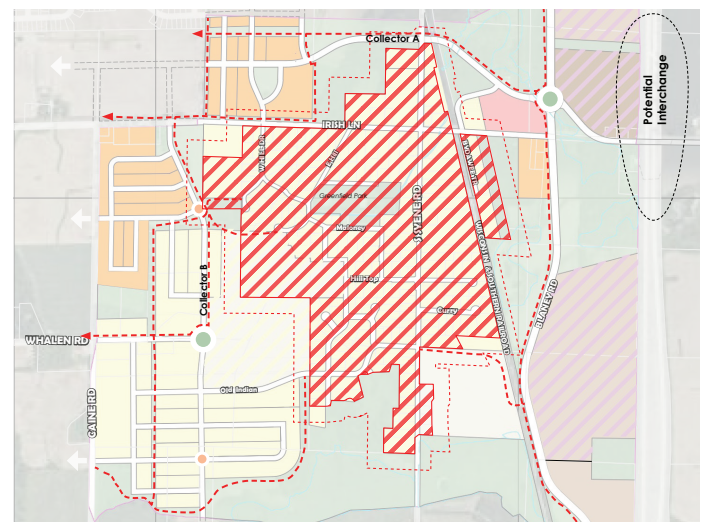
Within approximately 200 feet of the existing neighborhood, as shown on the right, building heights should not exceed 3 stories or 35 feet (the existing allowances in the neighborhood). Consider a dedicated open space on the north side of Irish Lane that can preserve existing old growth/heritage trees and provide space for a shared use path.



This neighborhood incorporates varied housing types, using building orientation to mitigate compatibility issues.



This apartment building steps down the building adjacent to a neighboring lower-density residential use.



The map above identifies a 200-ft buffer around the established neighborhood.



1. HOUSING GOAL & STRATEGIES (cont.)

Strategy #1.4

Encourage Traditional Neighborhood Design (TND) developments that allow for ‘missing middle’ and small-lot housing.

TND neighborhoods are modeled after the traditional pre-war neighborhoods in the United States that are prevalent throughout Wisconsin. TND promotes compact, pedestrian-oriented neighborhoods with a mix of commercial and residential uses, a variety of housing types, and public places where people can socialize and engage in civic life. TND also improves land use efficiency and opportunities for alternative modes of transportation.



The above four-unit development includes reduced setbacks and porches that provides a welcoming frontage. The building types also fit the “missing middle” housing formats.

What is the “missing middle”?

The Missing Middle is a range of multi-unit or clustered housing types compatible in scale with single-family homes that help meet the growing demand for walkable and urban living. Ellen Dunham-Jones, professor at the Georgia Institute of Technology, stated “well-designed ‘Missing Middle’ buildings unify the walkable streetscape as they greatly diversify the choices available for households of different age, size and income”. Housing types include duplex, triplex/fourplex, courtyard apartment, bungalow court, townhomes, multiplex and live/work units.





2. ECONOMY GOAL & STRATEGIES

Goal 2 – Employment and goods/services will be strategically located and connected to reduce the dependency on longer vehicle travel and to provide local and convenient options near the neighborhood.

Strategy #2.1

Commercial uses and building forms will be compatible with general neighborhood context.

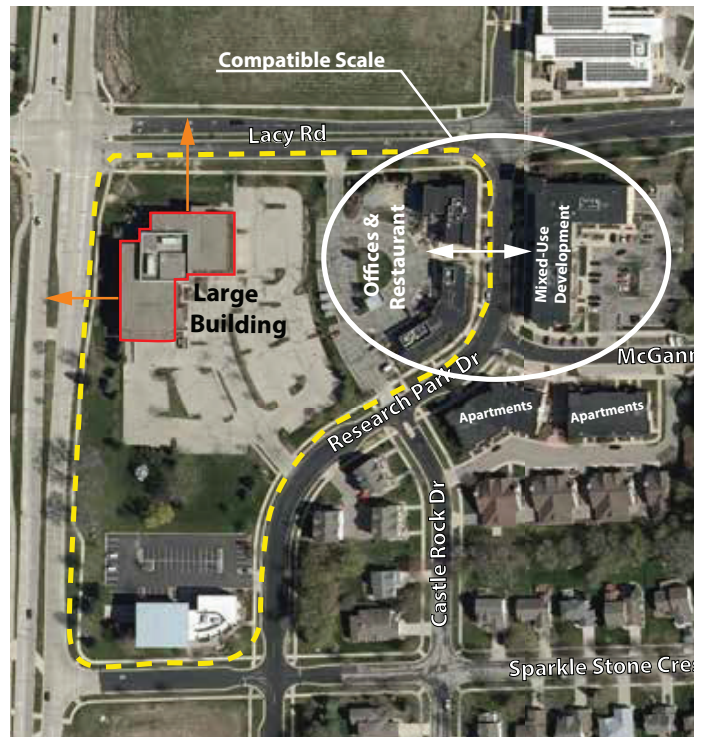
Commercial / Mixed-use nodes should be designed to be compatible with the surrounding residential area. The scale, massing and uses within the employment area should consider design solutions to minimize its impact on the surrounding neighborhoods. Pedestrian and vehicle connections should be provided between residential and the employment area(s).

Strategy #2.2

Promote flexible land uses east of the tracks that allow for either gentle increases in residential density or business park to respond to market needs and landowner interests.

Encouraging flexible land uses enables a more tailored and timely response to market needs at the time of development. However, fragmented residential developments can lead to long-term home value deterioration and reduce the sense of place and neighborhood feel for residents of the developments.

There are two clusters of flex area with one area located north of Irish Lane and the other located closer to Byrne Road. Whichever use is approved for more than half of a cluster shall result in requiring the remaining of the cluster to match the initial requested use for that specific cluster area.



This example ties the business park to the neighborhood along a minor street, as well as by an off-street trail. Building scale in the business park is smaller closer to the residential area.



This two-story mixed-use building has a pitched roof and gables compatible with single-story ranch homes in the surrounding well-established neighborhood.



3. MOBILITY GOALS & STRATEGIES

Goal 3A – Support future regional transportation connections that limit impacts on Greenfield’s local streets as the region continues to grow.

Strategy #3A.1

Develop a contiguous bike network through the neighborhood, connecting to the rest of the City and to the greater Dane County trail system.

Multi-use paths promote healthy lifestyles, provide alternative modes of transportation, and enhance the value of nearby neighborhoods. These benefits are amplified when interconnected and integrated into regional networks.

Strategy #3A.2

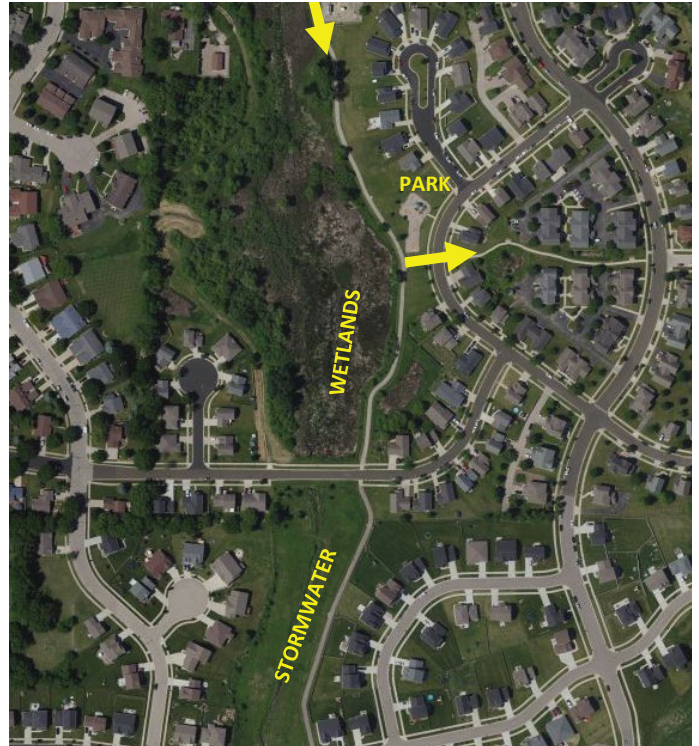
Encourage alternative north-south and east-west collector streets that shift traffic growth away from S. Syene and Irish Lane.

Channeling traffic to larger arterial roads, improves overall traffic flow and reduces local congestion. It enhances safety in residential areas by minimizing through-traffic.

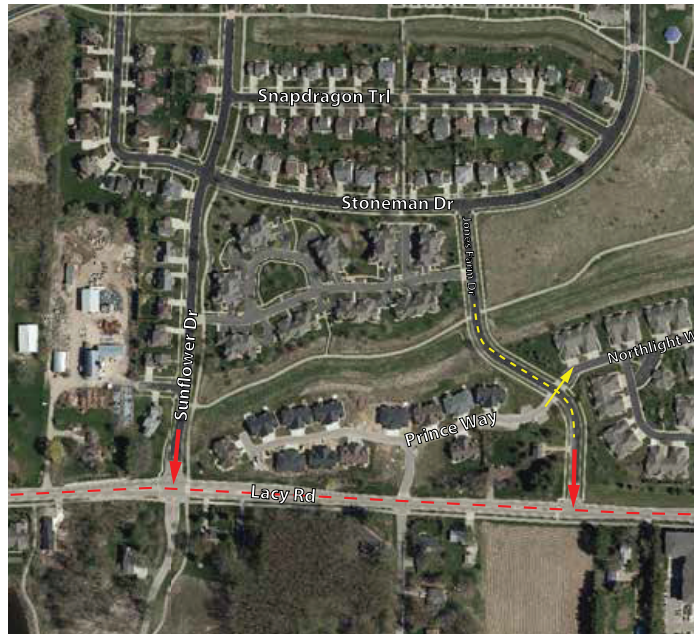
Strategy #3A.3

Continue considerations of a USH 14 interchange between the Lacy Road and County Highway MM interchanges to plan for regional transportation needs.

Future growth to the east and south will impact the level of service of existing roads. As the area continues to urbanize, the need for an additional interchange may be warranted. It is important to assess the potential long-term impacts of the interchange on the current and future developments near USH 14 and north of Irish Lane, should it be planned for or constructed in the proposed location. The interchange will enhance accessibility and reduce travel time for residents, alleviating local traffic congestion by providing a direct route to major roads. Consider connecting the interchange with Collector A and County Highway B.



This trail connects a major roadway to a neighborhood park to several local neighborhood streets.



New neighborhoods making road and pedestrian connections that were established in older subdivisions.



3. MOBILITY GOALS & STRATEGIES

Strategy #3A.4

Seek opportunities develop regional commuter rail along the Fitchburg-Oregon Railroad.

Although the tracks are currently used for freight, the City should monitor for opportunities for regional commuter rail development. When land is developed in Greenfield occurs, consider reserving public space adjacent to the railroad for potential future use.

Goal 3B – Implement safe, convenient and attractive streets for everyone regardless of age, ability or mode of transportation (pedestrian, bike, vehicle, transit).

Strategy #3B.1

Provide sidewalks and bike facilities (if necessary) along all streets in newly developed areas to promote walkability and connectivity.

Walkability is important in residential development, particularly in urban and suburban areas. Sidewalks provide safe and comfortable mobility.

Strategy #3B.2

Promote narrower streets to increase pedestrian safety and to develop land more sustainably.

Streets provide access and parking storage. The wider the road the greater cost to maintain (e.g., street sweep, plow and repair). Right-sizing roadways has safety, financial and environmental benefits.

Strategy #3B.3

Encourage proposed streets/trails to connect to existing streets and intersections, wherever practical.

Dead-end streets and non-continuous trail networks limit options when moving throughout a community. This reduced mobility increases travel distance and

traffic on primary roadways, can frustrate drivers/pedestrians, and discourages non-motorized travel. Development should make every effort to connect to existing facilities (trails, roadways and intersections).

This Plan anticipates neighborhood development to occur in phases over time; future development should anticipate and provide necessary connections between developments. Cul-de-sac and dead end streets proposed due to terrain or natural features should install multi-use paths connecting dead-ends to the street network.



Sidewalks can enhance safety for pedestrians, promote physical activity, and improve accessibility for all residents.



The photo above illustrates of a safe crosswalk connecting to a path.



3. MOBILITY GOALS & STRATEGIES (cont.)

Strategy #3B.4

Utilize traffic calming measures (e.g., bump-outs, traffic circles, speed tables, rectangular rapid flash beacons) where appropriate to create a better street environment for pedestrians and cyclists.

The frequency and speed of vehicles can greatly impact road safety, especially for pedestrians/bicyclists. “Traffic calming” measures that can be designed or retrofitted into a roadway can reduce vehicle speeds, and in some cases discourage vehicle usage (cut-through traffic).

Strategy #3B.5

Design streets, multi-use paths, and trails that include adequate lighting to ensure safety of users.

Well-designed lighting can enhance visibility and promote a sense of security, encouraging more people to walk, bike, and engage in outdoor activities. By integrating effective lighting solutions, communities perceive the streets as more welcoming.

Strategy #3B.6

Seek opportunities to develop a multi-use path along the Fitchburg-Oregon Railroad.

The railroad corridor could provide an opportunity for an east side path connection between the north and south ends of the City. This path could serve as the eastern portion of the Heritage Circle Route, as identified in the *Fitchburg Parks, Open Space, and Recreation Plan 2025-2030*.

Traffic Calming Measures reduce traffic speeds and cut-through traffic with the goal of increasing safety for motorists, bicyclists, and pedestrians.

- **Striping Drive Lane Edge:** Painted solid line to reduce the perceived lane width and separate it from parking or biking space.
- **Tree-lined Streets:** Streets with landscaped center medians and/or perimeter trees can affect driver perceptions of lane width, inducing lower speeds.
- **Speed Display Sign:** Street sign with radar that displays actual speed and prompts motorists to slow down (via blinking or flashing lights).
- **Bump-out (bulb-out, neck-downs):** Curb extensions into the road section (outside travel lanes) that narrows the road and length of pedestrian crossings.
- **Raised Crossing / Intersection:** Speed table across the entire crossing/intersection that reduces vehicle speed and creates level crossings for pedestrians.
- **Raised Median / Crossing Refuge:** Placement of a raised island in the middle of the roadway to narrow the vehicle travel lanes.
- **Chicanes and Traffic Circles:** Features that shift the path of traffic horizontally within the right-of-way. Chicanes do this mid-block and traffic circles do this within intersections.



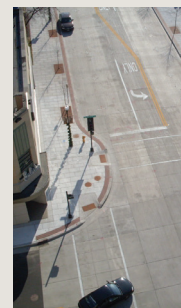
Raised Median / Crossing Refuge, Plus Speed Table



Speed Display Sign



Chicane



Bump-out



4. QUALITY OF LIFE GOAL & STRATEGIES

Goal 4 – Create and maintain open spaces accessible to all residents for recreation and neighborhood character preservation.

Strategy #4.1

Plan and design public infrastructure that is sustainable, attractive and low maintenance.

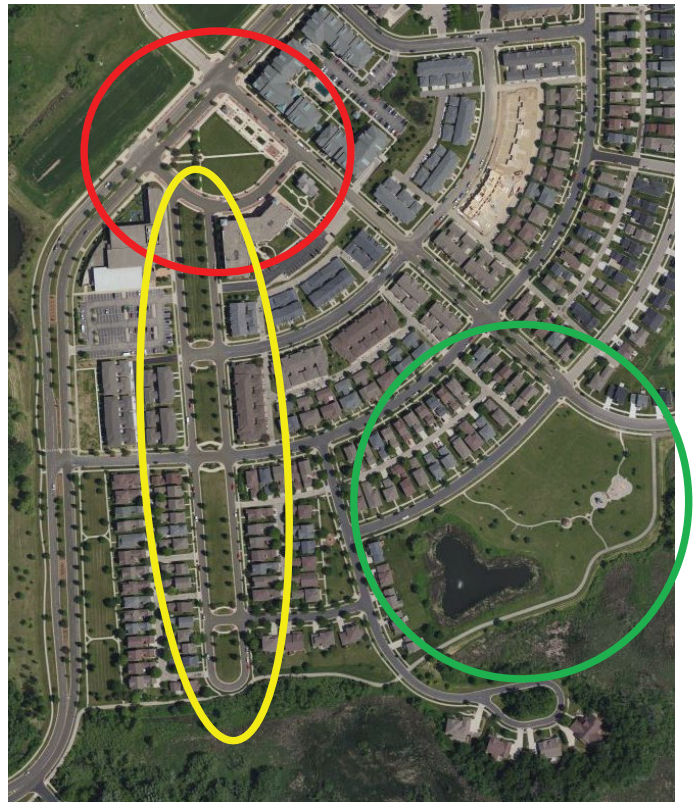
Effective streetscape design can improve pedestrian experience and safety, address stormwater management, and minimize necessary landscaping efforts. Elements including median or terrace treatments, landscaping, and paving design along primary roadways can also establish / enhance the community's identity.

Species of street trees should be selected for qualities such as low maintenance requirements, canopy size, climate survivability, and pollution tolerance. Road medians must be sized appropriately for the health of trees and plantings. Planting beds should utilize native plant species such as prairie grasses and require as little mowing as possible.

Strategy #4.2

Design new neighborhood residential areas around community gathering places.

Public/community facilities are the activity hubs within a neighborhood. Historically, these facilities were placed on the premiere site within a neighborhood/district/community. These facilities should be planned for and located in areas that are accessible and visible within the neighborhood.



This Sun Prairie neighborhood includes a variety of open spaces that provides for diversity of uses and amenities, including a plaza (red circle), boulevard street (yellow circle), and traditional neighborhood park (green circle). Below are examples of attractive streetscaping.



4. QUALITY OF LIFE GOAL & STRATEGIES (cont.)

Strategy #4.3

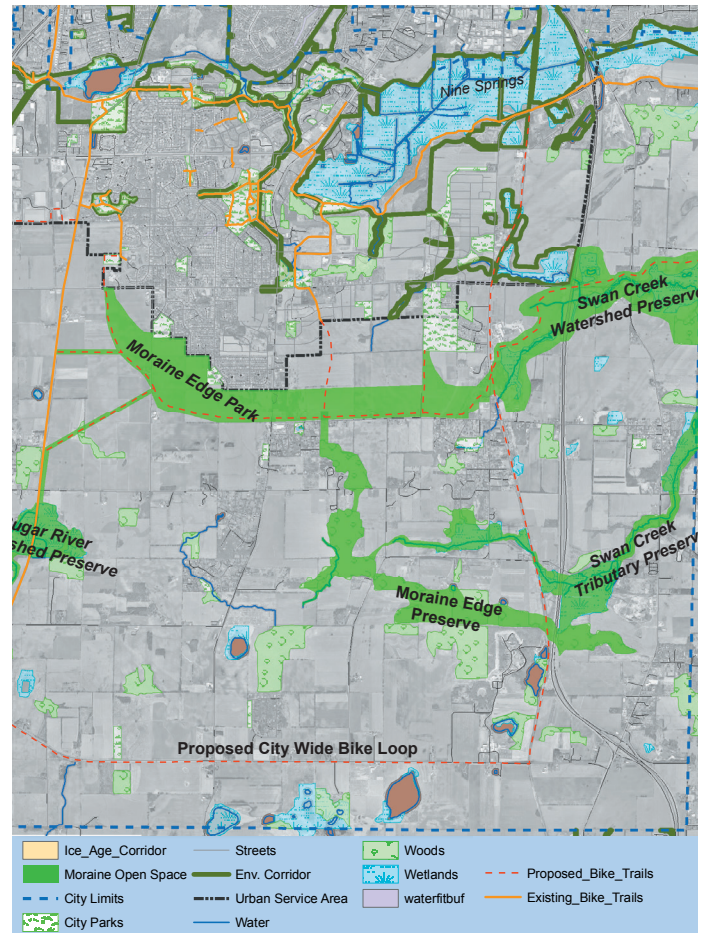
Plan for parks that vary in size and facilities to fulfill ranging neighborhood recreation interests consistent with the Fitchburg Parks and Open Space Plan.

Parks should be within 1/4- to 1/3-mile from residents with at least one neighborhood park within a 10 minute walk. Through neighborhood design, consider how different parks connect to each other, including to the existing parks such as Greenfield Park. Larger neighborhoods should consider more than one park with varying programs, where practical.

Strategy #4.4

Make intentional multi-modal connections between local and regional park/open space areas, especially developing a path through the proposed Moraine Edge Corridor.

Environmental features offer a break from the urbanized environments we live in. Trails and/or park amenities should take advantage of these features. Tying together several park and open space destinations provides a benefit to all neighborhoods residing along the route(s).



The Moraine Open Space and Preservation areas preserve and protect significant geological and natural features, wildlife corridors, groundwater recharge areas, high risk communication areas, and important historical and cultural features. (City of Fitchburg, Planning & Parks Departments, 2005)



5. SUSTAINABILITY GOALS & STRATEGIES

Goal 5A– Create an economically and environmentally sustainable development pattern, protecting existing natural features.

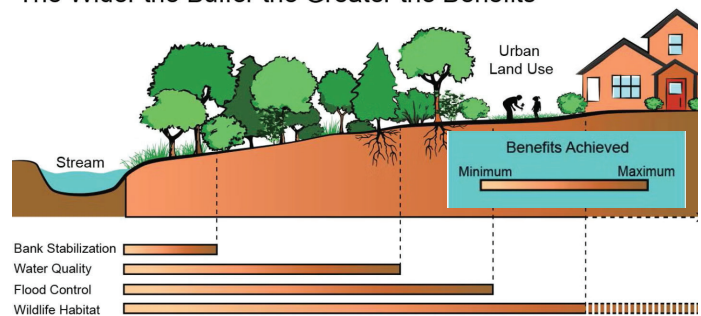
Strategy #5A.1

Provide adequate vegetative buffers between development and natural features.

Vegetated buffers (i.e., dense growth of shrubs, trees, high grasses, perennials, and other plants) can help slow, capture and filter stormwater runoff.



The Wider the Buffer the Greater the Benefits



Strategy #5A.2

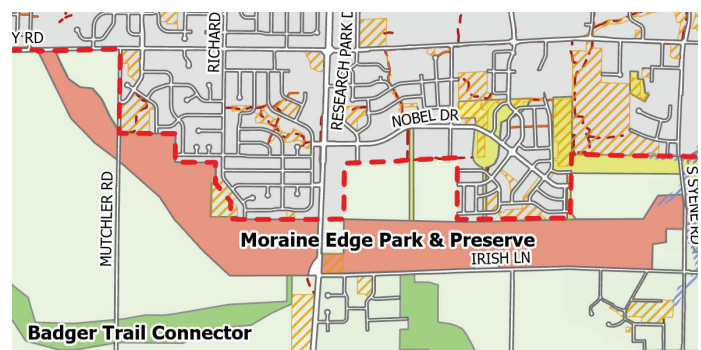
Integrate environmental corridors and open space into a comprehensive stormwater management system that provides key ecosystem services on a regional scale where appropriate.

Stormwater management areas can expand the open space corridor. Dry ponds can be seeded as a prairie and wet ponds can become a “pond” feature.

Strategy #5A.3

Integrate environmental features into the neighborhood as common open spaces for active or passive recreation, public gathering spots, or flood protection and stormwater management.

The proposed Moraine Edge environmental corridor will connect the ancient wooded areas near Syene Road and Irish Lane to the wetlands in the northeast and the parks in the northwest, just outside Greenfield. This provides areas for recreation and social interaction. These spaces can serve as natural flood protection and improve stormwater management.



Strategy #5A.4

Encourage preservation of high quality trees.

High quality trees can be preserved and integrated into new developments in a way that maintains ecosystem services and provides high aesthetic and quality of life value to adjacent residents.

Strategy #5A.5

Consider opportunities for alternative energy use within neighborhood design.

Future neighborhood development can support alternative forms of energy through solar-friendly urban design techniques and EV ready development. Aligning roadways east-west with roof planes facing north-south, allows for maximum surface for solar panels.



5. SUSTAINABILITY GOALS & STRATEGIES (cont.)

Goal 5B – Consider the historical significance of the neighborhood, especially opportunities to preserve farm fields and implementation of low-impact development techniques for infrastructure design.

Strategy #5B.1

Strategically preserve natural lands and existing farmland that can complement neighboring housing developments.

Maintaining the neighborhood's agricultural heritage honors its long-standing farming traditions and reinforces the community identity. Preserving natural lands and farmland can protect local biodiversity and promote outdoor activities and community engagement. Additionally, preserved areas serve as buffers between residential development and agricultural operations, reducing use conflicts while providing residents with scenic views and recreational opportunities that enrich their quality of life.

Strategy #5B.2

Ensure, through the development review process, that site development and infrastructure improvements occur in area with the least possible impacts to natural environments.

This approach preserves local ecosystems and biodiversity. This strategy also promotes sustainable growth, reduces environmental degradation, and enhances the community's overall quality of life.

Strategy #5B.3

Encourage landscaping practices on public and private property that help to filter and infiltrate rainwater.

This helps reduce runoff and prevents flooding, protecting local waterways from pollution. This strategy also promotes groundwater recharge, supports healthy plant growth, and enhances the aesthetic appeal of properties.

What is "Low-Impact" Development (LID)?

LID is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve the natural systems and hydrologic functions of a site (e.g., reducing roadway surfaces, permeable pavement surfaces).



The photo above presents design strategies to maximize infiltration through pervious materials. Below is an example of an Agrihood Development, balancing farming and residential.



Strategy #5B.4

Encourage energy-efficient buildings consistent with the city's existing energy targets.

Energy targets are available in the Fitchburg Sustainability Plan and the Clean Energy Resolution (R-26-19).

FUTURE LAND USE MAP

As discussed in **Chapter 1**, The Greenfield Future Development Area (FUDA) was identified in 2004, Resolution R-35-04, for incorporation in the urban service area. The City Comp Plan’s current Future Land Use (FLU) Map only presents existing land uses until a more detailed neighborhood plan is developed.

The neighborhood planning process (outlined in **Chapter 3**) produced a FLU Map for the Greenfield FUDA, illustrated in **Figure 2.1**. Land uses within the Neighborhood match the categories established in the City’s Comprehensive Plan, except for the Neighborhood Mixed-Use and Agrihood categories (see **Chapter 3** for land use information). There are also several hatched areas within the FLU Map, indicating flexibility to develop these areas as business park or residential based on market and/or site conditions.

Through the adoption of this Plan, the City will amend the Comprehensive Plan to incorporate the FLU Map for the Greenfield Neighborhood.

Comp Plan - Future Land Use Map (excerpt)

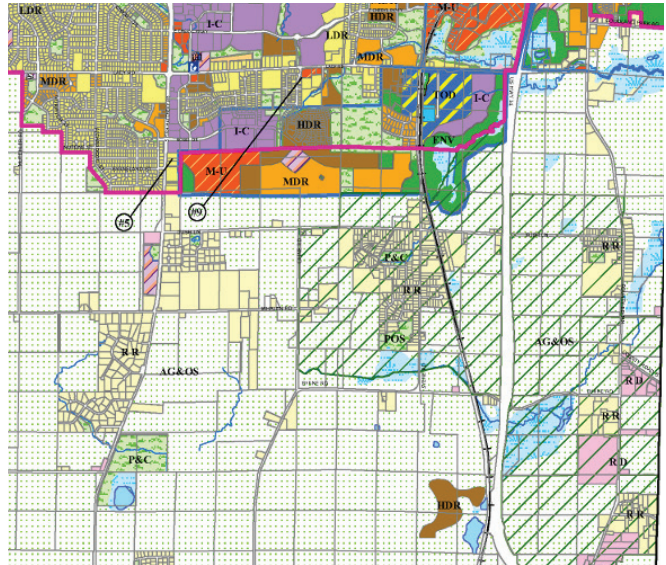
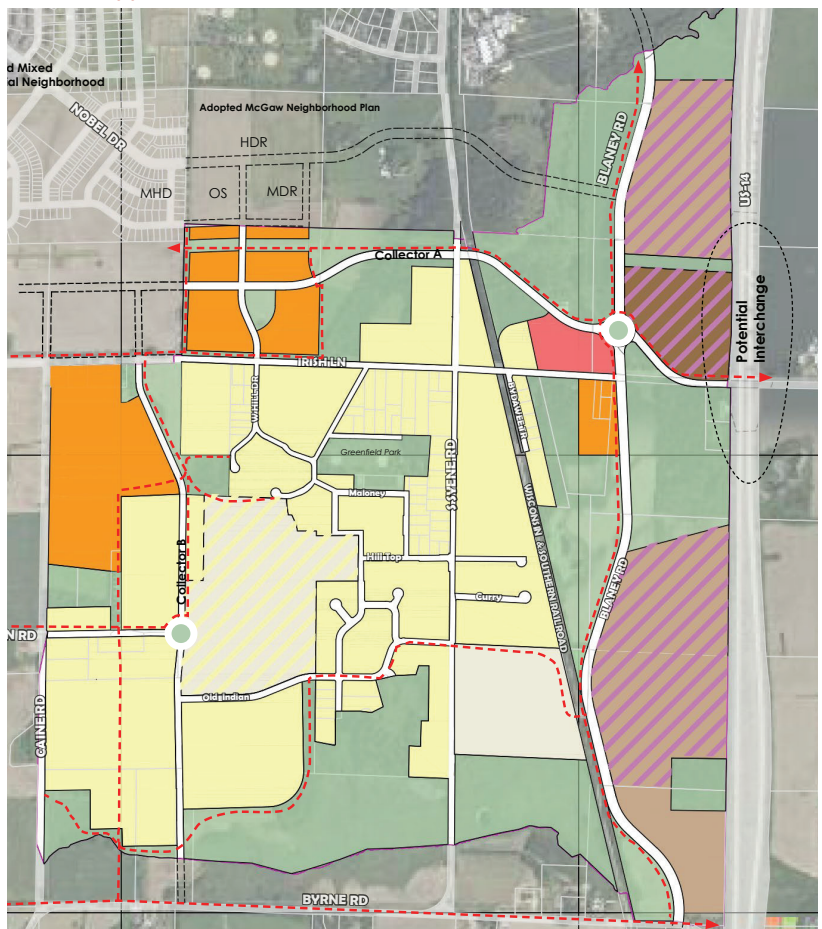


Figure 2.1: Recommended Future Land Use Map Revision
(Refer to Appendix D)



LEGEND

- 0-123 A. Business Park
(Range to include hatched areas)
- 0-22 A. High Density Residential
(Range to include hatched areas)
- 17-118 A. Medium-High Density Residential
(Range to include hatched areas)
- 59 Acres Medium Density Residential
- 7 Acres Neighborhood Mixed Use
- 270-325 A. Low Density Residential
(Range to include hatched areas)
- 29-84 A. Farming/Agrihood
(Range to include hatched areas)
- 308 Acres Parks, Stormwater Management, & Open Space

PLACEMAKING

QUALITY PLACES

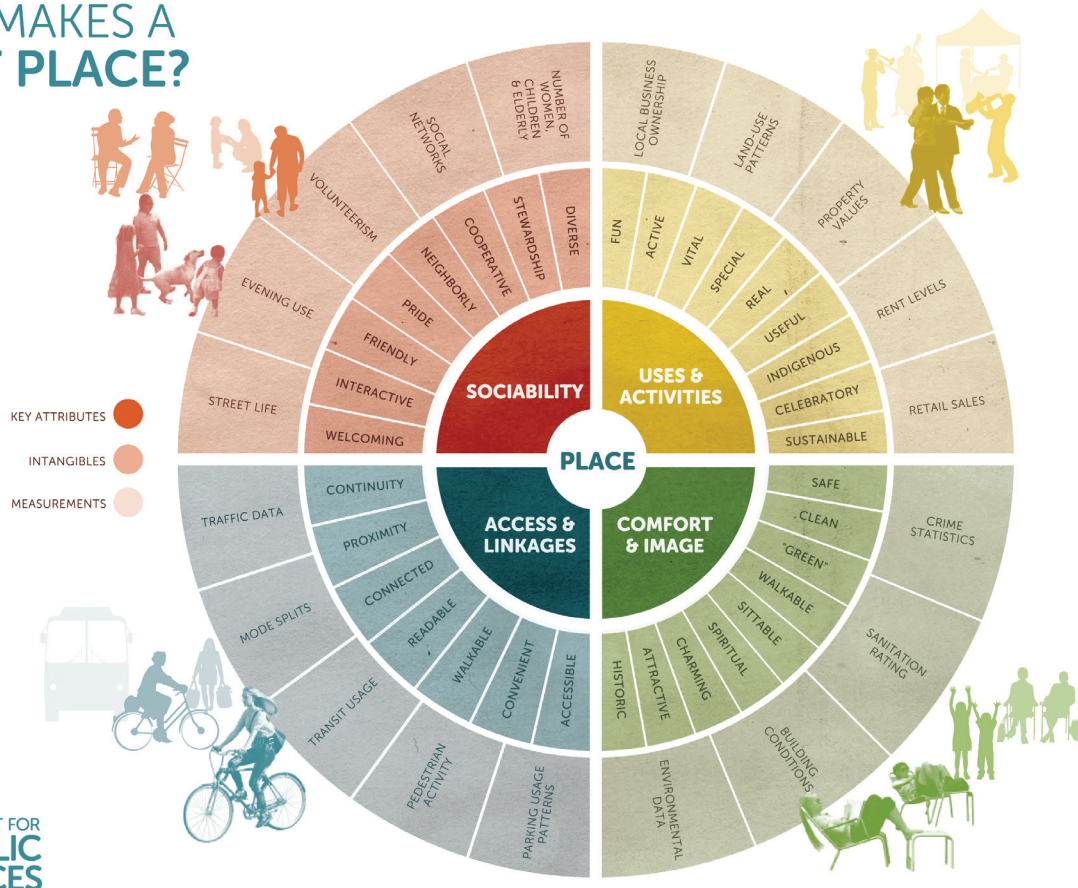
Placemaking is the *process* of creating **quality places** that attract people. Quality places can and should be unique and memorable, but there is a set of general physical characteristics that all good places share. Project for Public Spaces (PPS) has found that Quality Places share four qualities:

- 1) they are **accessible**;
- 2) people are engaged in **activities** there;
- 3) the space is **comfortable** and has a good image; and
- 4) it is a **sociable** place - one where people meet each other and take people when they come to visit.

The Place Diagram (created by PPS) is shown below, and describes the many facets that make a place “great”.

The Vision for this Plan is to make Greenfield a distinctive place. This section describes guidelines to work towards this goal; however, these guidelines are not intended as strict requirements.

WHAT MAKES A GREAT PLACE?



DESIGN GUIDELINES

This section is intended to create memorable and desirable buildings and spaces within the Greenfield Neighborhood. The objective is to create unique neighborhoods that residents will love and continue to invest in for many decades.

All developments are encouraged to meet these guidelines.

1. ECO / SUSTAINABLE DESIGN

- A. Orient buildings on the site to maximize natural light, ventilation, and solar energy opportunities.
- B. Consider using green roof technologies.
- C. Use “dark sky” friendly exterior lighting and energy efficient lighting technologies.
- D. Consider using mechanical systems that utilize renewable energy (solar, wind, geothermal) and minimize greenhouse emissions.
- E. Utilize rain water collection, storage and distribution for irrigation systems.
- F. Consider reusing “grey” water (wastewater generated from domestic activities such as laundry, dishwashing, and bathing) for irrigation and other non-potable uses.
- G. Include bio-filtration basins and swales as a part of the stormwater systems on site to promote infiltration and groundwater recharge and reduce sediment runoff.
- H. Consider using porous paving materials (asphalt, concrete and pavers) in parking areas, walkways, etc.
- I. Use drought tolerant landscaping materials to limit water use.
- J. Incorporate Level 1 or 2 electric vehicle charging stations within exterior and covered parking areas.



2. SITE PLANNING

- A. Minimize the amount of disturbance to the existing terrain. Sites and buildings should be designed to fit within the existing topography to the extent possible, while still providing an inter-connected street grid and the desired composition of land uses.
- B. Design sites to preserve large native trees and other significant vegetation, including prairie remnants, wetlands, and similar features.
- C. Public spaces and plazas are encouraged, where appropriate.
- D. Building setbacks should be similar to setbacks of adjacent building within a given block.
- E. Buildings and the primary entrance should front the public street.



The ADA ramp is incorporated in the stair entrance and meets the needs of all users.



An example of a development that preserves the local trees through parkland dedication, providing an attractive public space for the surrounding residences.

3. SIGNAGE & LIGHTING

- A. Appropriately-scaled signage is critical and should complement the building and site. Wall, projecting, and ground signs should be integrated within the overall building design in color, style and articulation.
- B. Where freestanding ground signs are proposed, the use of monument signs is preferred over pole or post mounted signs. Shrubs and/or perennial planting beds should be planted around freestanding signs.
- C. Lighting on exterior signs is encouraged to be mounted externally, above the sign, and directed downward, or internally lit for freestanding signs.
- D. Full cut-off (dark-sky compliant) exterior lighting is encouraged in all locations to reduce glare and light pollution.



Examples of full cutoff fixtures that minimize glare and light pollution.

4. ARCHITECTURE & DESIGN

- A. Buildings should utilize details or changes in materials to create a discernible base and top. Multi-storied buildings should have a horizontal expression line between the first and upper floors.
- B. Buildings should establish vertical proportions for the street facade (e.g., expression of structural bays, variation in material, and/or variation in building plane), and for the elements within that facade (e.g., windows, doors, structural expressions, etc).
- C. Avoid large, undifferentiated building walls and roof lines. Desired design features include variation in materials and colors, projecting and recessed bays, and variation in building heights.
- D. Street-facing facades should use durable and high-quality building materials. All sides of the building should include materials and design characteristics consistent with the front facade. Use of lesser quality materials for the sides and rear facades should be minimized. Vulnerable materials, such as EIFS, should not be used.
- E. All buildings should have clearly-defined and welcoming entrances. Awnings and canopies are strongly encouraged on ground floor facades of commercial, mixed-use and apartment buildings. Awning colors should relate to and complement the primary colors of the building facade. Glowing awnings (backlit, light shows through the material) are discouraged.
- F. All service, refuse, garage doors, mechanical equipment and loading dock areas should be screened from public view through strategic placement, landscaping, and/or architectural design integration. For sites with dual frontage configurations, these features should generally be located along a side yard, and not prominently visible from either the collector/arterial road or the local street.



Examples of various techniques in use to break down the apparent mass of a large building, including canopies, recessed decks, recessed top story, and variations in materials and wall plane.

5. PARKING, SCREENING & LANDSCAPING

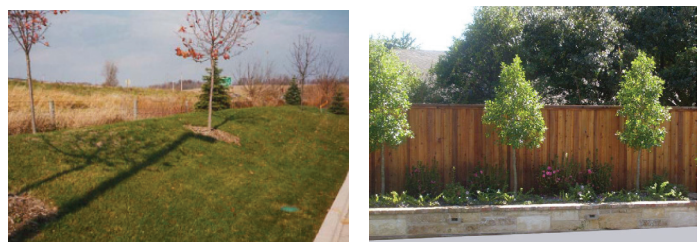
- A. Shared parking between uses is encouraged, to make more efficient use of land for parking.
- B. Parking is encouraged to be located in the side yard and rear yard, or beneath buildings.
- C. Parking and loading areas visible from the public street should be screened with berming, landscaping, fencing or a combination of these three.
- D. Construct pedestrian walkways between the public sidewalk and primary building entries. On-site walkways should be separated from traffic and designed to safely connect the building to parking lots and other destinations on the site.
- E. Parking lots should be landscaped along their edges and within each parking island. The incorporation of required stormwater detention and infiltration devices into the design of the parking area is encouraged.
- F. All parking areas should have concrete curbs to protect landscaping areas, excluding those areas dedicated for snow storage. The curbs may contain gaps to allow stormwater flow into infiltration basins.
- G. Fencing and screening should be of similar materials as primary building(s).
- H. Landscape design should use plant species native to the region, especially buffering wetlands and other significant natural features.



This illustration shows two developments on adjoining lots sharing parking and an access drive. A sidewalk connects the two developments through the parking area.



Example of well landscaped parking edges.



Examples of desired stormwater management designs within parking lots.

6. AGRIHOOD

This section aims to preserve and protect large tracts of farmland and cluster appropriately designed development in areas that are less visually or environmentally sensitive. In addition to all other guidelines, the following is recommended for Agrihood uses:

- A. Preservation of natural resources:** The development should aim to preserve visually sensitive areas and important natural resources, by clustering homes in a traditional village layout.
- B. Open Space:** To balance the farming and residential uses, the Agrihood should maintain 60 to 70% of the land as farmland open space and related structures.
- C. Housing Density:** The remaining 30-40% of the land should be single-family on 1/4 acre lots or smaller, duplexes, triplexes, fourplexes, with a density of 4 to 12 units per acre.
- D. Interconnected Trail Network:** It is recommended to have a network of shared-use trails through the development, connecting important community amenities while linking to trails in the neighborhood. This encourages outdoor activity and enhances community connectivity.
- E. Community Engagement:** Include project components that encourage engagement with food-production spaces, such as trails, edible landscaping, community gardens, and teaching gardens.

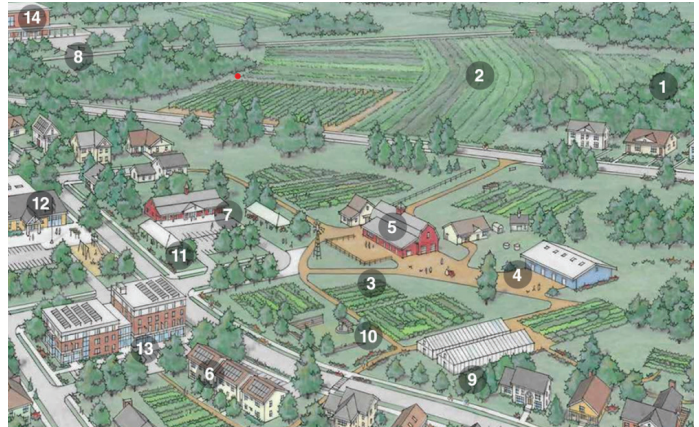


Diagram showing the balance between development and open spaces.



The examples above show a traditional village layout, and illustrate how the different houses share similar architectural language and style.

7. COMPATIBILITY GUIDELINES (ADJACENT TO LOW-INTENSITY RESIDENTIAL)

These compatibility guidelines should apply to all new multi-unit residential, office and/or mixed-use development of three-stories or larger and/or any development requiring a Planned Development (PD) zoning approval located on land abutting or across a street or alley from low-intensity residential. For purposes of this section, low-intensity residential development should mean single-family, duplex, townhomes (6 or less units), and small multi-unit buildings (8 or less units).

- A. Use Intensity.** In developments with multiple buildings with varying intensities, the development should locate buildings with the least intense character (e.g., lower heights, fewer units) nearest to the abutting low-intensity residential development.
- B. Building Height.** To ensure that new buildings are compatible in scale with surrounding properties, building height is limited to four (4) stories above ground level, except the height of the proposed structure(s) should not exceed thirty-five (35) feet in height in the following locations:
1. Portion of the structure within sixty (60) feet of a single-family or duplex lot.
 2. Portion of the structure within thirty (30) feet of any other low-intensity residential lot (i.e., structures with 3+ units).
 3. Portion of the structure within 200ft of any existing (as of the adoption of this plan) single-family primary structure.
- C. Bulk and Mass.** Primary facades abutting or across a street or alley from low-intensity residential development should be in scale with that housing by employing the following strategies:
1. Varying the facade setback a minimum of two (2) feet at an interval equal or less than the average lot width of the applicable low-intensity residential uses. For example, if a block of single-family lots with an average lot width of 50 feet is across the street from the development, the applicable facade should vary its setback, at a minimum, every 50 feet.
 2. Providing a gable, dormer, or other change in roof plane at an interval equal or less than the average lot width of the applicable low-intensity residential uses. For example, if a block of single-family lots is across the street from the development with an average lot width of 50 feet, the applicable roofline should vary, at a minimum, every 50 feet (measured at the roof eave).
- D. Roof Pitch.** The roof pitch of new residential buildings should range between 6:12 and 12:12. The roof pitch of porches should not exceed that of the residential building to which it is attached.
- E. Architectural Features.** Encourage all the following categories of architectural features, with preference for at least two, to be incorporated into street-facing facades:
1. Porches or porticos
 2. Balconies
 3. Dormers and Gables
 4. Bay Windows
 5. Door and Window Ornamentation which may include surrounds, pediments, lintels and sills, hoods, and/or shutters.
- F. Entrances.** Street-facing facades providing direct access to first story dwelling units through individual entrances are encouraged. Preference is at least twenty-five (25) percent of ground units having direct access.
- G. Garages.** Attached garages should not face or open towards the street. If this is not attainable, garages should be sufficiently screened and face the street with the highest intensity of adjacent uses.
- H. Parking.** Parking areas that are visible from the street and located in the building front lot setback should provide buffering at a minimum height of thirty-six (36) inches above the parking surface. Buffering can consist of landscaping, berms, fences/walls, or a combination of these.
- I. Refuse Areas.** Dumpsters should be placed either in the underground garage or behind the building with opaque screening, constructed complimentary material of the primary building. If the refuse area cannot be placed behind the building, a wood fence or wall, at least six (6) feet in height, with landscaping around trash enclosures is encouraged.

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CHAPTER 3

LAND USE

37 Land Use Background

This section looks at factors that impact current land use supply and future demand in the Greenfield study area. It highlights existing land use, zoning, and property ownership, and provides an overview of the natural environment that shapes the neighborhood.

44 Land Use Concept Development

This section outlines the preferred character for the neighborhood through feedback received on a series of land use concepts (Page 45 - Bubble Diagrams, Page 48 - Detailed Concepts, and Page 52 - Preferred Concept). Key design parameters are identified through the preferred concept, providing the basis for utility infrastructure review and the Future Land Use for this area.

EXISTING LAND USE & PROPERTY OWNERSHIP

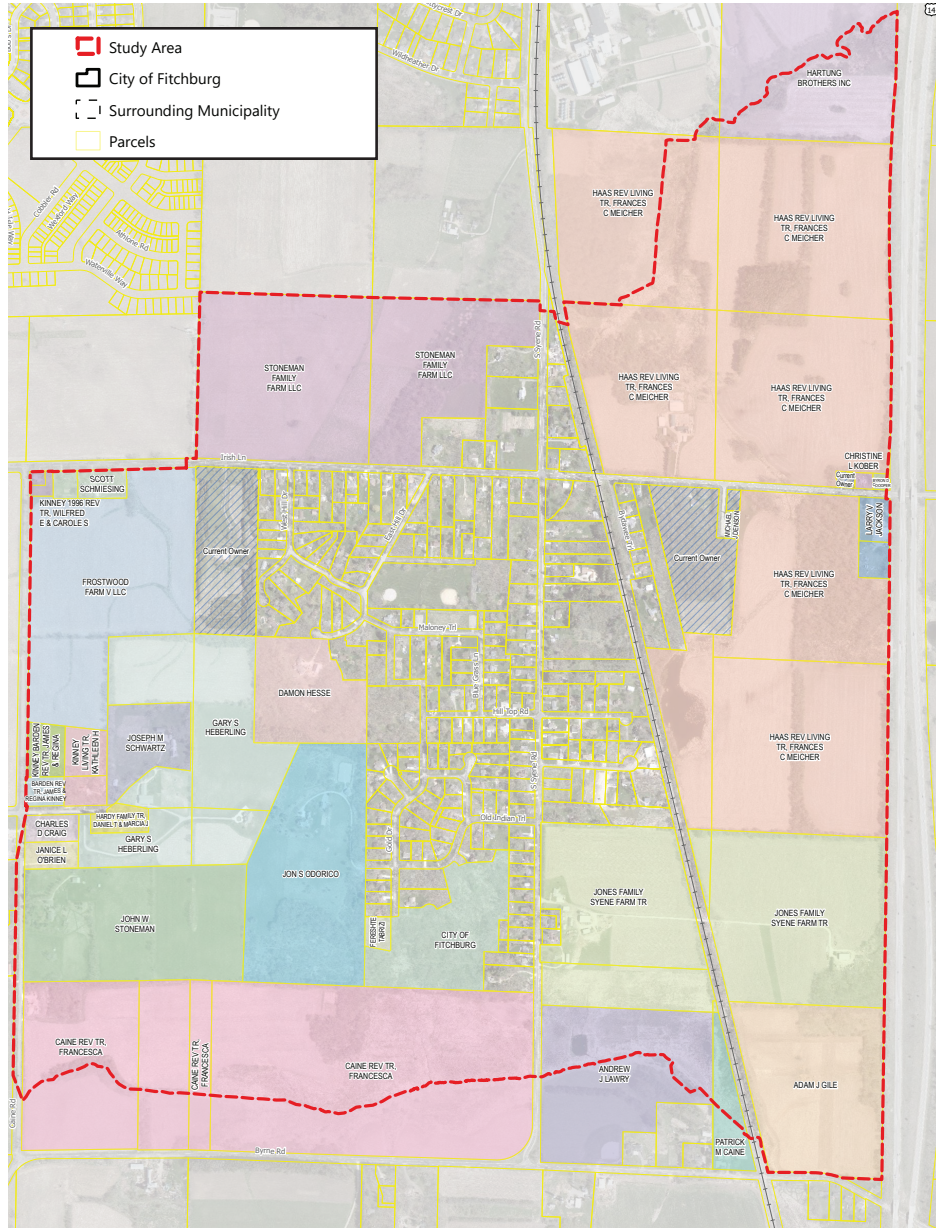
A crucial early step towards establishing a vision and promoting redevelopment is analyzing the existing environment. This chapter contextualizes the factors which will impact the current supply and future demand of land uses in the Greenfield Neighborhood, excluding municipal infrastructure factors that are discussed in Chapter Four.

PROPERTY OWNERSHIP

The Greenfield Neighborhood is mostly privately-owned, with only 1.8% of the land (17.1 acres) owned by the City of Fitchburg. Five entities (Haas Rev Living Tr, Frances C Meicher; Jones Family Syene Farm Tr; Caine Rev Tr, Francesca; Stoneman Family Farm LLC; Frostwood Farm V LLC) own 51.2% of the study area, making the outlook of this neighborhood closely tied to these parcels and their potential development.

Figure 3.1 illustrates the 267 parcels (of the 307 parcels in the study area) are within the established residential neighborhood; lands in this area are predominantly residential, distributed among several private owners, and surrounded by privately-owned agricultural land.

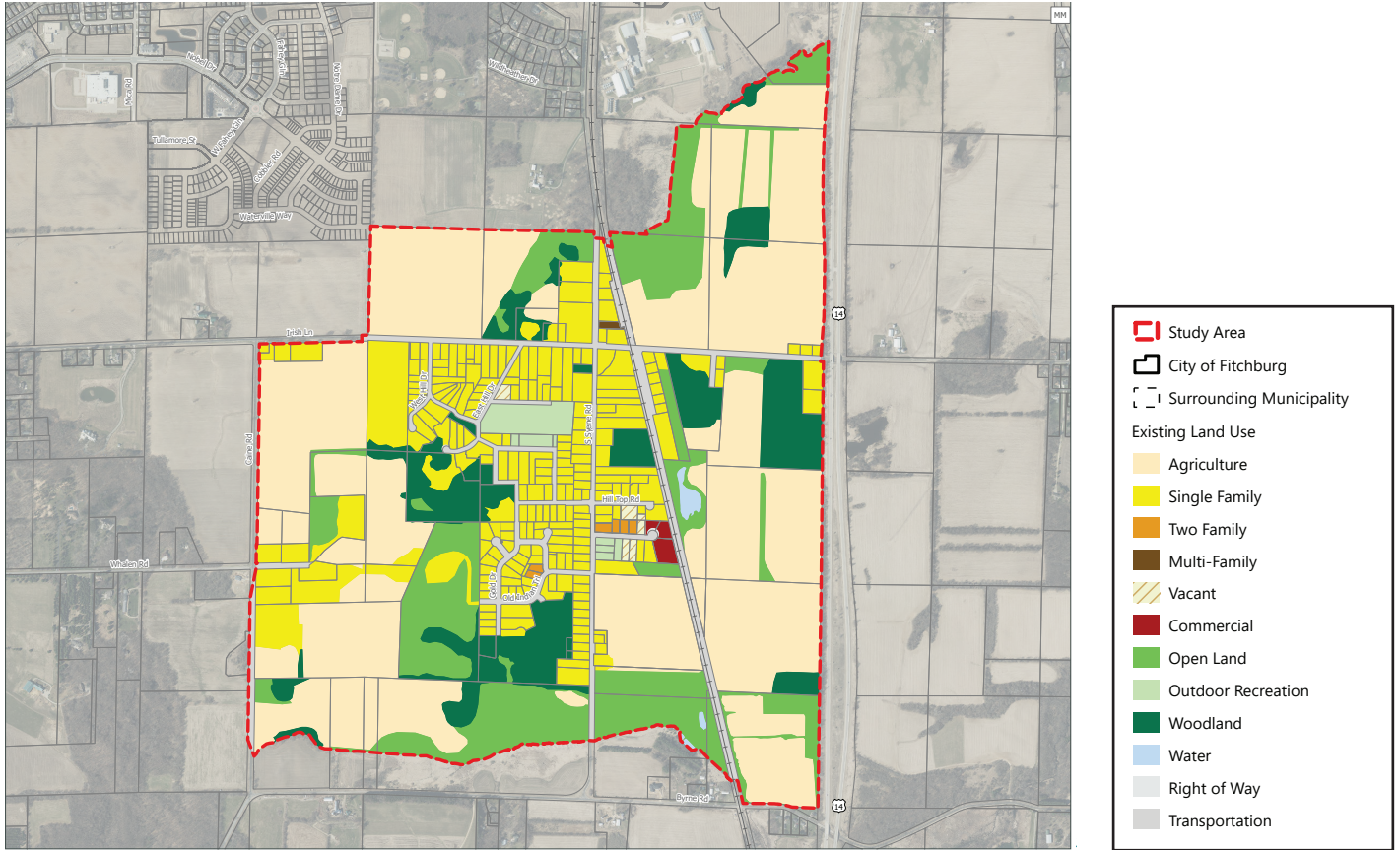
Figure 3.1: Property Ownership Map (Refer to Appendix D)



Photos of Neighborhood



Figure 3.2: Existing Land Use (Refer to Appendix D)



EXISTING LAND USE

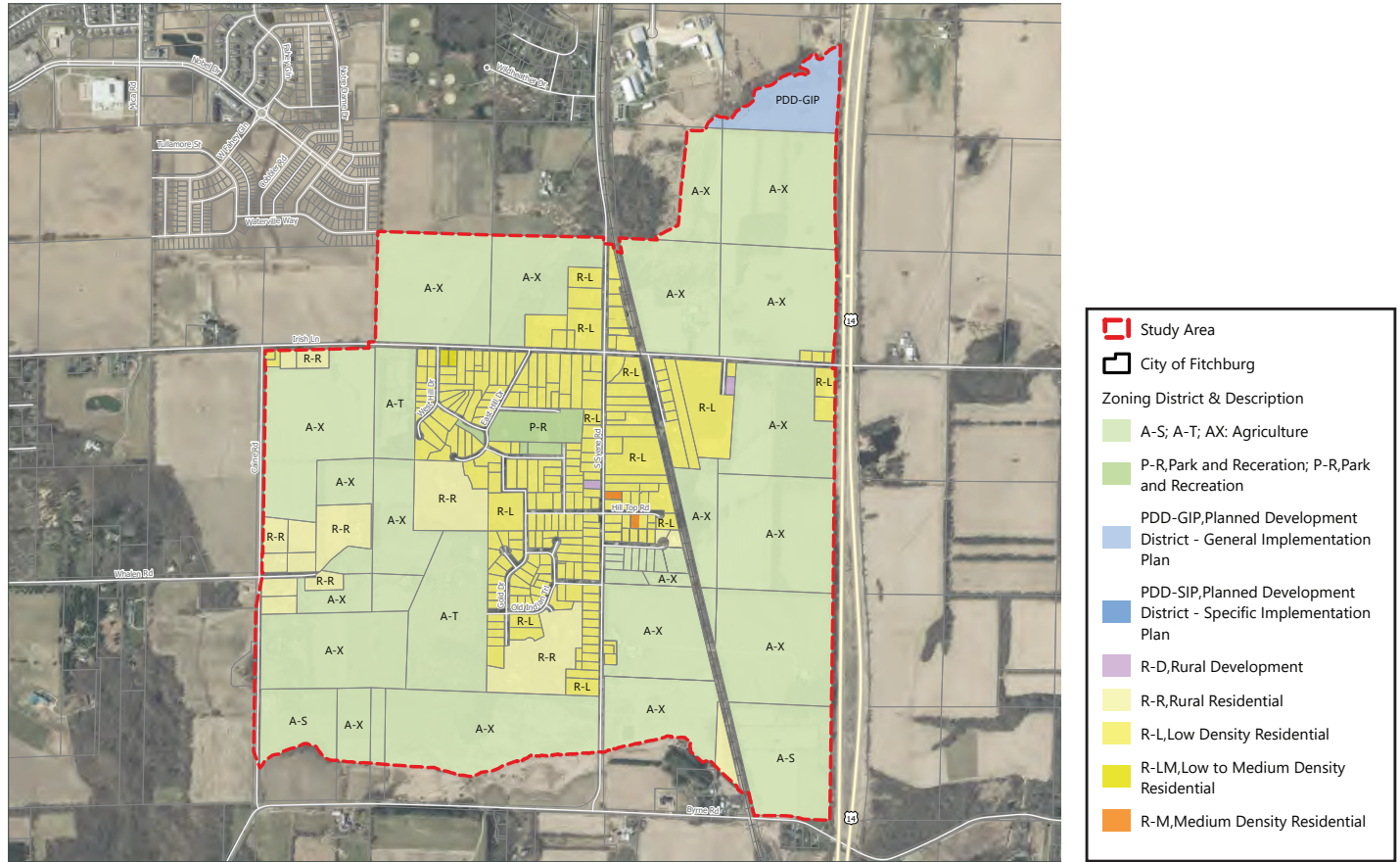
The study area has a rural residential/ ex-urban character. Its primary uses include agriculture (46% by area), single-family residential (20.6%), and open space (15.6%) (see **Table 3.1**).

The center of the study area is defined by single-family residential uses surrounded by agricultural land and woodlands. The existing residential development is a low-density, exurban environment with most lots in the half-acre to two acre range. The area has few vacancies with approximately three acres of vacant land (see **Figure 3.2**).

Table 3.1: Existing Land Use

LAND USE CATEGORY	AREA (acres)	
	acres	% of Total
Agriculture	455.85	46.0%
Commercial	2.70	0.3%
Multi-Family	0.55	0.1%
Open Land	154.31	15.6%
Outdoor Recreation	12.77	1.3%
Right of Way	0.18	0.0%
Single Family	202.74	20.4%
Transportation	54.39	5.5%
Two Family	2.31	0.2%
Vacant	3.06	0.3%
Water	2.68	0.3%
Woodland	100.12	10.1%
Total	991.66	100.0%

Figure 3.3: Existing Zoning (Refer to Appendix D)



ZONING

The city’s zoning ordinance assigns all parcels to districts, describes which uses may occur within each district, and establishes dimensional standards for development within each district, including minimum building setbacks, maximum lot coverage, and maximum building height.

Existing zoning within the study area is shown in the **Figure 3.3** and **Table 3.2**. Sixty percent (60%) of the study area is currently zoned as A-X (Exclusive Agriculture). Most parcels are zoned as R-L (Low Density Residential) with 240 parcels that comprise 19.1% of the land area. This zoning reflects the current character and rural feel of the neighborhood.

Table 3.2: Zoning

Zoning District	Parcels		Area		
	#	%	(sqft)	(Acres)	% of Total
A-S, Small Lot Agriculture	2	0.7	2,043,703	46.92	5.0
A-T, Transitional Agriculture	2	0.7	2,187,101	50.21	5.4
A-X, Exclusive Agriculture	33	10.7	24,639,335	565.64	60.4
P-R, Park and Recreation	5	1.6	501,310	11.51	1.2
PDD-GIP, Planned Development District - General Implementation Plan	4	1.3	820,900	18.85	2.0
PDD-SIP, Planned Development District - Specific Implementation Plan	1	0.3	118	0.00	0.0
R-D, Rural Development	2	0.7	42,562	0.98	0.1
R-L, Low Density Residential	240	78.2	7,809,011	179.27	19.1
R-LM, Low to Medium Density Residential	2	0.7	38,970	0.89	0.1
R-M, Medium Density Residential	2	0.7	36,461	0.84	0.1
R-R, Rural Residential	14	4.6	2,702,566	62.04	6.6
Total	307	100.0	40,822,035	937.14	100.0

NATURAL RESOURCE SYSTEMS

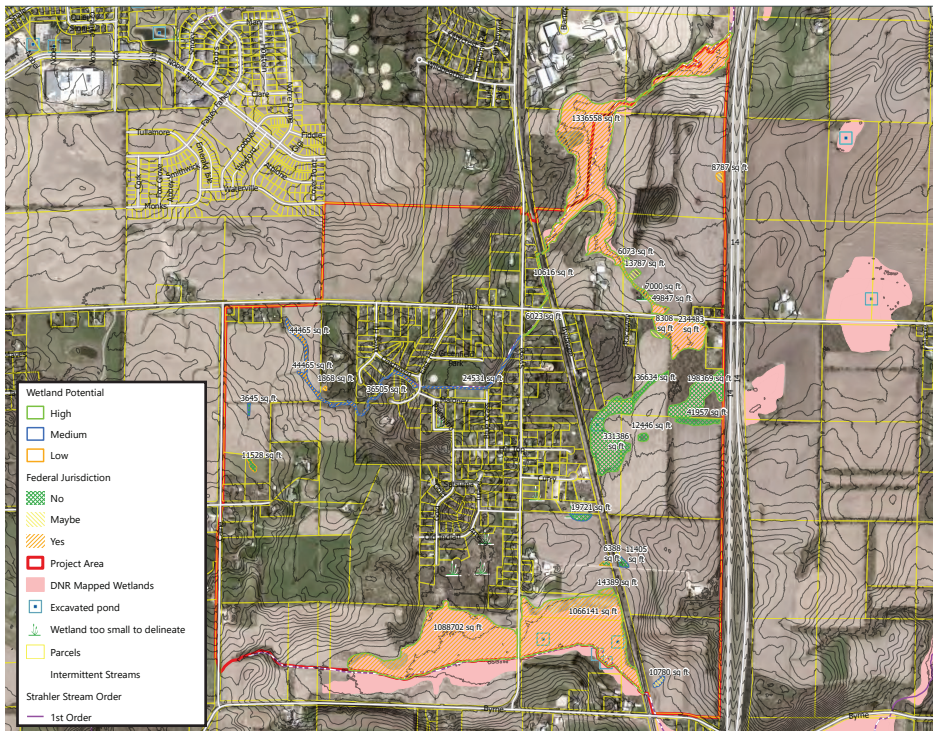
WETLANDS

As shown in **Figure 3.4**, there are several mapped wetlands in the northern, eastern, and southern portions of the Greenfield Neighborhood. The northernmost project area also includes a small area of flood plain with a 1% annual chance of flood hazard; another floodplain area is located just south of the project area. Within these known wetlands there are three small ponds; the largest pond is located centrally and east of the railroad. Two small ponds are located on the project area’s southern border.

During the project’s desktop review of wetlands, several potential wetlands were identified; these areas are hatched to indicate the likelihood of federal determination in **Figure 3.4**. Wetlands determined to be non-federal by the US Army Corps of Engineers can be filled (up to one acre per parcel) with wetland fill credits paid to the Wisconsin DNR. Greenfield residents expressed concern for preservation of the local wetlands, springs, and creek.

Wetlands play an essential role in the quality and quantity of local water sources. A study conducted by Joanne Kline in 2019 highlights the natural significance of certain wetlands within the study area. The

Figure 3.4: Wetland Potential (Refer to Appendix D)



Neighborhood is located in the Murphy Creek Subwatershed and Swan Creek Subwatershed, which feed into the Waubesa Wetlands. Kline notes that the Waubesa Wetlands are internationally designated as a “Wetland of Distinction” by the Society of Wetland Scientists. It is essential to prevent any adverse effects on the water that feeds into this wetland.

Growing Fitchburg 2030 includes a policy that environmental corridors (including wetlands) outside the current urban service area should provide a 300-foot, except their are allowances to reduce the setback as follows: 100 feet if an isolated wetland not mapped in the

Comprehensive Plan Map 4.3 and further reduced to 75 feet if degraded or farmed . This Plan exceeds this requirement.

Figure 3.5 identifies potentially restorable wetlands. Growth within the Greenfield Neighborhood should maximize the preservation and restoration of these areas through methods such as providing adequate buffer zones from development.

Potentially restorable wetlands in Greenfield are mainly located east of the railroad, west of US-14, and south of Irish Lane as well as south of Old Indian Trail and north of Byrne Road. However, some of the identified restorable

wetlands are conveyance ditches within farm fields, which are generally considered low-quality wetlands due to a buildup of contaminants. Chapter Four of this Plan identifies engineering standards for stormwater detention and treatment to protect priority wetlands, contiguous with existing wetlands or with Swan Creek or Murphy's Creek.

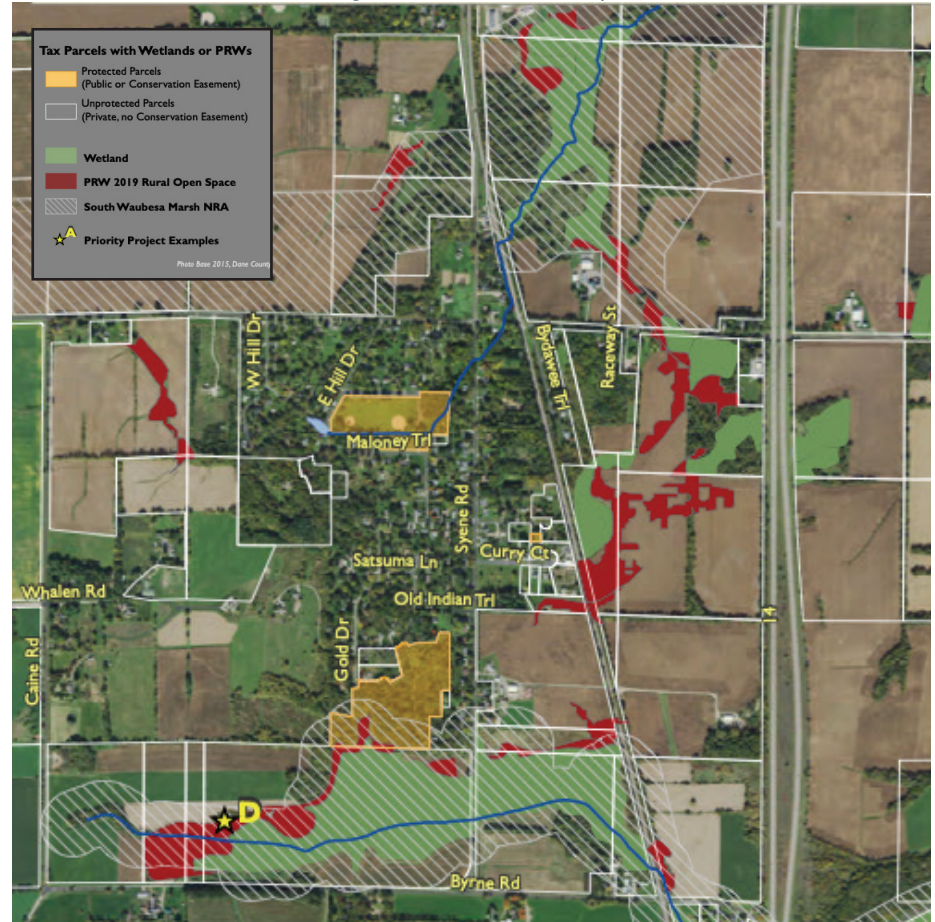
WOODLANDS

There are patches of woodlands throughout the Greenfield Neighborhood; the highest concentration is located within the residential neighborhood south of Irish Lane. Woodlands are also present along the perimeter of farm fields in the northern, eastern, and western areas of the neighborhood. Further study is needed to determine the maturity, species makeup, and health of these woodlands. The results of said study would indicate the practical need for preservation when considering future development.

In 2022, Capital Area Regional Planning Commission (CARPC)—in collaboration with the UW State Cartography Office, Dane County Tree Board, and Dane County Tree Canopy Working Group—updated its 2001 Heritage Oak Project inventory. Estimated to be at least 200 years old, heritage

Figure 3.5: Potentially Restorable Wetlands

(A Watershed Plan for Conserving Waubesa Wetlands" by Joanne Kline, 2019)



oaks are invaluable cultural and biological resources. According to this inventory, there are two heritage oaks located within the project site: one located near the intersection of Irish Lane and Highway 18, and the other is just east of the railroad crossing through Irish Lane (**Figure 3.6**).

SOIL & GROUNDWATER CONDITIONS

The USDA Natural Resources Conservation Service (NRCS) Web Soil Survey indicates that the Greenfield Neighborhood is composed of a variety of

loam and silt loam soil varieties, and one silty clay loam variety (Sable, approximately 55.8 acres or 5.5% of the project area). Silt loam soils within the project site include Batavia, Dodge, Dresden, Elburn, McHenry, Orion, Plano, Radford, Ringwood, St. Charles, Troxel, and Virgil; loam varieties include Griswold, Kidder.

McHenry silt loam (6 to 12% slopes) composes 18% of the project area (181.6 acres), and St. Charles Silt Loam (6 to 12% slopes) composes 18% (180.6 acres). These two varieties

encompass the largest portion of the Greenfield Neighborhood. All other soil types make up approximately 0.2% to 6.3% of the project area.

Figure 3.7 shows USDA ratings for dwellings based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification of the soil. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use.

In the study area, roughly:

- 22% of the land is “Not limited” (shown in green), indicating soil features that are very favorable for the specified use.
- 52% of the land is “Somewhat limited” (shown in yellow), indicating that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

Figure 3.6: Natural Resources (Refer to Appendix D)

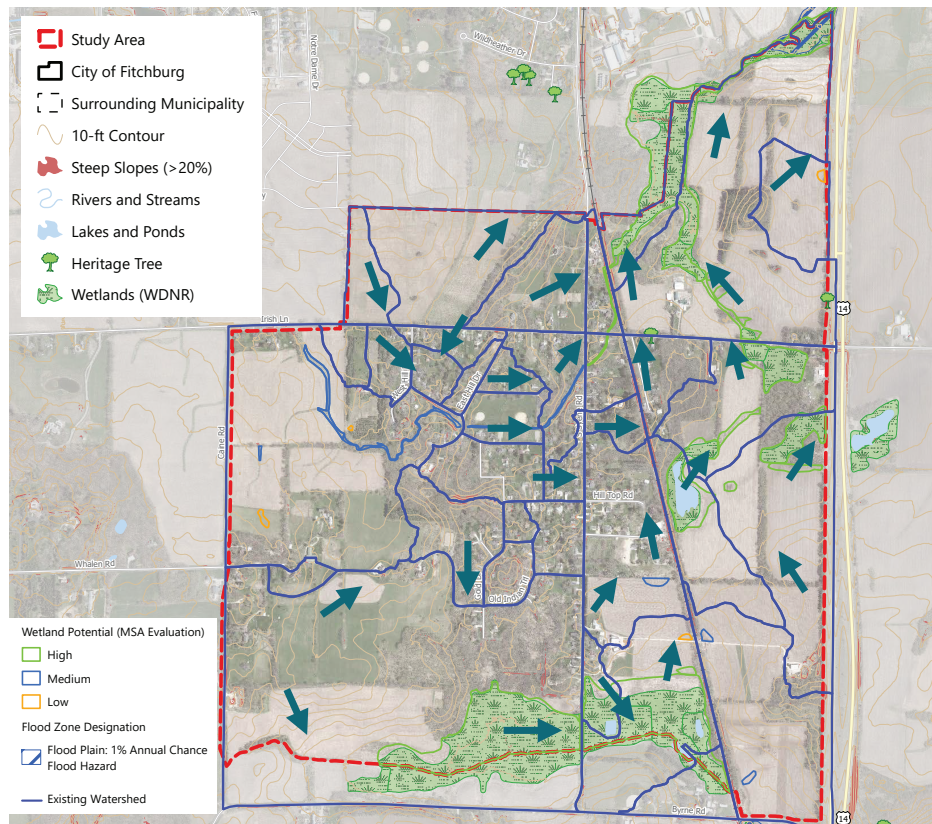
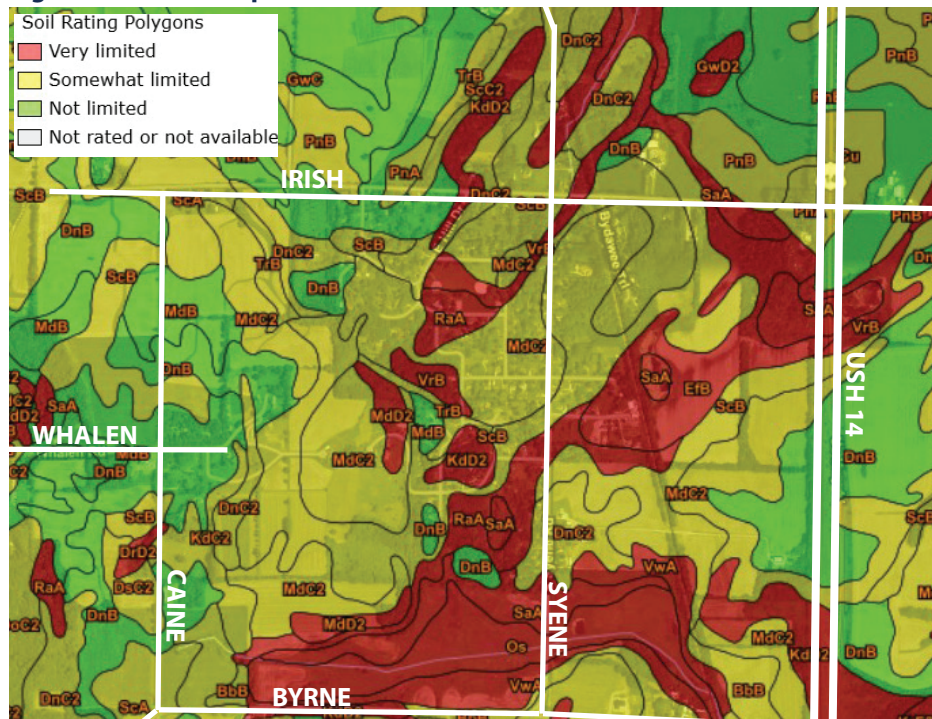


Figure 3.7: USDA map



- 26% of the land is “Very limited” (shown in red), indicating soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

ENDANGERED SPECIES

An Endangered Species Preliminary Assessment was conducted through the WDNR’s Natural Heritage Inventory to determine the presence of any endangered terrestrial and wetland species within a 1-mile buffer and aquatic species within a 2-mile buffer of the project area.

The assessment found that the project area is covered by the Broad Incidental Take Permit/ Authorization for No/Low Impact Activities, meaning the WDNR determined projects within this area will not impact or will minimally impact endangered or threatened species within the state provided that a number of follow up actions are implemented. No formal review letter from the WDNR is needed so long as the follow up actions are followed in compliance with state and federal law.

The follow up actions listed in the preliminary assessment relate to the Rusty Patched Bumble Bee and include providing active season habitat (prairie, marsh/wetlands, farmland, parks, and gardens) and overwintering habitat (non-compacted soils, sandy soils, or woodlands) for the bee. Any future development should use native trees, shrubs and flowering plants in landscaping, provide plants that bloom from spring through fall, remove and control invasive plants in any habitat used for foraging, nesting, or overwintering.

ARCHEOLOGY & HISTORIC STRUCTURES

Based on a Historical and Architectural Resources Survey of Fitchburg, some homes in the Greenfield Neighborhood and the RR bridge east of Syene Road were surveyed in detail but were not considered eligible for the national registers. The Indian Trail was identified on the City’s cultural resources map.

LAND USE CONCEPT DEVELOPMENT

INTENT

The land use design concept exercise was developed to support community discussion on density and development pattern, road network and open space preservation. Each concept was based on general design themes with varying land use percentages. This section will highlight general feedback received through different engagement activities (see Chapter One for a summary of the public engagement).

Typically, development will move forward when the current property owner shows interest to sell or build on the property.

The concept provided in this Plan provides:

- A long-term vision for what’s possible
- Character and design parameters should properties develop or redevelop
- Collaboration opportunities for existing property owners to best serve local businesses, residents, and the redevelopment area.

The provided concept does not:

- Restrict the properties from continuing current land uses.
- Establish the final design of the neighborhood.

DESIGN PROCESS

The development of a preferred concept went through three phases of evaluation, as described below.

1. **Bubble Diagrams** were developed, creating three options, recognizing land use transitions to surrounding areas, to provide coherent growth patterns. The concepts were reviewed by the Steering Committee and Plan Commission and adjusted based on feedback from the Community Survey. Following Plan Commission review and public input, the diagrams were refined into a preferred bubble diagram leading into phase two, where three options of detailed concepts were developed.
2. **Detailed Concepts** delineate environmental corridors, floodplains, topography, etc, and define the minimum and maximum density ratios, all while evaluating the neighborhood’s utility capacity. Following feedback from the Plan Commission, Steering Committee, and a summary of the public engagement, a preferred option was selected.
3. **Preferred Concept** includes further modifications and refinement based on feedback from landowners, the public and the Steering Committee. Based on this phase, the Future Land Use Map provided in Chapter 2 was developed.

PHASE 1: BUBBLE DIAGRAMS

OPTION A

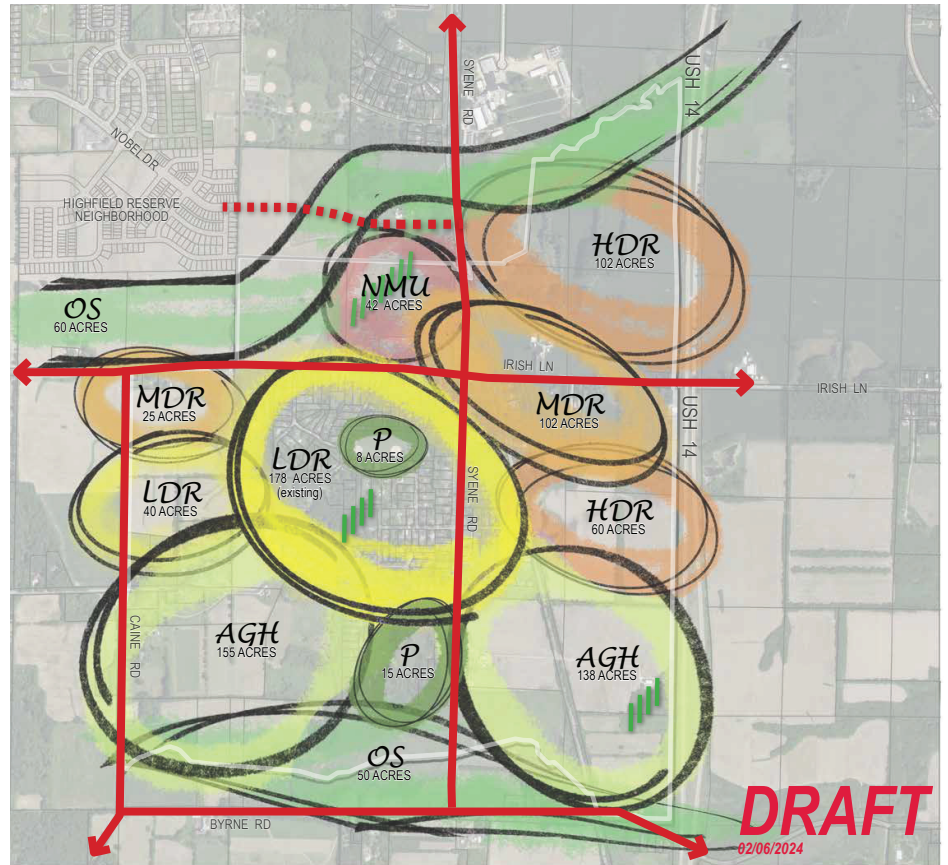
Primary Design Themes

- **No Interchange or New Collector:** Presents a scenario with no interchange or new collector roads.
- **No Business Park uses:** Excludes Business Park uses.
- **Density:** Concentrates the majority of development to the north.
- **Agrihood/Open Space:** Preserves open space, Agrihood, and existing farmland to the south.
- **Expansive Moraine Edge Park:** Allocates a large area for Moraine Edge Park.

Engagement Feedback

- **Transportation:** no clear consensus on the interchange addition, with some residents supporting and others opposing the change.

Figure 3.8: Bubble Diagram - Option A (Refer to Appendix D)



- **Business Park:** Should be included to meet employment needs.
- **Moraine Edge Park:** Large dedication is not practical.

Proposed Land Use Percentages:

Neighborhood Mixed-use (15-30 U/A + Commercial)	42 Acres	4%
High Density Residential (11-20 U/A)	162 Acres	17%
Medium Density Residential (6-10 U/A)	127 Acres	13%
Low Density Residential (>6 U/A)	218 Acres	22%
Agrihood & Farming	293 Acres	30%
Park, Open Space & SW Management	133 Acres	14%
Business Park	0 Acres	0%

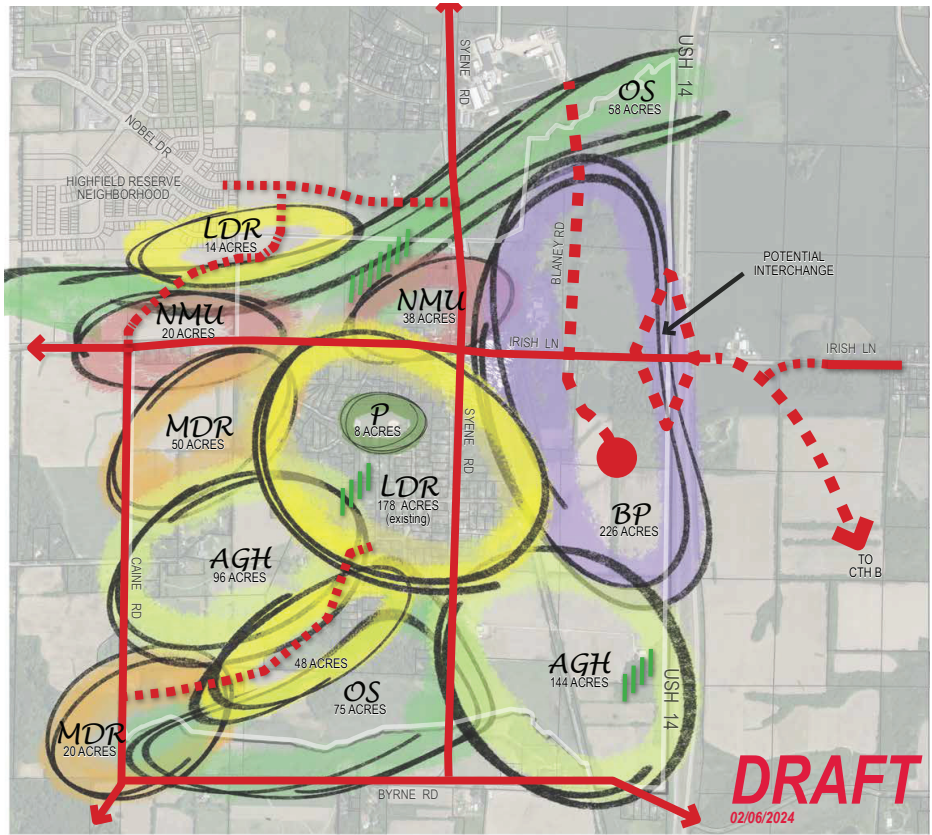
OPTION B
Primary Design Themes

- **Interchange at Irish Lane:** adds an interchange at Irish Lane.
- **Business Park uses:** adds Business Park uses along the east.
- **Density:** Concentrates the majority of development to the north.
- **Preserving open space:** through Agrihood, open space, and existing farmland to the south.
- **Moraine Edge Park:** Allocates a smaller area for Moraine Edge Park.

Engagement Feedback

- **Commercial uses:** the public perceived commercial uses as less probable near Caine Road.
- **Traffic and heritage trees:** Concerns about traffic on Irish Lane and its impact on large oak trees.

Figure 3.9: Bubble Diagram - Option B (Refer to Appendix D)



- **Preferred diagram:** The Steering Committee preferred this option.

Proposed Land Use Percentages:

Neighborhood Mixed-use (15-30 U/A + Commercial)	58 Acres	6%
High Density Residential (11-20 U/A)	0 Acres	0%
Medium Density Residential (6-10 U/A)	70 Acres	7%
Low Density Residential (>6 U/A)	240 Acres	25%
Agrihood & Farming	240 Acres	25%
Park, Open Space & SW Management	141 Acres	14%
Business Park	226 Acres	23%

OPTION C

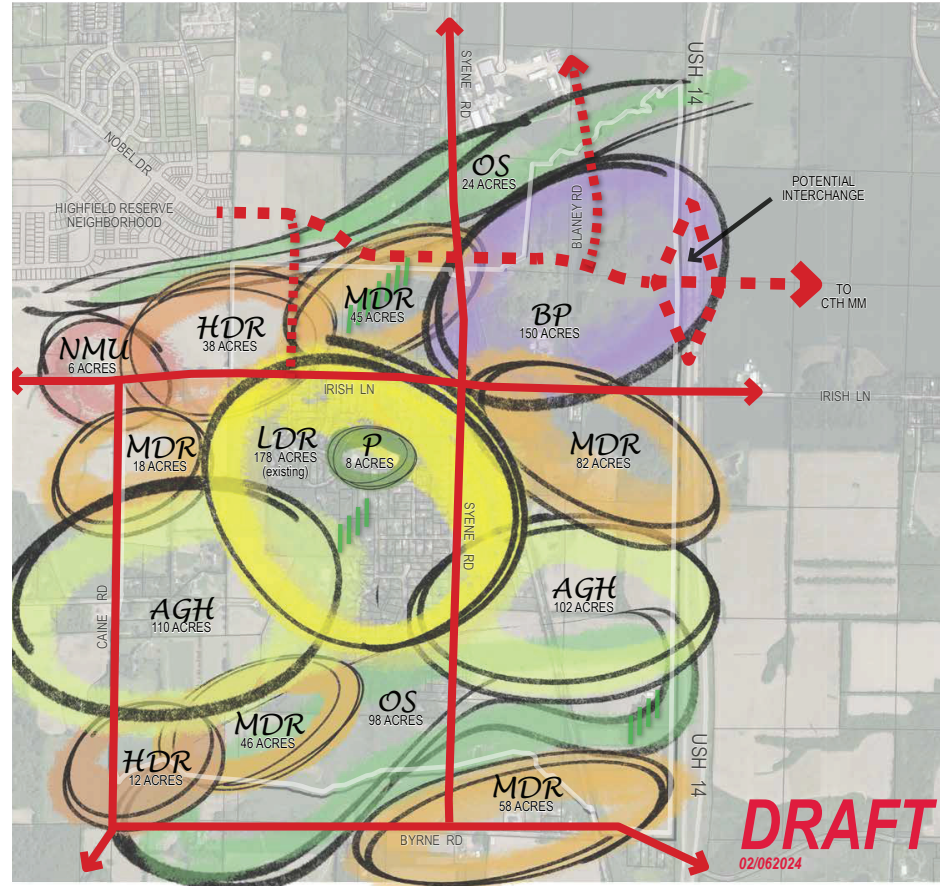
Primary Design Themes

- **Interchange north of Irish:** Connects to Nobel Drive.
- **Business Park in the northeast:** Designates the area for a Business Park.
- **Development flexibility:** Allows for development across the area.
- **Agrihood/Open Space:** Dedicates the lowest area to Agrihood and open space.
- **Moraine Edge Park:** Narrows and locates Moraine Edge Park north.

Engagement Feedback

- **Density:** Concerns about high density, especially in the south area of the neighborhood.
- **Separate E/W road:** Interest but no consensus on the addition of an east-west road to divert future traffic from Irish Lane. Steering Committee requested traffic relieving alternatives.

Figure 3.10: Bubble Diagram - Option C (Refer to Appendix D)



Proposed Land Use Percentages:

Neighborhood Mixed-use (15-30 U/A + Commercial)	6 Acres	1%
High Density Residential (11-20 U/A)	50 Acres	5%
Medium Density Residential (6-10 U/A)	249 Acres	26%
Low Density Residential (>6 U/A)	178 Acres	18%
Agrihood & Farming	212 Acres	22%
Park, Open Space & SW Management	130 Acres	13%
Business Park	150 Acres	15%

PHASE 2: DETAILED CONCEPT

CHANGES FROM PHASE 1

Based on bubble diagrams, recommendations by the Steering Committee, additional review of the study area, and the extensive feedback received in Phase 1, the project team developed a detailed land use concept.

Changes from initial design phase include:

- Reduced residential density while promoting the Missing Middle approach
- Included additional “open space” buffering between existing and new development areas
- Preservation of significant open space
- Alternate configuration of Irish Lane to limit non-residential traffic
- Locating high density housing, mixed-use and business park east of the railroad
- Limited interventions within the existing established Greenfield neighborhood

SCENARIO A: DESIGN THEMES

- **Reducing traffic and increasing connectivity:** Adding an interchange at Irish Lane with connections north to Blaney Road and Nobel Drive.
- **Introducing commercial uses:** Establishing a Business Park north of Irish Lane.
- **Limiting higher residential densities:** Restricting higher residential densities in the northwest, west, and southeast areas.
- **Preserving farmland and single-family residential:** Showing Agrihood use to the south.
- **Introducing medium-density residential:** along Caine Road to balance the low-density infrastructure.

SCENARIO B: DESIGN THEMES

- **Local character:** Preserves the local character of the existing established Greenfield neighborhood by introducing a green buffer space between Irish Lane and the proposed collector to the north
 - **Commercial Use:** This option changes the Neighborhood Mixed Use to Commercial Use north of Irish Lane
 - **Gentle Density:** Changes High Density to Medium-High Density in the North-west sections of the study area. It moves the proposed collector street to the north south to allow for more development around it.
 - **Agribusiness Park:** introduces the concept of the Agribusiness Park use east of the tracks
- ### SCENARIO B ALTERNATIVE: DESIGN THEMES
- **New E/W connection to Interchange:** This option includes the closure of Irish Lane at the tracks
 - **Business Park east of the tracks:** Designates the area east of the tracks for Business Park development
 - **Node at roundabout:** Establishes a Commercial node at the roundabout near the potential interchange.
 - **Preservation of farmland:** Focuses on preserving farmland in the central area.
 - **Mix of Residential:** along the western side and north of Irish Lane.

Figure 3.11: Detailed Concept - Scenario A (Refer to Appendix D)

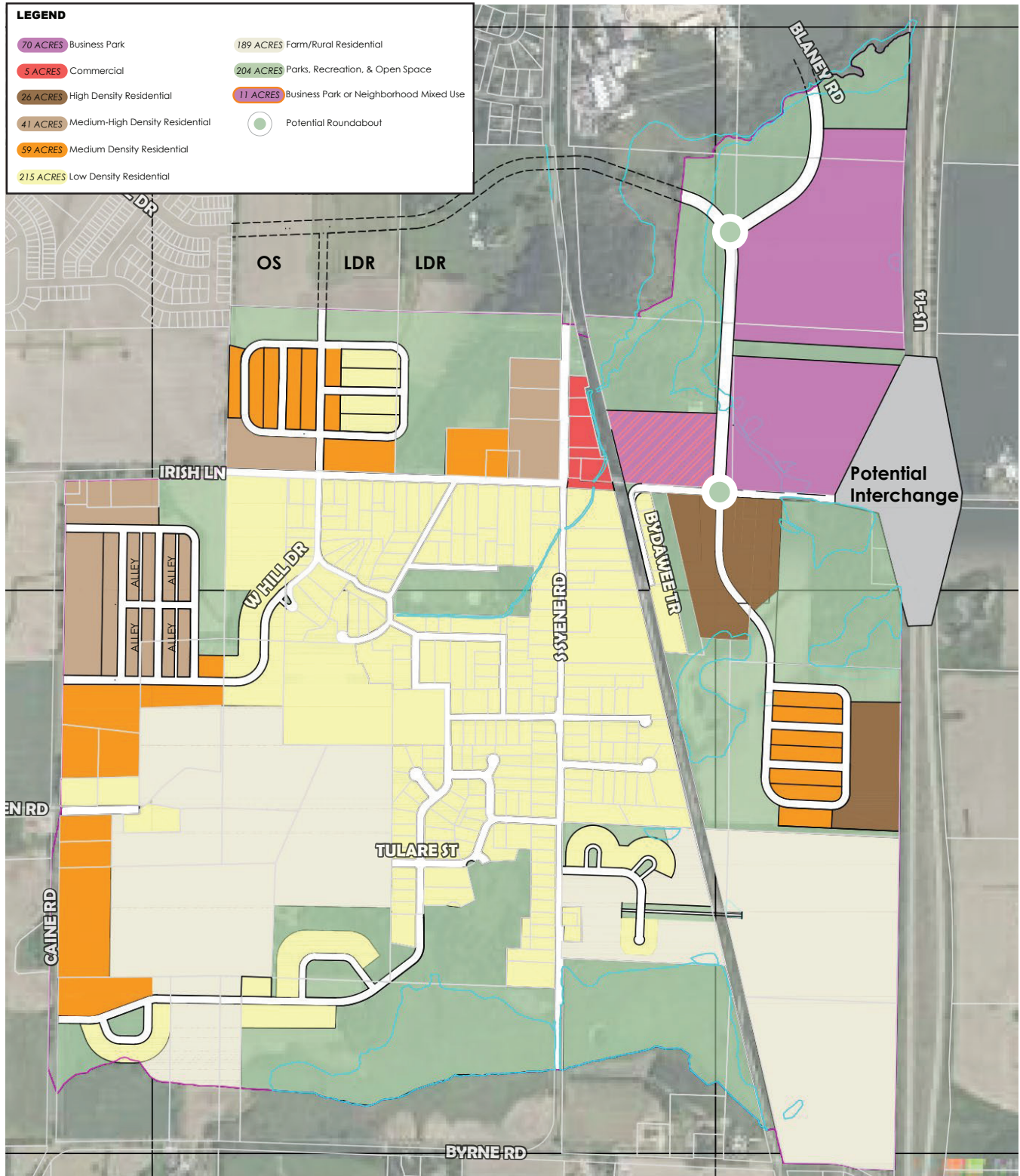


Figure 3.12: Detailed Concept - Scenario B (Refer to Appendix D)

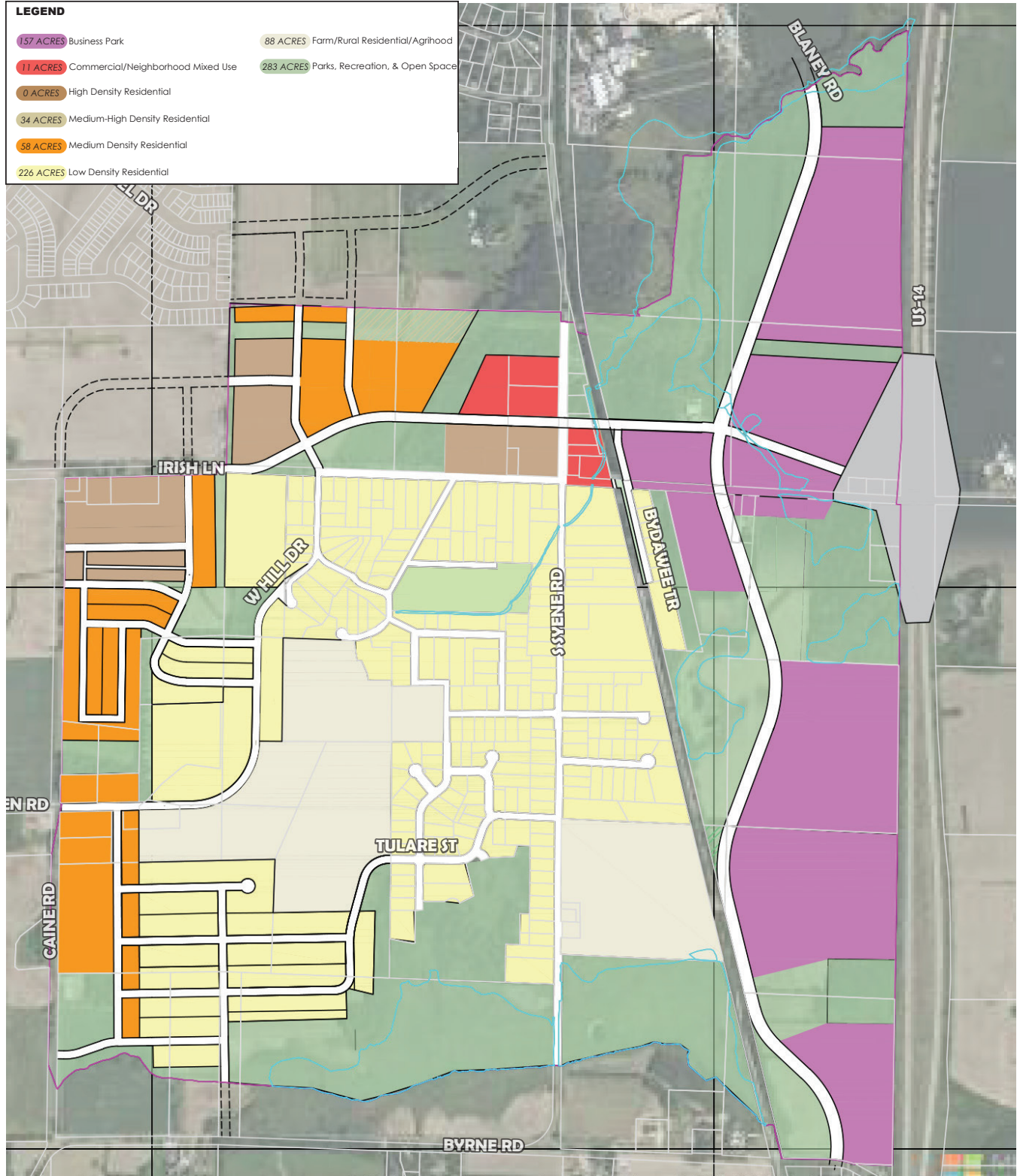
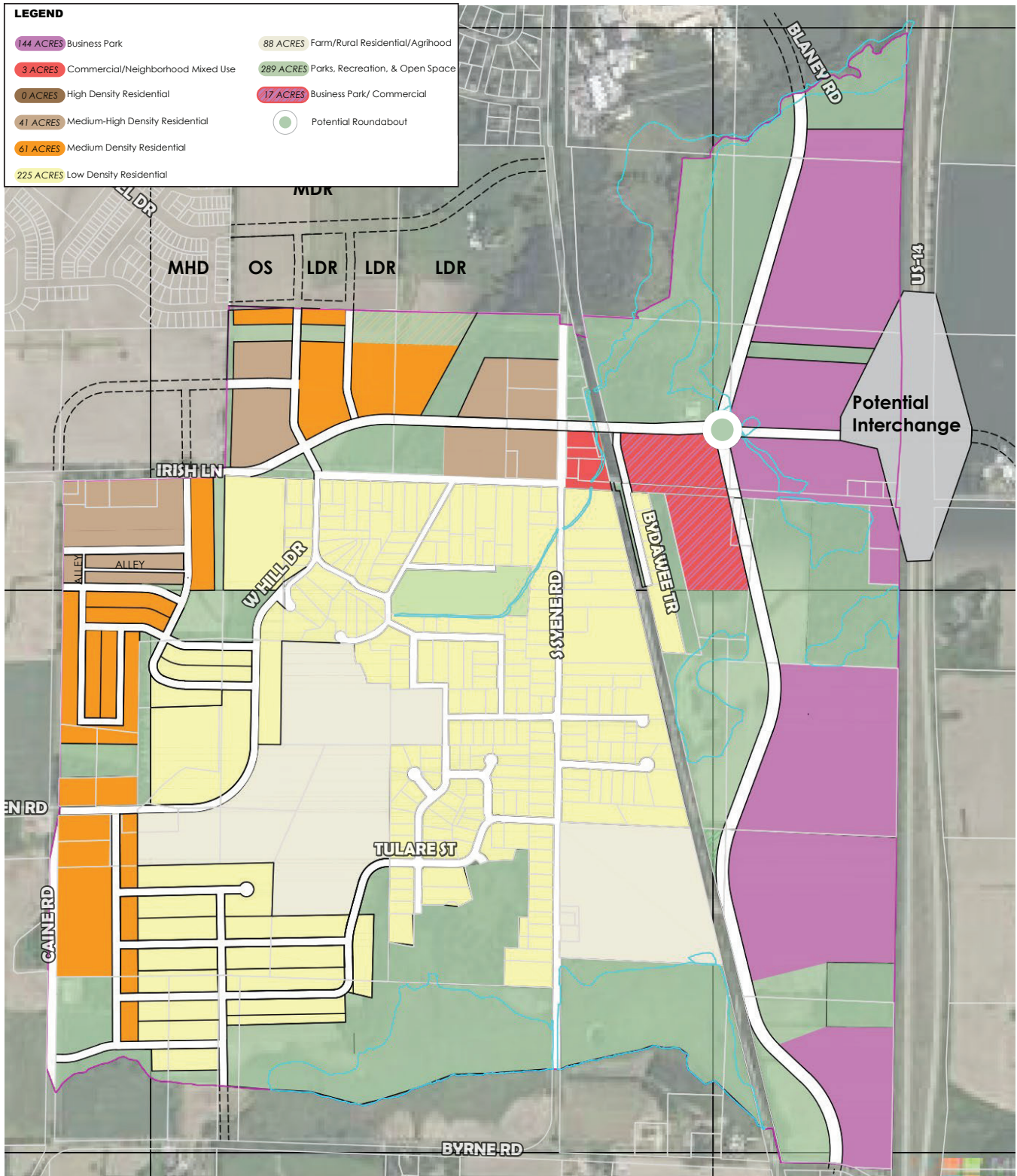


Figure 3.13: Detailed Concept - Scenario B Alternative (Refer to Appendix D)



PHASE 3: PREFERRED CONCEPT

Addressed Comments

- *Reduced residential density*
- *Added additional “open space” buffering between existing and new development*
- *Preserved a significant amount of open space*
- *Included “Agrihood” land use category*
- *New collector roads to limit non-residential traffic on Irish Lane and Syene Road*
- *Reduced commercial and business areas and limited them east of the tracks*
- *Limited interventions within the existing neighborhood*

CHANGES FROM PHASE 2

Based on the feedback received in Phase 2, the project team developed a preferred concept, serving as the base for the Future Land Use Map, with the following changes:

- Collector ‘A’ moved north to minimize impacts to existing landowners
- Removed connections into neighborhood and introduced Collector ‘B’ to move traffic through neighborhood
- Reduced densities north of Irish and east of Collector ‘B’
- Reduced business park area, and locating higher densities only east of railroad
- Removed connection between Nobel Drive and Blaney Road due to potential feasibility issues. The preferred concept shows the connection as depicted in the adopted McGaw Neighborhood Plan.

CHANGES IN LAND USE PERCENTAGES

Illustrated in **Figure 3.14**, the preferred concept reduces both Neighborhood Mixed-use/ Commercial and Business Park uses, while increasing the Low, Medium, and Medium-High Density Residential as well as the Open Space. The concept provides room for flexibility, where it could include between zero to three percent of High-Density residential as well as three to nine percent of Agrihood. The flexibility provides more freedom to adapt to market conditions by providing two alternatives.

Figure 3.14: Land Use Percentage Changes Throughout the Phases

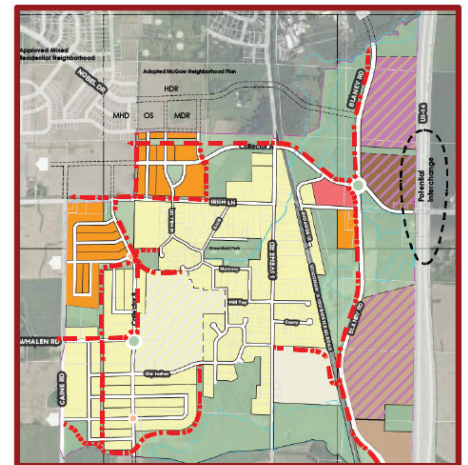
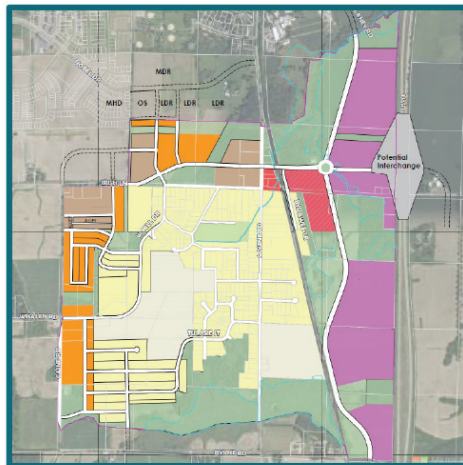
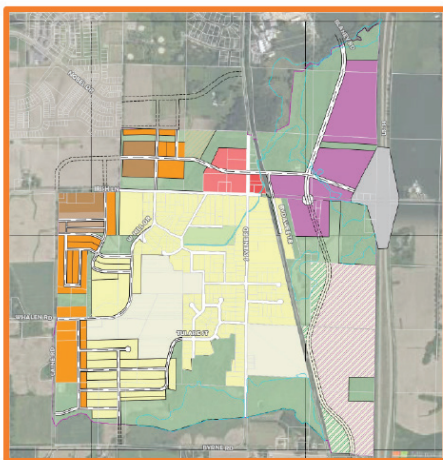
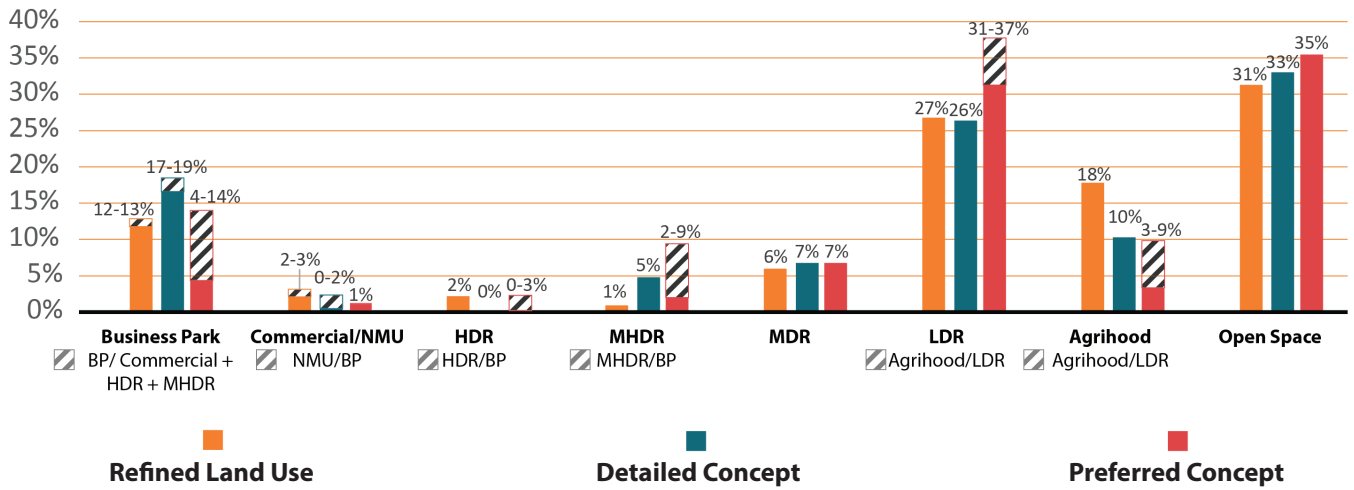
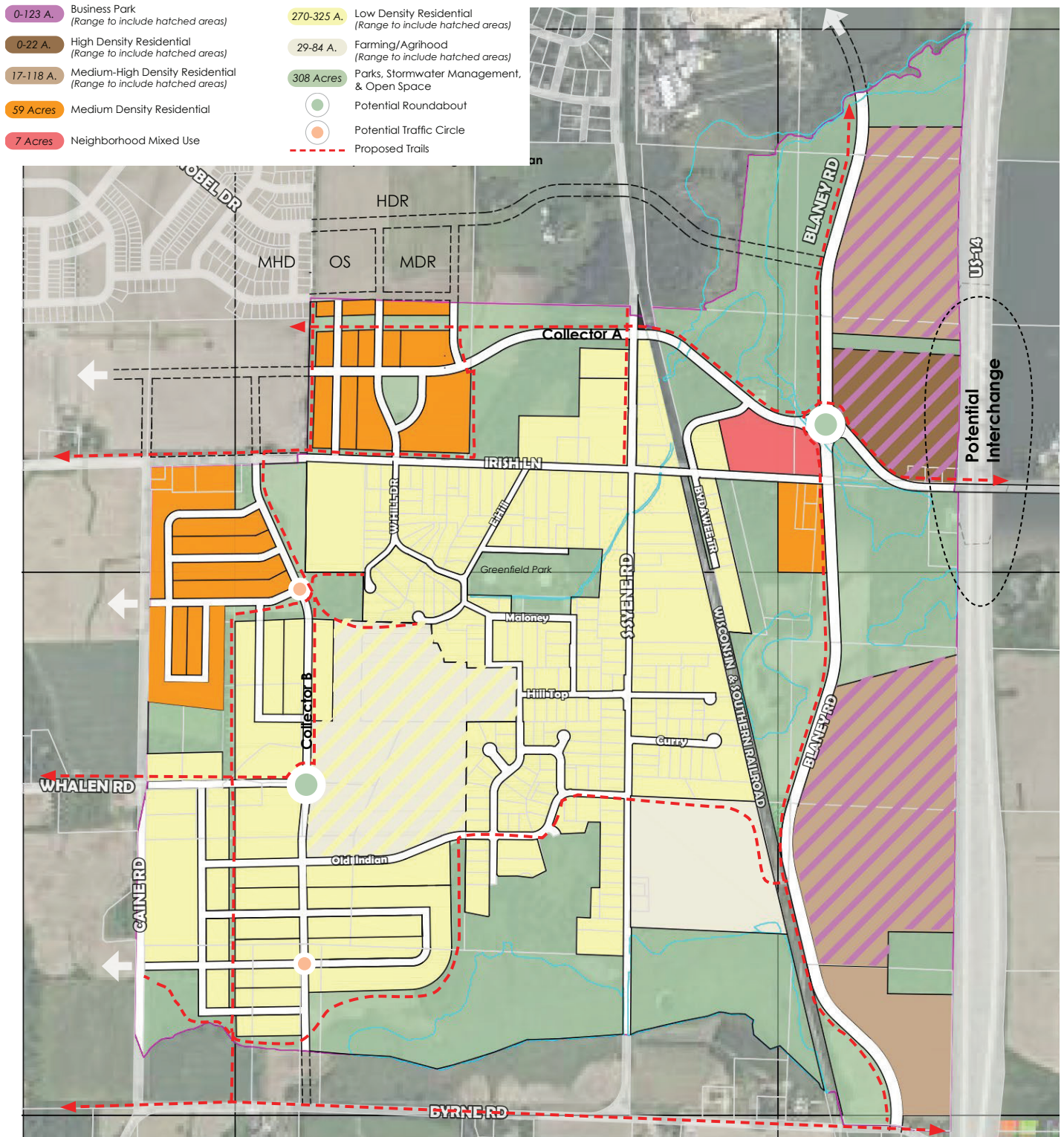


Figure 3.15: Preferred Concept (Refer to Appendix D)



DESIGN THEMES

Connections

Collector 'A' will establish a long term east-west connection through Fitchburg. It will absorb most of the traffic from Irish Lane, preserving its local character and enhancing the safety in the surrounding residential area. The need for a parallel collector to relieve pressure from Irish Lane is due to several factors:

- The impact on old growth trees and the adjacent neighborhood
- Current traffic conditions on Irish Lane, and the anticipated increase in county traffic with new neighborhood developments
- Current concerns around the number of driveways on Irish Lane

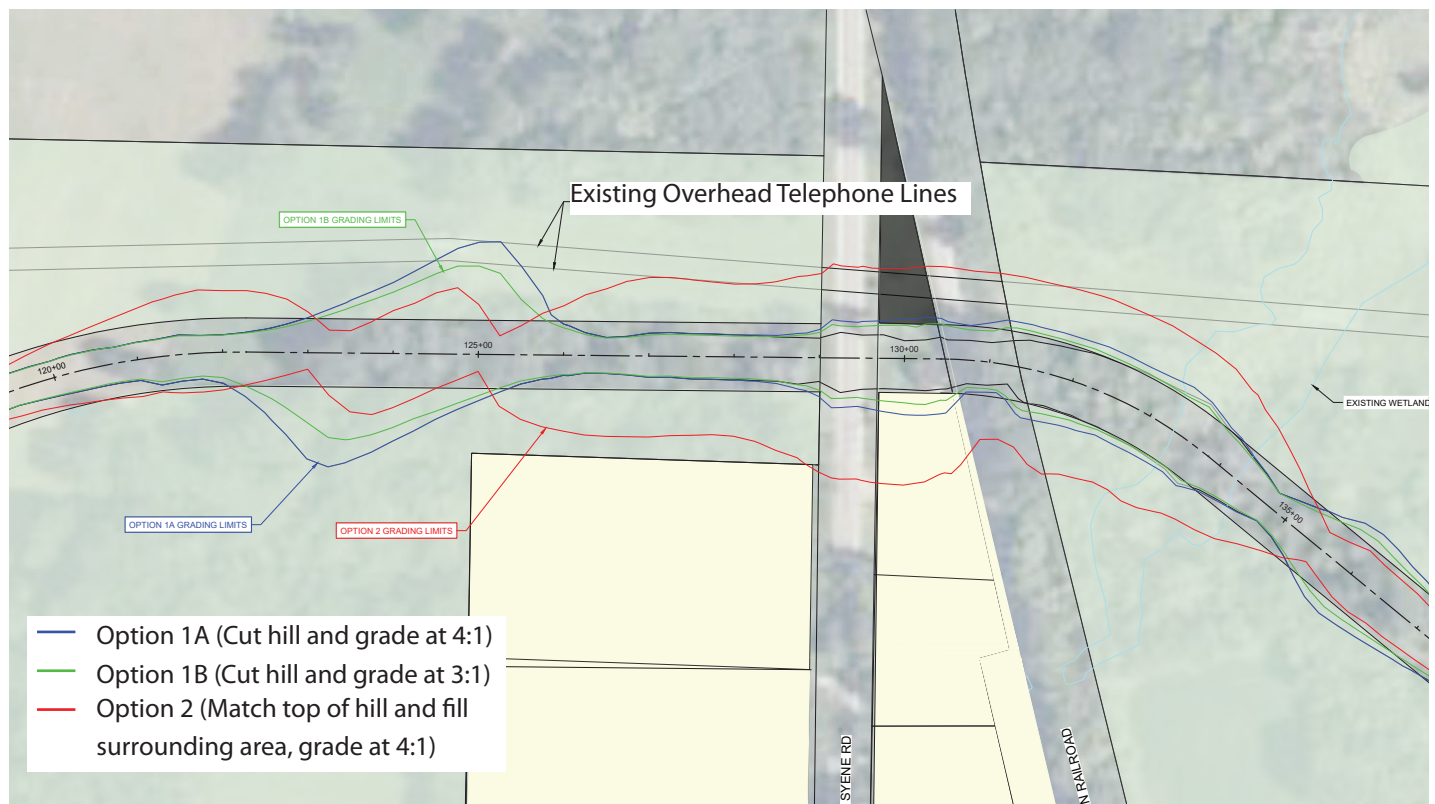
The preferred option strategically locates Collector 'A' north, to minimize its impacts on existing farmland and landowners. The location is also

based on the following:

- The location of overhead power lines and poles north of Irish Lane
- The existing grades and the required slope for a collector
- The minimum required spacing between two collector roads, leading to a needed buffer between Irish Lane, the proposed Collector 'A', and the Nobel Drive extension

To preserve the local character, this layout introduces Collector 'B' to provide an alternative to Syene Road, reorient the traffic from the local roads, and move traffic throughout the neighborhood. To enhance connectivity, Old Indian Trail is extended West, connecting the established Greenfield neighborhood to the potential new development. This design enhances safety by providing an additional access point to the existing neighborhoods.

Figure 3.16: Collector A Grading Plan (Refer to Appendix C)



Density

Higher-density developments are concentrated along the major collector roads east of the railroad through the neighborhood. Neighborhood Mixed-Use areas create a more gradual transition between busy external roads to lower density areas within the neighborhood. Based on assumed densities per each residential land use, the provided concept at full build-out could provide 1,073 to 4,259 residential units (low to midpoint of Comprehensive Plan densities).

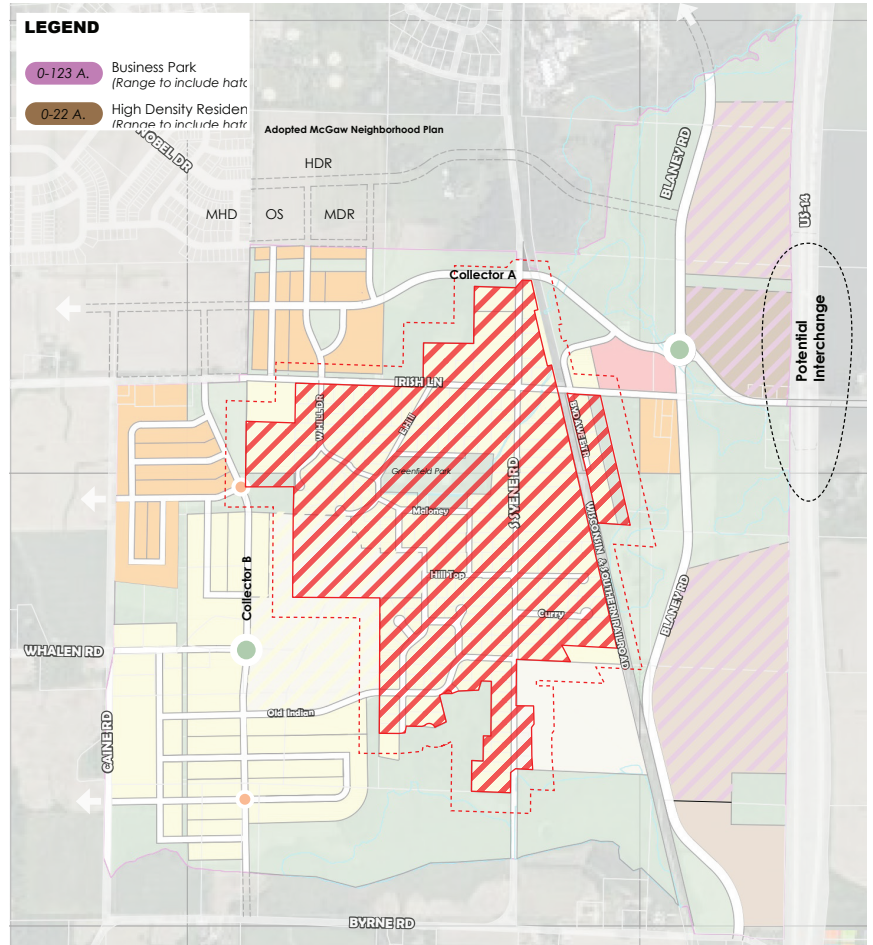
Compatibility with Existing Greenfield Neighborhood

In response to the neighborhood petition created during the planning process, the City will maintain a 200-foot low-density buffer adjacent to the existing established Greenfield neighborhood (See **Figure 3.17**) to maintain the existing character of the neighborhood. This buffer area should maintain the same height restriction set for the established neighborhood, which restricts buildings to three (3) stories (or 35 feet).

Agrihood

Agrihood integrates food production/garden plots, into smaller residential clusters. It aims to preserve and protect large tracts of farmland and cluster appropriately designed development in areas that are less visually or environmentally sensitive, similar to a traditional village. These areas can include single-family, duplex, triplex, and fourplexes built into working farms or community gardens, all connected by a shared-use trail network.

Figure 3.17: Preferred Concept (Refer to Appendix D)



Additional design strategies for Agrihoods are detailed in **Chapter 2**.

Neighborhood Mixed-Use (NMU)

The City's Comprehensive Plan allows Mixed-Use to include "variety of housing units, types and densities along with neighborhood scale retail businesses and offices," located within either mixed-use or standalone buildings (where permitted by comprehensive development plans). This Plan envisions greater flexibility in the NMU area, allowing standalone multi-unit buildings, standalone commercial buildings, and/or vertical mixed-use (see sidebar). NMU Development within the Neighborhood is recommended to meet the following requirements beyond those identified in **Chapter 2**:

- The development should be context-sensitive in scale, massing and design.
- Site design should create walkable environments catering to the pedestrian more than the automobile.
- All buildings are set close to the sidewalk with doors and windows facing the street with parking located behind the building.
- Individual multi-unit residential developments are allowed, as well as blocks or groupings of duplex/townhome lots and single-unit homes on alleys.
- Individual neighborhood commercial developments are allowed up to 25,000 square foot multi-tenant buildings, but may also include small-scale single-tenant buildings.

Vertical vs Horizontal Neighborhood Mixed-Use

Vertical Mixed-Use combines different uses in the same building. Lower floors generally have more public uses (such as retail) with private uses on the upper floors (professional offices, residential, or hotel).



Horizontal Mixed-Use combines single-use buildings on distinct parcels in a range of land uses within one block, providing a mix of uses within a walkable block.



DEVELOPMENT PHASING

To provide sanitary services to new development, Area 1 must be constructed first to enable servicing of Areas 2 and 3. Area 1 includes the initial extension of the Syene interceptor, which will provide services to the entire neighborhood.

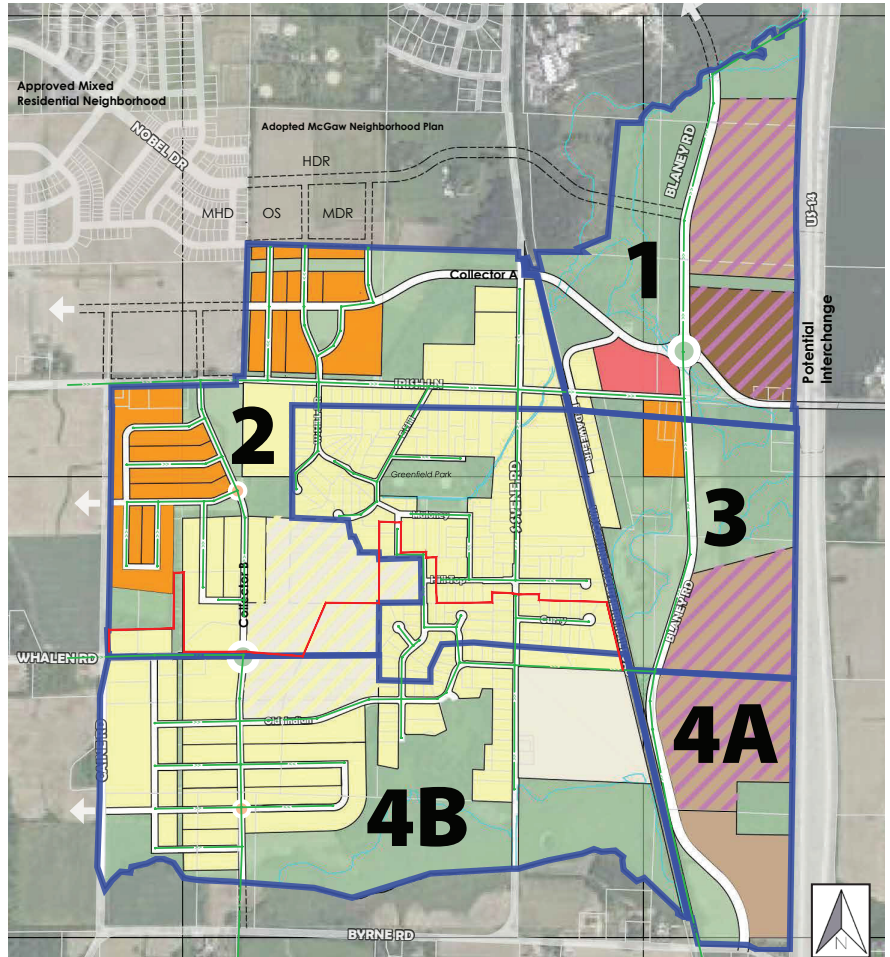
Following this, Areas 2 and 3 will be available for development. Area 3 requires significant infrastructure improvements and offers limited development potential, which is why it is separated from Area 1. Areas 4A and 4B will be serviced by Area 3.

The established Greenfield neighborhood will not need to connect to City sanitary service to allow for future growth, except for the lots abutting Irish Lane and Old Indian Trail as noted in **Figure 3.18**.

The total acreage contained within each of the different phases is as follows:

- Phase 1:** 161.76 acres
- Phase 2:** 240.53 acres
- Phase 3:** 108.90 acres
- Phase 4A:** 76.87 acres
- Phase 4B:** 268.14 acres

Figure 3.18: Development Phasing Map (Refer to Appendix D)



- Phase Area
- Proposed Sewer

CHAPTER 4

ENGINEERING

60 Stormwater Management

This section identifies the needs and requirements for managing stormwater in the study area.

65 Utility Infrastructure

This section reviews preliminary utility analysis within the study area and provides recommendations for sewer and water service extensions.

73 Transportation Network

This section reviews the existing multi-modal transportation infrastructure and transit service in the study area, and offer improvement recommendations.

STORMWATER MANAGEMENT

This section highlights key water resource issues and provides a planning-level approach to managing stormwater for the future developed neighborhood. The conceptual plan was developed with consideration for key concerns regarding flooding issues as noted by neighborhood residents. Refer to Appendix C for the detailed preliminary stormwater management plan.

KEY ISSUES

The neighborhood faces multiple issues related to stormwater management and off-site issues that would impact the overall layout and implementation of this neighborhood plan. Key issues include the following:

- The neighborhood land use includes an existing low-density, wooded neighborhood surrounded by agricultural fields and high-quality sedge wetlands to the South.
- There are regulatory wetlands located in the project area. The wetlands are primarily located around the streams with three mapped wetlands on the eastern side of the neighborhood (Figure 4.2). High quality wetlands are present downstream in the Swan Creek and Murphy Creek watersheds, including the Waubesa Wetlands State Natural Area. Residents noted their concerns regarding preserving and restoring the wetlands in the neighborhood to protect the Watershed quality and quantity.
- Surface water runoff drains in three general directions. The runoff draining to the north will travel to an intermittent stream of Swan Creek. The runoff draining to the east will flow into a closed depression just outside the project area. The runoff draining to the south will flow into Murphys Creek.
- Localized flooding has been an issue near Curry Court and Old Indian Trail. A study was completed by AE2S in 2021. Residents noted their concerns regarding recurring flooding.

Figure 4.1: Greenfield Neighborhood Preferred Concept - Priority Restorable Wetlands

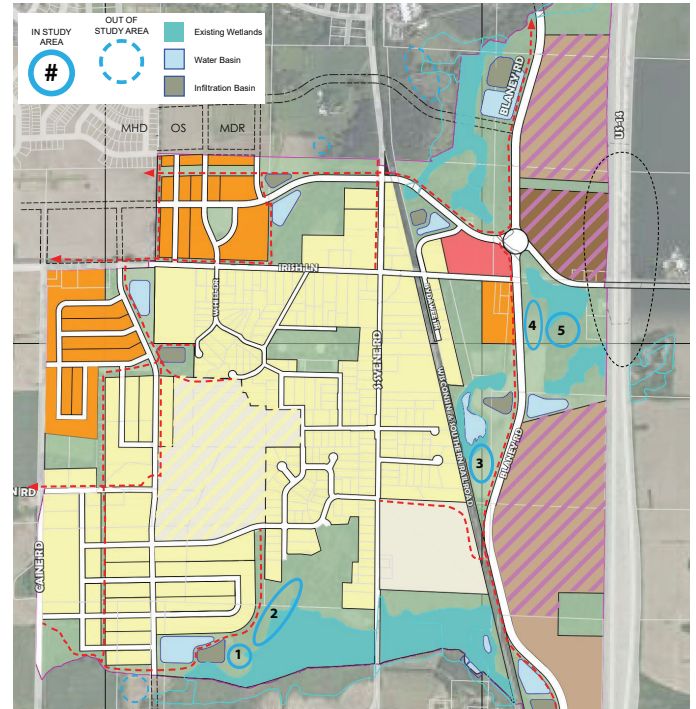
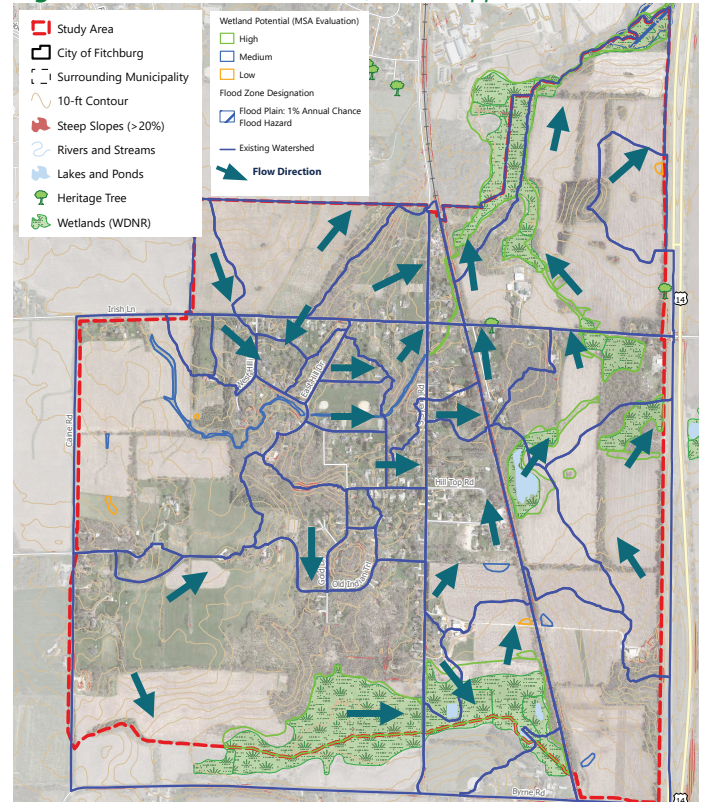


Figure 4.2: Natural Resources (Refer to Appendix D)



- Localized flooding near the Syene/Irish intersection, with occurrences of stormwater over topping Syene Road and flooding of homes.

PROPOSED LAND USE

The conceptual stormwater management plan was developed during the neighborhood planning process using the preferred Land Use concept (see **Chapter 3**). Proposed land use will be a mix of lower density residential areas on the west side of the neighborhood and high-density residential/business park on the east side of the neighborhood.

STORMWATER MANAGEMENT DESIGN AND STANDARDS

The entire neighborhood will need to be added to the urban service area, so an amendment will need to be submitted to the Capitol Area Regional Planning Commission (CARPC) before development can occur. Typically, CARPC requires post-development runoff volume for the 1-year, 2-year, 10-year, 100-year, and 200-year, 24-hour storm event to be reduced to 90% of the pre-development runoff volumes.

STORMWATER FACILITY MANAGEMENT

The City of Fitchburg will accept and maintain the stormwater facilities in public outlots following City standards. Any facilities on private lots will be maintained by the property owners and will be subject to a maintenance agreement in perpetuity, per Ch. 30-26(e)(7) of the City of Fitchburg Ordinance, Ch. 14.49(3)(d), and 14.51(1)(i) of Dane County ordinances.

Table 4.1: Maximum Pre-Development Runoff Curve Numbers

Pre-Development Land Use	Hydrologic Soil Group Curve Number			
	A	B	C	D
Woodland	30	55	70	77
Grassland	39	61	71	78
*Cropland	39	61	71	78

* Development must meet the pre-development cropland curve numbers outlined in Table 4.1. Curve numbers for the conceptual stormwater management plan were more restrictive for crop land uses. The conceptual model in the appendix was not updated to reflect these changes.

Figure 4.3: Potential Stormwater Management Concept



Performance Standards

Each development within the Greenfield Neighborhood will be subject to the criteria outlined in the City's ordinance and State's administrative code. Regional basins can be utilized to meet the performance standards for multiple developments in the neighborhood, if agreed upon by the landowners and the City.

In addition, to meet these criteria on both the City and State level, in order to preserve the habitat function in Swan and Murphy Creek, Neighborhood-specific design objectives that go above and beyond the City's and State's standard ordinance criteria will also be necessary.

Peak Discharge Rate Control

- Control post-development peak discharge to pre-development rates for the 1-year and 2-year, 24-hour storm events (Wisconsin Administrative Code, Chapter NR 151).
- Control post-development peak discharge to pre-development rates for the 1-year, 2-year, 10-year, 100-year, and 200-year, 24-hour storm events (City of Fitchburg Ordinances, Section 30-28(b)(4), and Dane County Ordinance, Ch. 14.12(2)(c)1).
- The maximum runoff curve number in such calculations shall be those shown in **Table 4.1**.

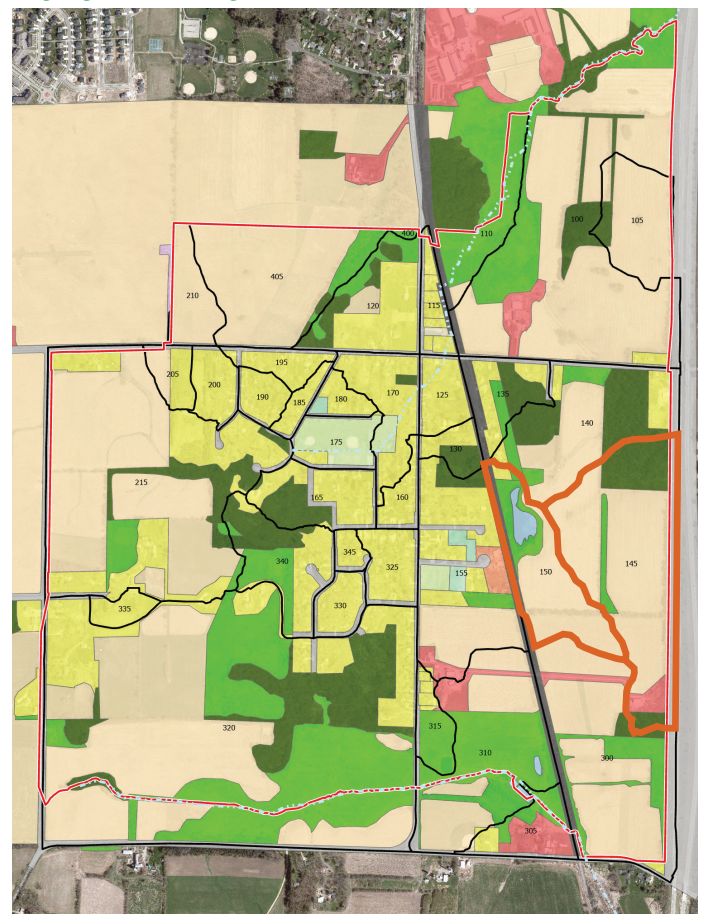
Volume Control

- Maintain 100% of the pre-development infiltration (stay-on) volume, with no caps on area required and no exemptions for roads or soil type, based on the 1981 annual rainfall series (City of Fitchburg Ordinances, Section 30-28(b)(6)a and NR 151).

Water Quality

- Retain 80% of Total Suspended Solids post-development compared to no controls (Section 30-28(b)(1)a of the City ordinance and NR 151).

Figure 4.4: Watersheds with Closed Depressions
(Highlighted in Orange)



LEGEND

Intermittent Streams	Commercial	Park	ROW
Project Area	Utility	Railroad	SFR
Existing Watershed	Farmstead	Vacant	
Agriculture	Multi-Family	Water	
Closed Depression	Open	Woodland	

Areas Draining to Closed Depressions

- Establish a flood protection elevation in the closed depressions equivalent to standing water level that would result from back-to-back 100-year runoff events (Dane County Ordinances, 14.12(2)(g)3).

RESTORABLE WETLANDS

As discussed in **Chapter 3**, there are portions of the neighborhood with wetland ecosystems primarily around Swan Creek and Murphy Creek. In **Figure 4.1**, there are five areas identified as potentially restorable wetlands that are near existing mapped wetlands.

In order to protect the wetlands and the quality of the creeks, stormwater detention and treatment needs to be engineered with the following in mind. The creek, with its relatively cool water characteristics, should be protected from the thermal impacts of stormwater inputs. Stormwater outfalls, which concentrate flows in one location, could contribute to scouring within the channel during large rain events. Stormwater practices that may help meet this objective include stormwater infiltration, which could reduce the volume of stormwater inputs into the creek, and which may help maintain groundwater baseflow to the wetland and creek. Distributed stormwater outfalls into the wetland and creek may reduce scouring flows.

The main work of restoration and enhancement within the wetland should focus on increasing the diversity of the wetland plant community. Reducing populations of non-native invasive species, particularly reed canary grass, will involve substantial herbicide treatments, potentially regular prescribed burning, and replanting with native species.

Factors that contribute to the spread and dominance of reed canary grass should also be addressed. Inputs of sediment and nutrients into the system from the adjoining agricultural fields should be mitigated with substantial upland environmental corridors of dense native herbaceous plantings, such as prairie. If accumulated agricultural sediments are present and are changing the hydrologic regime by making the wetland drier, these deposits should

be removed. After removal, the areas should be replanted with native species.

RECOMMENDATIONS - STORMWATER Stormwater Modeling

M1. Maintain 100% of pre-development infiltration volume, with no caps on area required and no exemptions for roads or soil type, based on the 1981 annual rainfall series.

M2. For new development in the neighborhood, design practices to maintain pre-development peak runoff rates for the 1, 2, 10, 100, and 200-year, 24-hour design storm. The maximum pre-development runoff curve number in such calculations is further detailed in **Table 4.1**.

M3. Impervious area percentages for proposed land use types shall not exceed the table without changes in the stormwater management areas.

M4. Consider a potential BMP structure in the southwest corner of the Caine/Irish intersection to improve current conditions (as shown on **Figure 4.3**). While this area is outside of the study area, it could be considered as part of any development of the same owner in the southeast quadrant of the Cain/Irish intersection.

Water Resources

M5. During the Blaney Road extension south of Irish Lane, it is recommended that the overflow elevation of the closed depression east of the railroad tracks be lowered. Improvements to the drainageway headed north should also be considered. This was recommended as a potential alternative during the Curry Court and Old Indian Trail Study to help reduce flooding in the neighborhood. However, during the study it was determined that it was not a viable solution because the landowner was not willing to give the City a stormwater easement. This solution should be reconsidered if/when the land is sold and/or developed.

M6. Most of the development will occur at the edges of the neighborhood. Based on existing topography, it was assumed that the development will require seven stormwater practice locations, which include a paired system approach with a wet pond and infiltration basin. The stormwater practices could be designed to serve multiple developments depending on how each future developer purchases and develops the land.

M7. All new culverts under roadways shall be designed to convey runoff from the 200-year, 24-hour storm event.

M8. Stormwater facilities should be integrated into the landscape and aesthetic design of open space to support the creation and restoration of natural landscapes including restored/enhanced wetlands while also enhancing recreational opportunities.

M9. Development should review “A Watershed Plan for Conserving Waubesa Wetlands” by Joanne Kline to determine opportunities to restore wetlands within the neighborhood. As shown in Figure 4.1, five areas have been identified for potentially restorable wetlands based on the Kline Report, Preferred Land Use Concept and Future Land Use Map.

M10. The main work of restoration and enhancement within the wetland should focus on increasing the diversity of the wetland plant community. Reducing populations of non-native invasive species, particularly reed canary grass, will involve substantial herbicide treatments, potentially regular prescribed burning, and replanting with native species.

M11. Allowing density bonuses (more units for a given land area) in exchange for wetland restoration or accepting high-quality and/or

restored wetlands as parkland dedication could help restore and preserve priority wetlands. If density bonuses are considered, they should be incremental and limited to the areas east of the railroad to avoid significant density increases near the existing Greenfield neighborhood.

M12. The City Engineer may consider requiring over-detention in strategic locations in the neighborhood to reduce stormwater flows into the existing neighborhood and into Swan Creek and Murphy Creek. This would create post-development storm flows that are better than predevelopment flows.

M13. Explore the installation of a USGS monitoring station at Lalor Road and Murphy Creek. This location is in the Town of Dunn. The USGS, Town of Dunn and other partners may be available to work with the City and developers to fund the installation and operation of this station (as occurred with the Swan Creek USGS station).

M14. Encourage dedication of open space for native vegetation and environmental corridors to support wildlife habitat and resident well-being. Encourage volunteer involvement in nature restoration and hands-on education and citizen science.

M15. Encourage developers to use alternative stormwater and water use reduction techniques such as rain barrels and grey water recycling systems in new developments.

UTILITY INFRASTRUCTURE

SANITARY SEWER

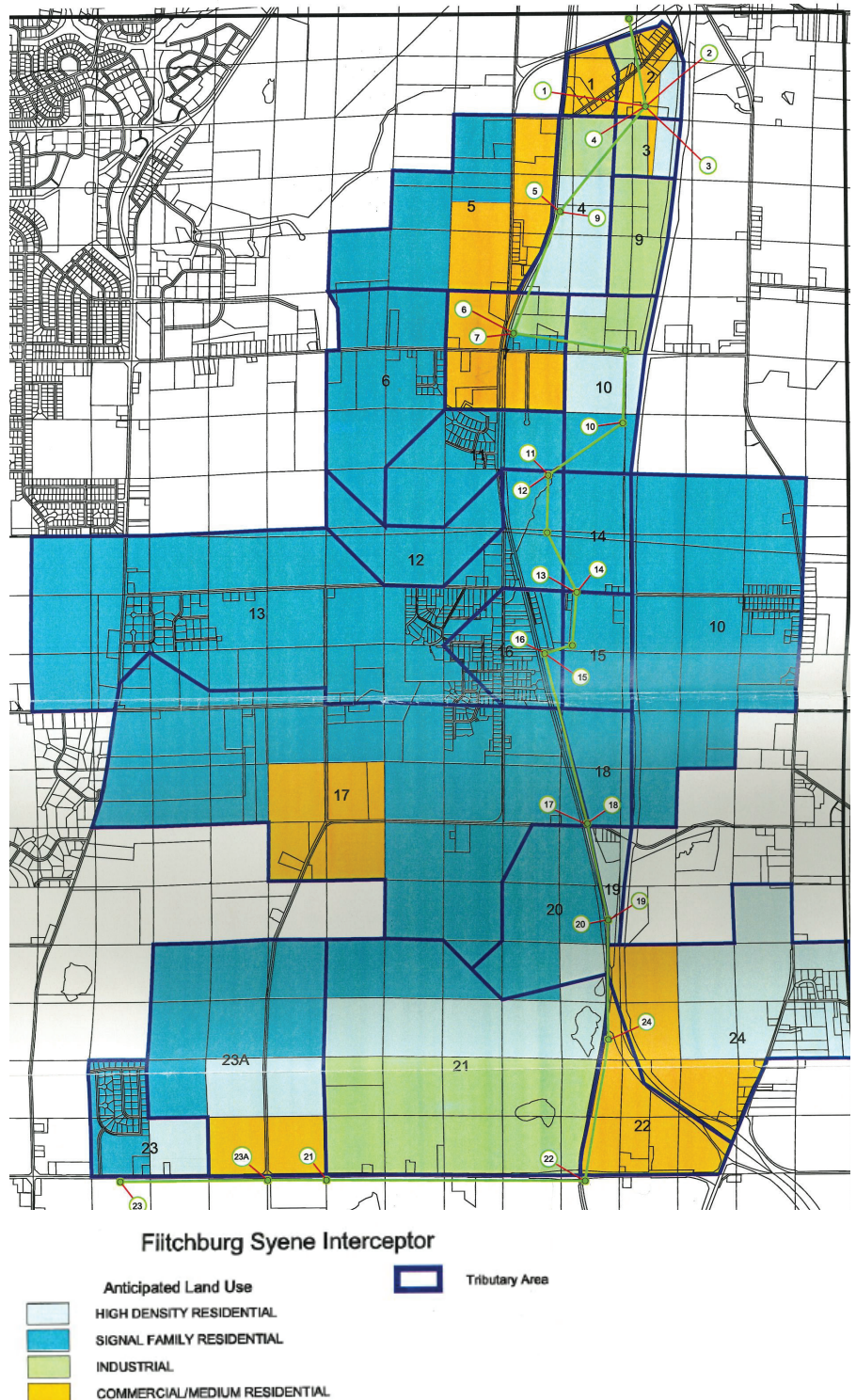
The Syene interceptor conveys sanitary waste water from Fitchburg to Madison Metropolitan Sewerage District's (MMSD's) interceptor and treatment facility in Madison. The existing Syene interceptor has capacity to serve the development planned for the Greenfield Neighborhood. The Syene Interceptor is designed to service lands to southern City limits, as shown in **Figure 4.5**.

Future extensions of this interceptor can also be sized to accommodate the planned density. The existing interceptor north of Lacy Road is 36 inches in diameter. This size will need to be reassessed before the next planned extension in 2025 and beyond.

This Neighborhood Plan suggests the interceptor will follow the future extension of Blaney Road extending south to Byrne Road, deviating from the Syene Interceptor Design Study (2000). Beyond this neighborhood the interceptor may extend south along the railroad line, as presented in Figure 4.5. Future studies will determine the exact route.

The City's current FUDAs were selected to avoid development requiring a lift station due to their additional upfront and long-term maintenance costs of development. At this time, the intent is to serve all lands **in this neighborhood** by gravity **and maintain reasonable**

Figure 4.5: Syene Interceptor Tributary Area Map
Syene Interceptor Design Study (2000)



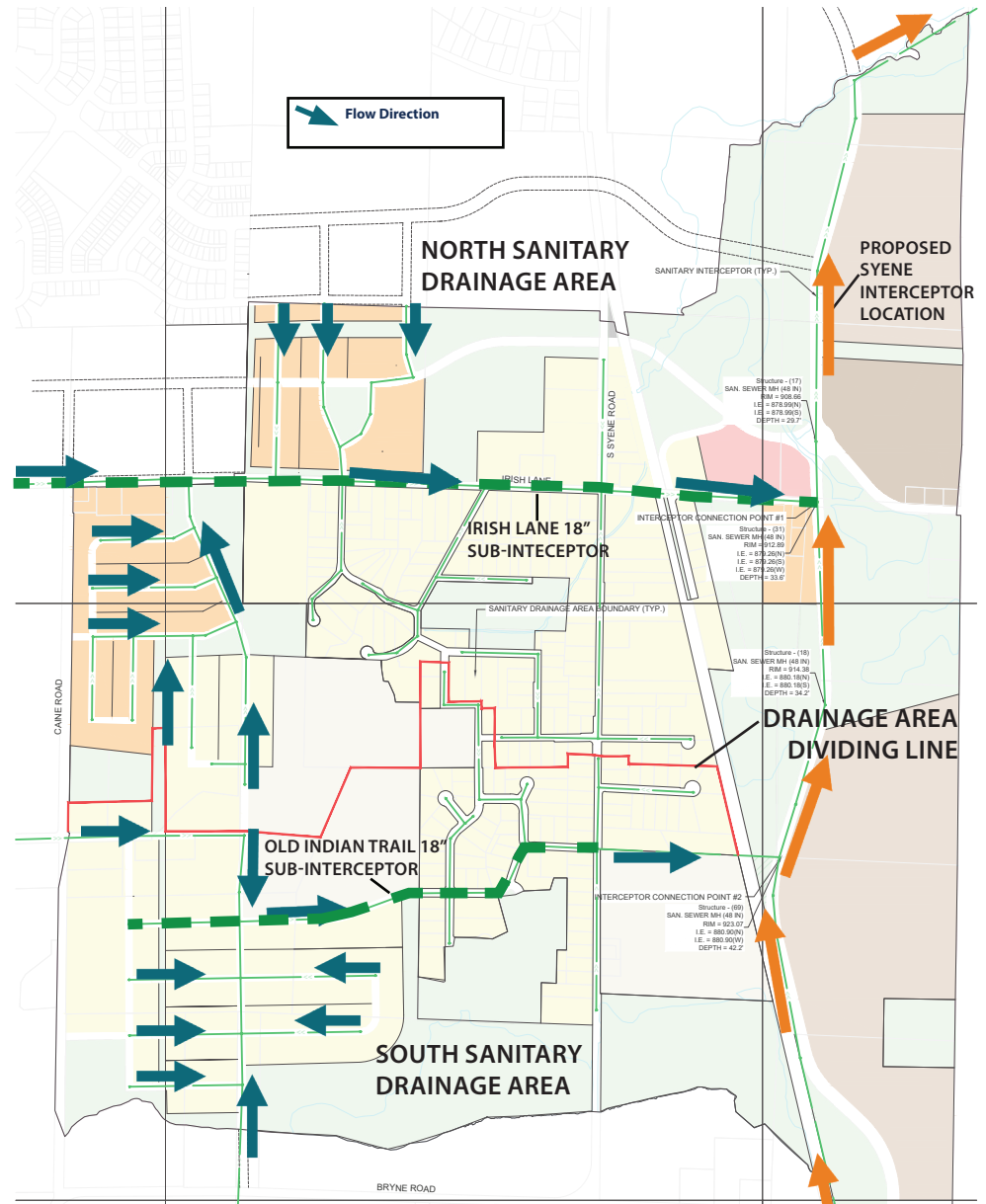
depths, two sub-interceptors will need to be extended from the Syene Interceptor. A sub-interceptor along Irish Lane will service the north drainage area and a sub-interceptor along Old Indian Trail will service the south drainage area in this neighborhood. See Figure 4.6 for the proposed drainage area divide.

Sanitary Sewer Calculations Overview

In order to service this neighborhood by gravity and maintain reasonable depths, two sub-interceptors will need to be extended from the Syene Interceptor. A sub-interceptor along Irish Lane will service the north drainage area and a sub-interceptor along Old Indian Trail will service the south drainage area in this neighborhood. See Figure 4.6 for the proposed drainage area divide.

Sanitary sewer sizing is evaluated based on the preferred neighborhood concept (see **Chapter 3**), which includes areas that may develop either as residential or business park. To assess the potential of either land use scenario, **Tables 4.1-4.4** include Scenario A (all residential) and Scenario B (business park).

Figure 4.6: Proposed Sewer Interceptor and Collector Layout



The design assumes average water usage of 80 gallons per day per person. The number of people per unit is per US Census and has been interpolated to cover the steps between density.

Off-Site Area

The sanitary sewer system within the Greenfield Neighborhood should be designed to accommodate capacity needs for future urban service area expansions west and south of this neighborhood (area within the red dashed line in Figure 4.7). This area is referred to as off-site development in the **Tables 4.1-4.4**.

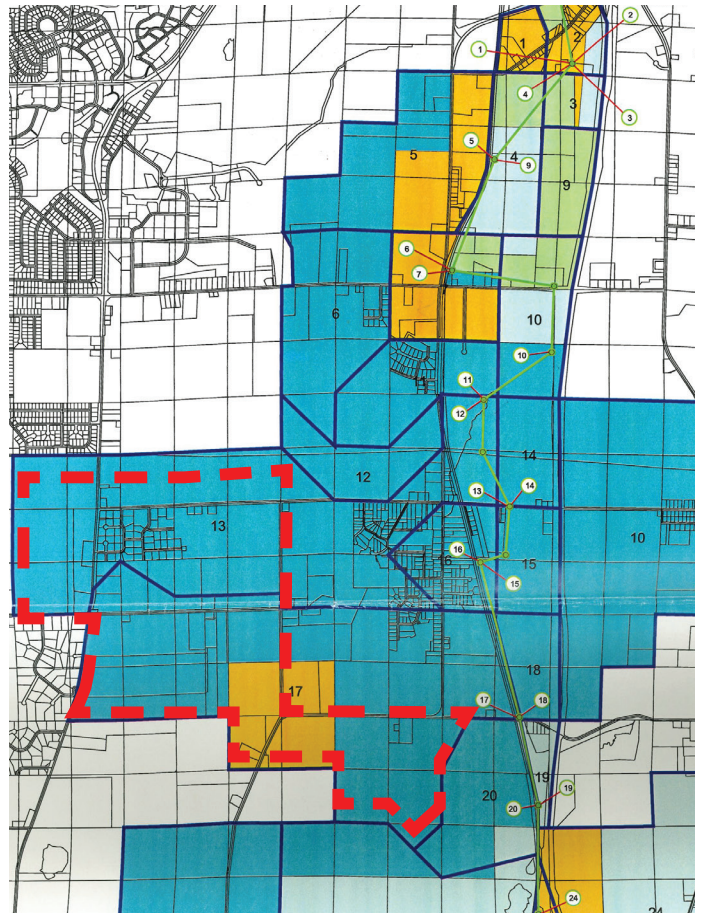
Off-site areas are included to ensure the proposed infrastructure can accommodate potential development beyond the Greenfield neighborhood if the City's growth management strategies are amended in the future. The following assumptions were used to determine the potential number of units in this off-site service area:

- 60% developable area (this study assumes that 40% of the land area is reserved for environmental factors, development limitations, stormwater management, and park land). This equates to an estimated 315 **developable** acres to the north and 365 **developable** acres to the south.
- An average density of eight units per acre is the average density for this area, which may be conservatively high; therefore, this service extension will provide for an estimated 2,520 units to the north and 2,910 units to the south.

Estimate of Average Daily/Peak Wastewater Flow

Estimated flow rates for average wastewater are based on typical rates of 1,500 gallons per day per acre for commercial/business park use and 80 gallons per person per day for residential use. A peak factor of 2.5 for commercial uses and 4.0 for residential uses **was utilized to calculate peak flows needed to size local sewer mains in this neighborhood. The following formula was used to calculate peak factors for sub-interceptors (peak factor minimum 2.5):** $\text{Peak Factor} = 1 + 14 / (4 + \text{Equivalent Population (in thousands)})$. Option A (all flex area developed as residential) produces a

Figure 4.7: Offsite Area Extension (Syene Interceptor Tributary Area Map)



higher flow in both areas for the sub interceptors, with an estimated peak flow of 5.595 cfs from the north (**Table 4.1**) and 5.357 cfs from the south (**Table 4.3**).

North Area

Based on **Tables 4.1-4.2 (on the next page)**, **preliminary calculations indicate the need for a 18-inch diameter sub-interceptor on Irish Lane** (see **Table 4.8** for sizing information). This includes potential service to the existing neighborhood.

South Area

Based on **Tables 4.3-4.4**, **preliminary calculations indicate the need for a 18-inch diameter sub-interceptor on Old Indian Trail** (see **Table 4.8** for sizing information).

Table 4.1: North Proposed Sanitary Peak Flow (Flex Space - Residential)

Median Unit/Acres									
Land Use	Metrics			Average Flows (GPD)	Average Flows (cfs)	Peak Factor for Local Flows	Local Peak Flow Contribution (cfs)	Peak Factor for Sub-Inteceptor	Sub-Inteceptor Peak Flow Contribution (cfs)
Business Park	1500 GPD/acre	0.0 acres		0	0.000	2.5	0.000	2.5	0.00
Low Density Residential	80 GPD/person	330 units	2.8 people/unit	73,920	0.114	4	0.457	2.5	0.29
Medium Density Res.	80 GPD/person	416 units	2.5 people/unit	83,200	0.129	4	0.515	2.5	0.32
Med-high Density Res.	80 GPD/person	539 units	2.3 people/unit	99,176	0.153	4	0.614	2.5	0.38
High Density Residential	80 GPD/person	1,105 units	2.0 people/unit	176,800	0.274	4	1.094	2.5	0.68
Neighborhood Mixed	80 GPD/person	193 units	2.0 people/unit	30,800	0.048	4	1.191	2.5	0.12
	1500 GPD/acre	7.7 acres		11,550	0.018	2.5	0.045	2.5	0.04
Agrihood (res. only)	80 GPD/person	0 units	2.8 people/unit	0	0.000	4	0.000	2.5	0.00
Offsite	80 GPD/person	2,520 units	2.3 people/unit	463,680	0.717	4	2.870	2.5	1.79
Pipe Size Needed = 18"				939,206	1.453				3.63

Table 4.2: North Proposed Sanitary Peak Flow (Flex Space - Business Park)

Median Unit/Acres									
Land Use	Metrics			Average Flows (GPD)	Average Flows (cfs)	Peak Factor for local flows	Local Peak Flow Contribution (cfs)	Peak Factor for Sub-Inteceptor	Sub-Inteceptor Peak Flow Contribution (cfs)
Business Park	1500 GPD/acre	59.3 acres		88,950		2.5	0.000	2.5	0.00
Low Density Residential	80 GPD/person	330 units	2.8 people/unit	73,920	0.114	4	0.457	2.5	0.29
Medium Density Res.	80 GPD/person	416 units	2.5 people/unit	83,200	0.129	4	0.515	2.5	0.32
Med-high Density Res.	80 GPD/person	0 units	2.3 people/unit	0	0.000	4	0.000	2.5	0.00
High Density Residential	80 GPD/person	0 units	2.0 people/unit	0	0.000	4	0.000	2.5	0.00
Neighborhood Mixed	80 GPD/person	96 units	2.0 people/unit	15,360	0.024	4	0.095	2.5	0.06
	1500 GPD/acre	3.9 acres		5,850	0.009	2.5	0.023	2.5	0.02
Agrihood (res. only)	80 GPD/person	0 units	2.8 people/unit	0	0.000	4	0.000	2.5	0.00
Offsite	80 GPD/person	2,520 units	2.3 people/unit	463,680	0.717	4	2.870	2.5	1.79
Pipe Size Needed = 15"				730,960	0.993				2.48

Table 4.3: South Proposed Sanitary Peak Flow (Flex Space - Residential)

Median Unit/Acres									
Land Use	Metrics			Average Flows (GPD)	Average Flows (cfs)	Peak Factor for local flows	Local Peak Flow Contribution (cfs)	Peak Factor for Sub-Inteceptor	Sub-Inteceptor Peak Flow Contribution (cfs)
Business Park	1500 GPD/acre	0.0 acres		0	0.000	2.5	0.000	2.5	0.00
Low Density Residential	80 GPD/person	421 units	2.8 people/unit	94,304	0.146	4	0.584	2.5	0.36
Medium Density Res.	80 GPD/person	0 units	2.5 people/unit	0	0.000	4	0.000	2.5	0.00
Med-high Density Res.	80 GPD/person	1,174 units	2.3 people/unit	216,016	0.334	4	1.337	2.5	0.84
High Density Residential	80 GPD/person	0 units	2.0 people/unit	0	0.000	4	0.000	2.5	0.00
Neighborhood Mixed	80 GPD/person	0 units	2.0 people/unit	0	0.000	4	0.000	2.5	0.00
	1500 GPD/acre	0.0 acres		0	0.000	2.5	0.000	2.5	0.00
Agrihood (res. only)	80 GPD/person	80 units	2.8 people/unit	17,920	0.028	4	0.111	2.5	0.07
Offsite	80 GPD/person	2,920 units	2.3 people/unit	537,280	0.831	4	3.325	2.5	2.08
Pipe Size Needed = 18"				865,520	1.339				3.35

Table 4.4: South Proposed Sanitary Peak Flow (Flex Space - Business Park)

Median Unit/Acres									
Land Use	Metrics			Average Flows (GPD)	Average Flows (cfs)	Peak Factor for local flows	Local Peak Flow Contribution (cfs)	Peak Factor for Sub-Inteceptor	Sub-Inteceptor Peak Flow Contribution (cfs)
Business Park	1500 GPD/acre	63.9 acres		95,850	0.000	2.5	0.000	2.5	0.00
Low Density Residential	80 GPD/person	421 units	2.8 people/unit	94,304	0.146	4	0.584	2.5	0.36
Medium Density Res.	80 GPD/person	0 units	2.5 people/unit	0	0.000	4	0.000	2.5	0.00
Med-high Density Res.	80 GPD/person	248 units	2.3 people/unit	45,632	0.071	4	0.282	2.5	0.18
High Density Residential	80 GPD/person	0 units	2.0 people/unit	0	0.000	4	0.000	2.5	0.00
Neighborhood Mixed	80 GPD/person	0 units	2.0 people/unit	0	0.000	4	0.000	2.5	0.00
	1500 GPD/acre	0.0 acres		0	0.000	2.5	0.000	2.5	0.00
Agrihood (res. only)	80 GPD/person	80 units	2.8 people/unit	17,920	0.028	4	0.111	2.5	0.07
Offsite	80 GPD/person	2,920 units	2.3 people/unit	537,280	0.831	4	3.325	2.5	2.08
Pipe Size Needed = 15"				790,986	1.076				2.69

PUBLIC WATER SERVICE

Greenfield is located in the Northeast Zone, one of three water pressure zones serving Fitchburg. A new Northeast high capacity well is planned in the northwestern quadrant of the neighborhood.

Figure 4.8 provides a conceptual watermain layout.

The average water demand for the proposed development is estimated to be **431,040 - 621,225** gallons per day, as illustrated in **Tables 4.5-4.6**. Accounting for the highest max day/average day ratio **in the past 15 years** of **2.13** in the east/northeast zone, the estimated peak water demand for the development would be **918,115 - 1,323,209** gallons per day.

PRIVATE UTILITIES

In addition to the public utilities discussed above there are several private utilities that serve the community with facilities that impact the Greenfield Neighborhood and surrounding area including fiber optics, gas and electric.

Figure 4.8: Proposed Watermain Layout

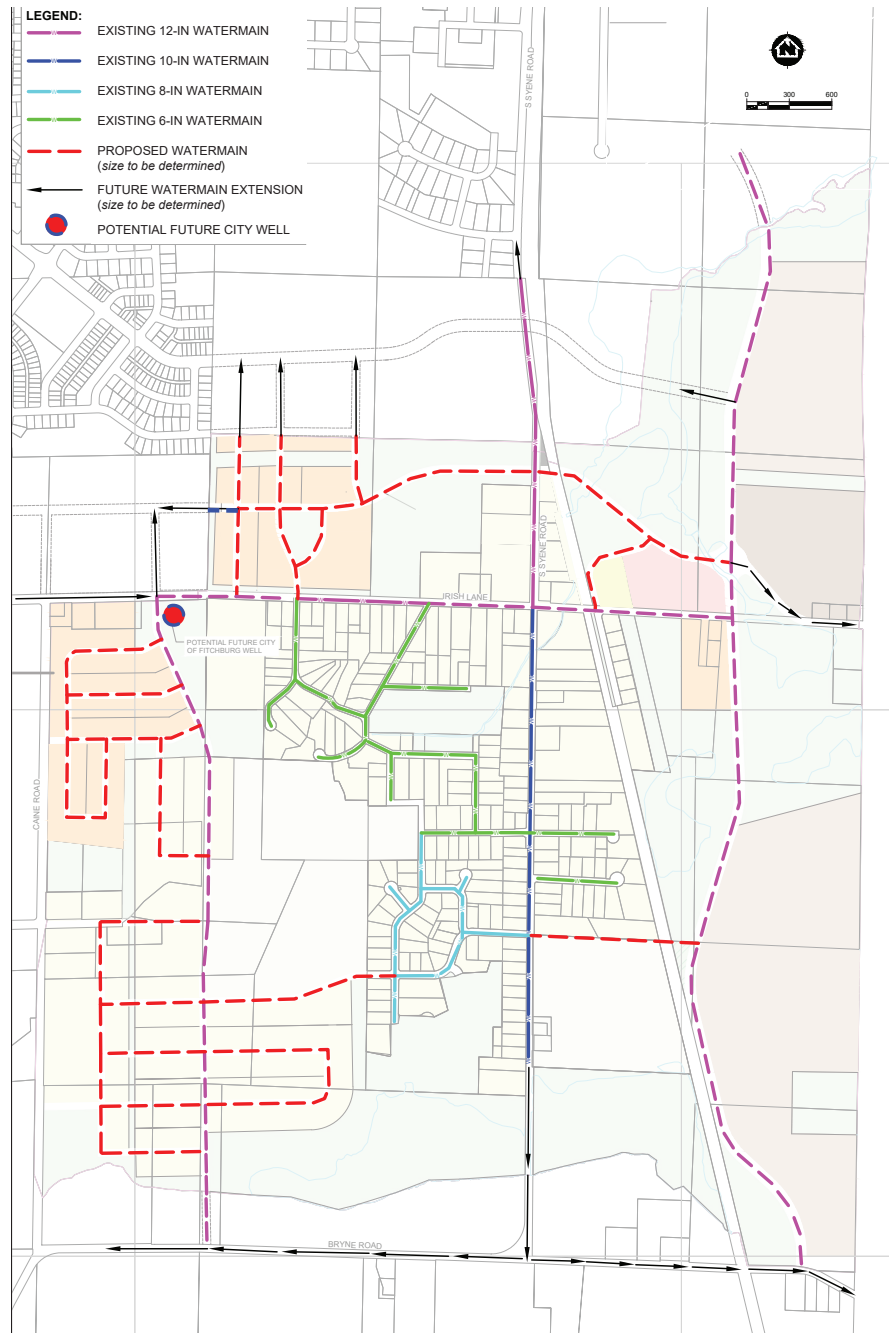


Table 4.5: Average and Peak Water Demand (Option A)

Land Use	Metrics		Average Flows (GPD)	Max Day/ Ave. Day Ratio	Max Day Demand (GPD)
Business Park	1,500 GPD/acre	0 acres	0	2.13	0
Low Density Residential	220 GPD/unit	519 units	114,180	2.13	243,203
Medium Density Res.	145 GPD/unit	416 units	60,320	2.13	128,482
Med-high Density Res.	145 GPD/unit	1,713 units	248,385	2.13	529,060
High Density Residential	130 GPD/unit	1,105 units	143,650	2.13	305,975
Neighborhood Mixed	130 GPD/unit	193 units	25,090	2.13	53,442
	1,500 GPD/acre	8 acres	12,000	2.13	25,560
Agrihood (res. only)	220 GPD/unit	80 units	17,600	2.13	37,488
Total			621,225		1,323,209

Table 4.6: Average and Peak Water Demand (Scenario B)

Land Use	Metrics		Average Flows (GPD)	Max Day/ Ave. Day Ratio	Max Day Demand (GPD)
Business Park	1,500 GPD/acre	123 acres	184,500	2.13	392,985
Low Density Residential	220 GPD/unit	519 units	114,180	2.13	243,203
Medium Density Res.	145 GPD/unit	416 units	60,320	2.13	128,482
Med-high Density Res.	145 GPD/unit	248 units	35,960	2.13	76,595
High Density Residential	130 GPD/unit	0 units	0	2.13	0
Neighborhood Mixed	130 GPD/unit	96 units	12,480	2.13	26,582
	1,500 GPD/acre	4 acres	6,000	2.13	12,780
Agrihood (res. only)	220 GPD/unit	80 units	17,600	2.13	37,488
Total			431,040		918,115

RECOMMENDATIONS – UTILITIES

Recommendations for utilities improvements emphasize actions to be initiated by the City of Fitchburg in order to fulfill the vision, goals, and principles of this plan. In addition, many public and private utilities improvements will be initiated by the private development community as a component of individual development projects. **To the extent that is practical, use of condemnation for new sanitary sewer infrastructure should be avoided.**

W1. Follow the Proposed Conceptual Sewer Interceptor and Collector Layout. Re-evaluate interceptor/sub-interceptor sizes with each sewer extension to ensure changes in land use densities are accounted for. Approximate pipe sizing per area is as follows (see **Table 4.8**):

- Install 36" interceptor along Blaney Road, starting north of the neighborhood down to Byrne Road, likely in stages.
- Install 18" sub-interceptor sewer main along Irish Lane from Blaney Road to the west.
- Install 18" sub-interceptor sewer mains through Old Indian Trail.

W2. Model and evaluated proposed network system in this neighborhood as part of the next water system master plan update to determine final water pipe sizes. Based on the Preliminary Watermain Plan layout. Approximate pipe sizing per area is as follows:

- Install 12" water main along Blaney Rd , Irish Ln, Collector B, and potentially Byrne Road.
- Install 10" water main along Collector A , Collector B, Syene Road (south end), and within Business Park and Higher Density/Multi-unit Residential Areas (BP/HDR)
- Install 8" water main for all other Lower Density Residential areas (LDR/MDR).

W3. Evaluate the need for a water main and size (if needed) on Caine Road with the next water system master plan update.

Table 4.8: Pipe Capacity Calculations

Pipe Capacity Calcs									
D	8"	10"	12"	15"	18"	21"	24"	27"	30"
R	0.333	0.417	0.500	0.625	0.75	0.875	1	1.125	1.25
A	0.349	0.545	0.785	1.227	1.766	2.404	3.140	3.974	4.906
P	2.093	2.617	3.140	3.925	4.710	5.495	6.280	7.065	7.850
R	0.167	0.208	0.250	0.313	0.375	0.438	0.500	0.563	0.625
N	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
C	100.485	104.293	107.510	111.584	115.027	118.020	120.676	123.069	125.249
S	0.004	0.003	0.002	0.002	0.001	0.001	0.008	0.008	0.008
Q (cfs)	0.905	1.373	1.979	2.963	4.310	5.935	23.965	32.809	43.452

TRANSPORTATION NETWORK

Effective transportation infrastructure is critical to the Neighborhood's long-term success. This section reviews existing conditions for motor vehicle, pedestrian, bicycle, and mass transit infrastructure.

The Greenfield Neighborhood is currently outside of — but located close to — the City's transit service area and its bike facilities. The neighborhood is adjacent to US Highway 14 which connects to the Beltine Highway and Madison area.

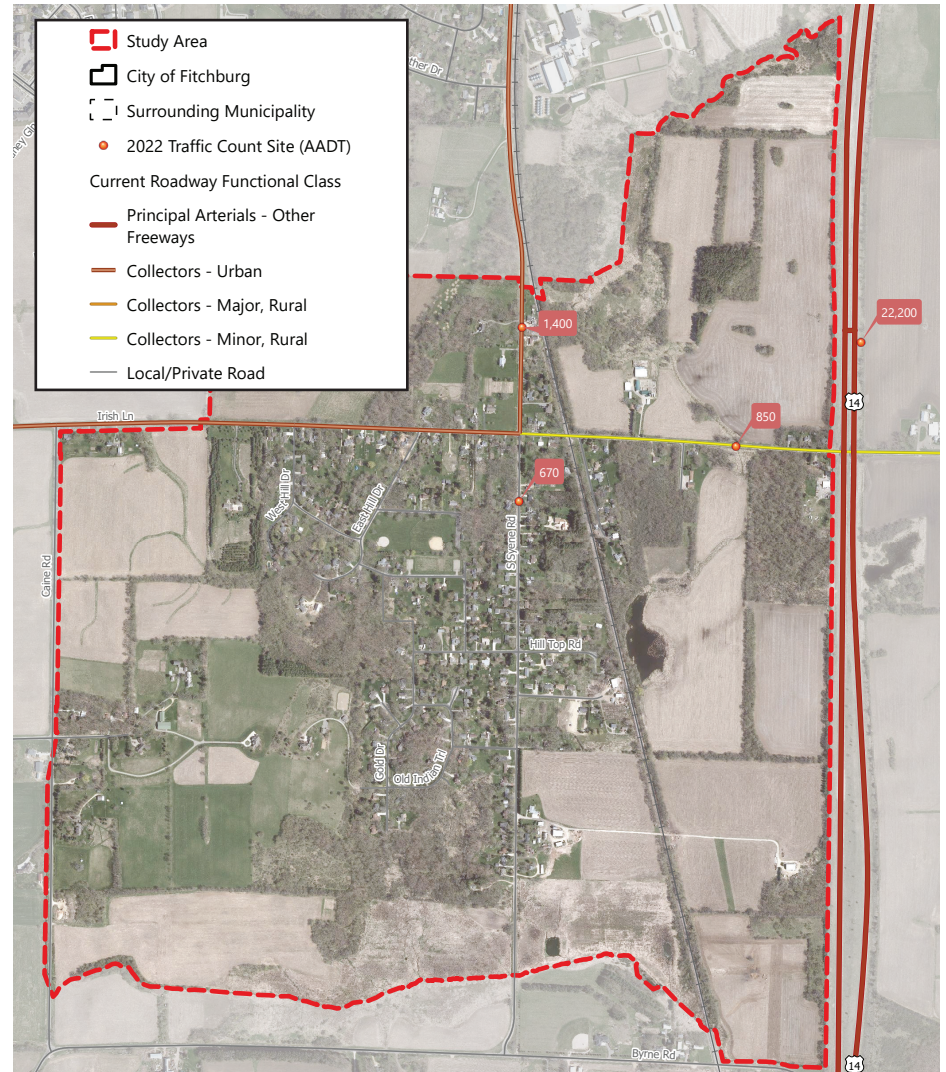
EXISTING CONDITIONS US Highway 14

The neighborhood's eastern limit is defined by US Highway 14 (see **Figure 4.9**). USH 14 has no direct access to the neighborhood. The closest interchange connections are at Exit 134 for Lacy Road and Exit 139 for County Highway MM. The Neighborhood will benefit from establishing safe and efficient access to this primary arterial through an effective internal street network.

Proposed USH 14 Improvement

According to Chapter 10 of *A Policy on Geometric Design of Highways and Streets, 7th Edition* (AASHTO) the minimum interchange spacing based on current conditions would be a minimum of two (2) miles apart; however, the City intends to see urban growth over the next 10-20 years through this corridor. As it develops, the highway may be considered "urban", which will allow for interchanges to be

Figure 4.9: Transportation Network



within one (1) mile of each other. Since the current distance between interchanges exceeds four (4) miles, the neighborhood is an ideal location for an additional interchange to provide better connectivity as the region grows around USH 14. The question on spacing impacts where within the neighborhood an interchange may be constructed based on existing interchange north (1.7

miles from Irish Lane) and south (2.4 miles from Irish Lane). A new interchange coupled with a new east-west collector could absorb some of the traffic from Irish Lane and South Syene Road. It would also complement the potential urban development in the next twenty years, providing better mobility throughout the City and increasing potential for employment development around the connection.

Street System

The street network provides six points of access into the study area via Caine Road, Irish Lane, Whalen Road, and South Syene Road; South Syene Road and Irish Lane are primary high-traffic collectors through the existing neighborhood. South Syene Road changes moving south, from a collector (major, rural) into a local road. Irish Lane changes from a collector (major, rural) to a collector (minor, rural) while moving east.

Transit System

The City of Fitchburg contracts with Madison Metro for transit service within the City limits. The Greenfield Neighborhood falls outside of the service area of the transit system. Bus routes include Route B on Fish Hatchery Road; Route D2 on Nesbitt Rd, Fitchrona Rd, and Anton Dr; Route H on Post Road; Route 65 on E Cheryl Parkway

Greenfield Neighborhood Current Street Conditions



Irish Ln



S Syene Rd



Byrne Road



Caine Road

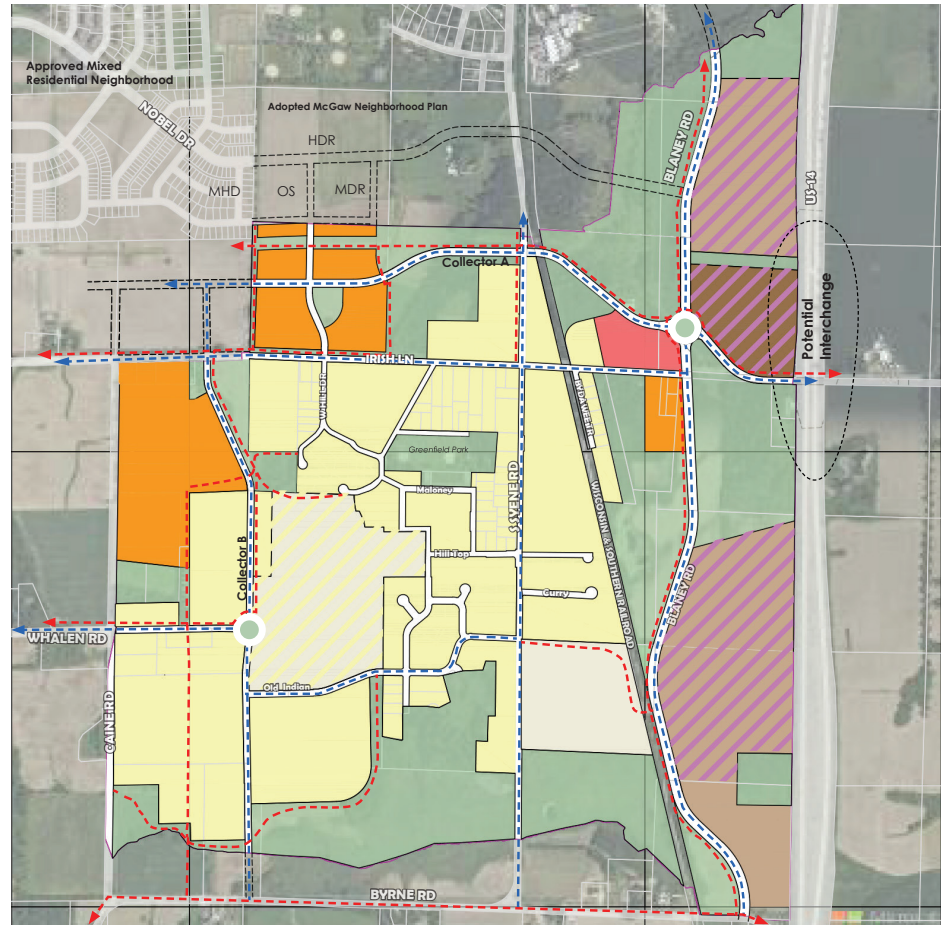
and CTH MM; and Route 75 on McKee Road.

Bicycle/Pedestrian Routes

The existing neighborhood does not currently have any bike lanes; however, the City’s robust bicycle/pedestrian network is located just north within the current Urban Service Area. It is served by several major regional trails such as the Military Ridge State Trail, Badger State Trail, Cannonball path, and Capital City State Trail. During the Public Engagement process, many residents noted their concerns regarding speed issues and pedestrian/bike safety issues on Irish Lane and S. Syene Road.

Figure 4.10 illustrates the Plan’s Future Land Use Map with proposed routing for shared use paths (red dashed line)

Figure 4.10: FLU Map with Bicycle & Pedestrian Facilities



LEGEND

- 0-123 A. Business Park (Range to include hatched areas)
- 0-22 A. High Density Residential (Range to include hatched areas)
- 17-118 A. Medium-High Density Residential (Range to include hatched areas)
- 59 Acres Medium Density Residential
- 7 Acres Neighborhood Mixed Use
- 270-325 A. Low Density Residential (Range to include hatched areas)
- 29-84 A. Farming/Agrihood (Range to include hatched areas)
- 308 Acres Parks, Stormwater Management, & Open Space
- Potential Roundabout
- Proposed Trails
- Bike Lanes

and on-road bike lanes (blue dashed line) throughout the neighborhood.

TRAFFIC REVIEW

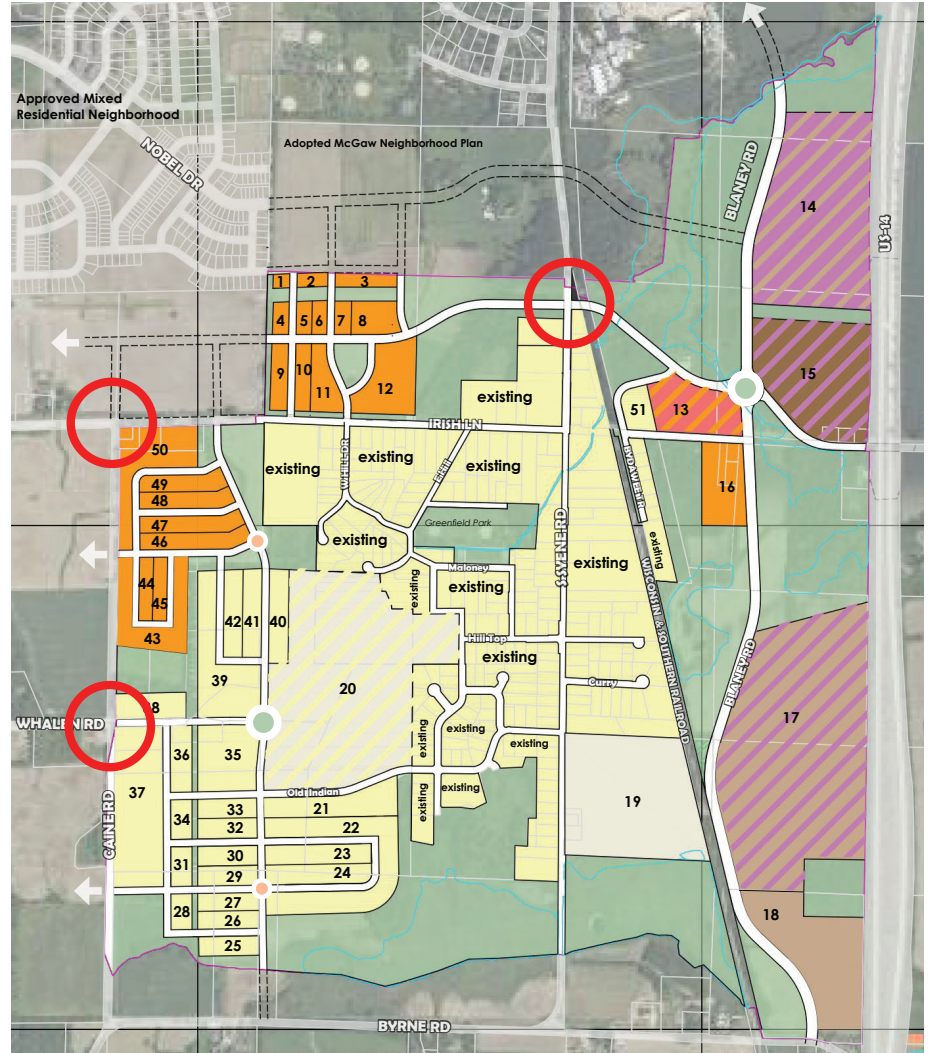
The planning process included a high-level review of intersections most likely to be impacted by development. The study intersections are listed below:

- Whalen Road & Caine Road (existing minor street stop-control)
- Irish Lane & Caine Road (existing minor street stop-control)
- S Syene Rd & Collector A (proposed new intersection)

The review assessed new development’s expected impact on the study intersections and evaluated the necessity of improvements to maintain acceptable operations. Assumed land uses and potential impact (number of dwelling units, building sizes, etc) were estimated based on lot acreage and densities as outlined in **Chapter 3** of this Plan.

The proposed land use concept provides two scenarios for future development. Option A assumes greater residential development, while option B assumes a business park in lots 14, 15, and 17. This plan proposes extending Blaney Road north of the neighborhood to Byrne Road, and constructing new collector

Figure 4.11: Transportation Network



LEGEND

- 37 ACRES Business Park / Medium-High Density Residential
- 22 ACRES High Density Residential / Business Park
- 64 ACRES Medium-High Density Residential / Business Park
- 17 ACRES Medium-High Density Residential
- 59 ACRES Medium Density Residential
- 7 ACRES Neighborhood Mixed Use / Medium Density Residential
- 270 ACRES Low Density Residential
- 55 ACRES Farming/Agrihood / Low Density Residential
- 29 ACRES Farming/Agrihood
- 308 ACRES Parks, Stormwater Management, & Open Space
- Potential Roundabout
- Potential Traffic Circle
- Proposed Trails
- Study Intersection

roadways within the development. The analysis assumed full buildout by 2045.

ASSESSMENT METHODOLOGY

Trip Generation

Trip generation rates were applied to the proposed land uses based on the Institute of Transportation Engineers (ITE) Trip Generation Manual. In Option A, lots adjacent to USH 14 are assumed to be medium- and high-density residential land use (70% of HDR would be mid-rise multi-family housing, 30% as low-rise multi-family housing per City guidance). In Option B, lots adjacent to USH 14 are assumed to be general office or manufacturing uses. The trip generation tables for Options A and B are provided in **Appendix C**. (Exhibits 1 and 2). The calculated peak hour trips were assigned to the study intersections based on trip distribution percentages.

Trip Distribution

Overall trip distribution percentages were estimated based on traffic data collected at area intersections, historical count data, and expected routing of land uses in the proposed development. Adjustments were made based on engineering judgement of observed employment centers in the area and likely travel routes, given the significant residential component of the proposed development.

Local distributions at intersections are based on the engineering judgement of anticipated travel time within the new roadway network and distance to destinations relative to a development's access points.

A future extension of Collector A aligned with Irish Lane and Caine Road was considered while determining the distribution of the new trips. For analysis purposes, it was assumed 35% of the new trips would use Collector A, and 25% would use Irish Lane based on the relocation of the railroad

crossing from Irish Lane to Collector A, and the traffic calming on Irish Lane.

An analysis was also completed for a potential interchange on USH 14 near Irish Lane. Land use was assumed to remain the same for the interchange alternative, but the distribution of new trips was adjusted based on a change in routes with the new interchange. No adjustments to existing background traffic were made for the interchange alternative analysis.

Expected distributions without the USH 14 interchange are identified in **Figure 4.12**. With the addition of a future interchange on USH 14, it is assumed that a majority of new traffic heading north and south would shift away from the local arterial and collectors. Distributions were adjusted accordingly, as shown in **Figure 4.13**.

Evaluated Intersections

Caine Road & Whalen Road

The existing intersection at Caine Road & Whalen Road is a minor street stop-controlled on the east and west approaches, with one lane on each approach. Both Caine Road and Whalen Road have a rural cross section without existing pedestrian or bike facilities.

Irish Lane & Caine Road

The existing intersection at Irish Lane & Caine Road is a T-intersection with minor street stop control on the south approach. All three approaches have one lane. Both Irish Lane and Caine Road have a rural cross section without existing pedestrian or bike facilities.

Syene Rd & Collector A

This Plan proposes a new intersection on Syene Road at Collector Road "A", approximately 1,110 feet north of Irish Lane & Syene Road. Railroad tracks owned by Wisconsin & Southern Railroad are located approximately 135 feet east of the

Figure 4.12: Trip Distribution (No Interchange)

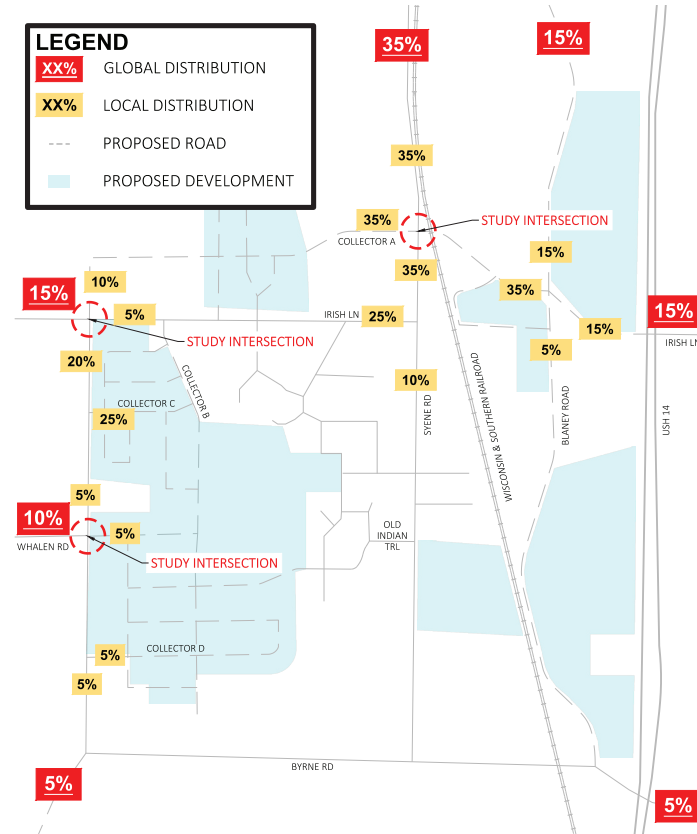
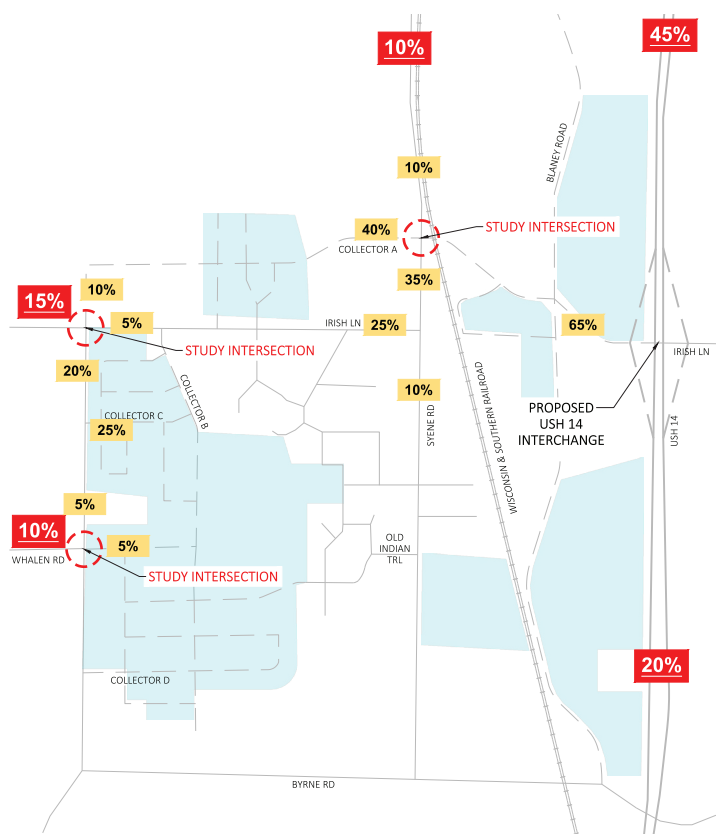


Figure 4.13: Trip Distribution (With Interchange)



proposed intersection. Coordination will be required with Wisconsin & Southern Railroad to establish this crossing with potential impacts to the Syene railroad crossing. Preference will be to keep both crossings, but moving the crossing from Irish Lane to Collector A will provide an east-west connectivity through the neighborhood that minimizes impacts to the existing residents.

TRAFFIC ANALYSIS

Peak hour traffic counts (6:00 AM – 9:00 AM, 3:00 PM – 6:00 PM) were collected at major intersections near the study area in December of 2023. These intersections included Byrne Road & Caine Road, Caine Road & Irish Lane, and Irish Lane & Syene Road. The most recent average growth rate of 0.5% used by WisDOT for Dane County was applied to the traffic counts to forecast volumes to the 2045 full build condition.

Note: No traffic counts were collected at Caine Road & Whalen Road. An estimate of the existing traffic at the study intersections was required to perform analysis and were estimated using the traffic counts from the nearby major intersections collected for this study. Given the lack of development west of the Whalen Road intersection, turning movements to/from the west approach were assumed to be negligible. Existing movements to/from the east approach at the Irish Lane & Syene Road intersection were moved to the new intersection with Collector A & Syene Road, assuming the railroad crossing on Irish Lane is closed and moved to the Collector A.

Considering that overall AM peak hour volumes are lower than PM peak hour, only the PM peak period was included in the analysis. The analysis of the study intersections included Capacity, Level of Service, & Queueing Analysis, and Traffic Signal Warrant Analysis.

Capacity, Level of Service, & Queueing Analysis

The operational and capacity analyses were completed using Synchro 12, HCS2023 software, Highway Capacity Manual (HCM) 7th Edition methodologies, and WisDOT headway values, as specified in TEOpS 16-15-20.2.1. This analysis assigns a level of service (LOS) to each movement that refers to the overall quality of flow at an intersection. LOS ranges from very good, LOS "A," to very poor, LOS "F," based on delay measured in seconds per vehicle.

Table 4.9 represents the delay criteria used for determining the LOS at an intersection. Should delay or capacity fall below the improvement threshold (lower than LOS D), alternate traffic control changes may be considered as part of this study. Full operational analysis outputs can be viewed in **Appendix C**.

Traffic Signal Warrant Analysis

Caine Road & Whalen Road

This intersection was analyzed with existing control and lane geometry. There is one shared lane on all approaches with stop control on the east and west approaches. Based on the results of the operational analysis, all approaches are expected to operate at or above LOS B for each of the Scenarios A & B, and with or without the interchange. Analysis results for Scenarios A & B for both non-interchange and interchange alternatives are included in **Appendix C** (*Exhibit 5*).

Irish Lane & Caine Road

Assuming the north leg will be added at the intersection with the development, the intersection was analyzed as a minor street stop control on the northbound and southbound approaches (with one shared lane on the remaining approaches). Based on the operational analysis, all approaches except for the northbound lane are expected to operate at or above LOS C for each of the Scenarios A & B, and with or without the interchange; the

northbound lane operates at LOS F for all scenarios, which is below the improvement threshold (LOS D).

Potential improvements considered at this intersection were a traffic signal, roundabout, and adding turn lanes on Caine Road. Traffic signal warrant analysis was completed including the expected traffic from the anticipated development and forecasted traffic counts. The Manual on Uniform Traffic Control Devices (MUTCD) specifies nine warrants used to justify the consideration of a traffic signal at an intersection. Based on the location of the intersections and surrounding land use, only Warrant 1 (eight-hour vehicular volume), Warrant 2 (four-hour vehicular volume), and Warrant 3 (peak hour volume) were evaluated. The remaining signal warrants were not intensively reviewed as part of the analysis as the existing roadway infrastructure and land uses would not apply to the remaining warrants.

An eastbound right turn lane at the intersection of Irish Lane & Caine Road is warranted based on the results of the WisDOT turn lane warrant analysis, which accounts for the design speed of the roadway, percentage of turning vehicles, and the number of conflicting oncoming vehicles to provide guidance for turn lanes at an intersection. As future development occurs near Greenfield, or observed turning movements rise, additional turn lanes may be considered. Left and right turn lanes are not expected to be warranted on Caine Road at Whalen Road due to expected low turning volumes; therefore, WisDOT turn lane warrants were not evaluated for the Caine Road & Whalen Road intersection.

An interim improvement measure to be considered is the addition of a northbound left turn lane on Caine Road. The results of the analysis with the northbound left turn lane shows the northbound through/right turn lane operates at LOS B and the northbound left turn lane is expected to operate

Table 4.9: Highway Capacity Manual Level of Service

LOS	Unsignalized Average Control Delay (seconds/vehicle)	Signalized Average Control Delay (seconds/vehicle)	Delay Type
A "Very Good"	0 – 10	0-10	Short
B	>10 – 15	>10 – 20	
C	>15 – 25	>20-35	
D Improvement Threshold	>25 – 35	>35-55	Moderate
E	>35 – 50	>55-80	
F "Very Poor"	>50	>80	Long

at LOS E. The results of the queue analysis show adding the northbound left turn lane would decrease the reported 95th percentile queue length of the northbound approach from 175 feet to 75 feet for the northbound left turn lane. Analysis results for both Scenarios A & B for the non-interchange and interchange alternatives are included in Exhibit 5, **Appendix C**.

Syene Road & Collector A

Traffic signal warrants were not evaluated at this intersection as part of this analysis. Based on the anticipated development volumes, it is assumed traffic signal warrants would be met. Only a traffic signal and roundabout alternative will be included as part of the future planning review.

All approaches would operate above LOS D for the traffic signal and roundabout scenarios for both development Scenarios A and B, with or without the USH 14 interchange. Slight differences in the configuration of the approaches were utilized to achieve traffic analysis results of LOS D or better for each of the alternatives. Analysis results and lane configurations for the traffic signal and roundabout alternatives for Scenarios A & B (non-interchange and interchange options) are included in Exhibit 5, **Appendix C**.

INTERSECTION ALTERNATIVES

The recommended alternatives for the study intersections will allow for safe and efficient operations to accommodate development. These

locations should be monitored for additional improvements when traffic increases and/or further development occurs.

Whalen Road & Caine Road

All movements through this intersection would score at or above LOS B and no significant queuing is expected, therefore no improvements are recommended. The existing minor street stop control on Whalen Road & Caine Road should remain. The City should continue to monitor the intersection and consider future improvements if safety or traffic operation issues arise as the development progresses.

Irish Lane & Caine Road

When traffic signal warrants are not met, it is not typically recommended to change the intersection control type to traffic signals or a roundabout. Installing traffic signals or a roundabout at unwarranted intersections could violate driver expectations, increase crashes, and cause delays. In the interim, the City should consider adding one eastbound right turn lane and one northbound left turn lane (evaluating these additions for impacts to adjacent properties and any existing old growth/ heritage trees). The City should continue to monitor the intersection and consider future analysis if dictated by safety or traffic operation issues.

Syene Rd & Collector A

As the area continues to develop, both a traffic

signal and roundabout would operate acceptably. A roundabout typically can handle additional capacity and has greater safety benefits when compared to a signalized intersection. Based on the results of the analysis, potential intersection configurations for each development scenario and potential interchange alternative are shown in Exhibit 6, **Appendix C**.

With the proximity of the railroad to the intersections, a traffic signal or roundabout would both require coordination with the railroad and special attention during design to include any safety equipment at the crossing recommended by the railroad. The potential new railroad crossing on Collector A would cross through the turn lanes for the signalized alternative. If a roundabout is preferred, the City should reserve additional right-of-way at the intersection to allow for a roundabout to be constructed in the future. Given the larger footprint of a roundabout, alignment may need to shift slightly west to allow enough clearance to the new railroad crossing (further study required).

RECOMMENDATIONS - TRANSPORTATION

Recommendations for transportation improvements will promote roadway user safety and build connectivity to existing infrastructure.

To the extent that is practical, use of eminent domain for new roads should be avoided.

T1. When warranted by delay or safety concerns, consider a traffic signal or roundabout at the Irish Lane & Caine Road intersection to accommodate the projected traffic from the Greenfield development. *Not expected within the 2045 design year.*

T2. The development proposes a new intersection at Collector Road A and Syene Road, approximately 1,100 feet north of the existing Irish Ln and Syene Road intersection. A traffic signal or roundabout should be considered at the new intersection

to accommodate the projected traffic from the Greenfield development and potential diverted traffic from the removal of the existing railroad crossing on Irish Lane.

T3. Concurrent with future development, extend Blaney Road from the limits of the Greenfield development north to Lacy Road.

T4. Concurrent with future development, extend Collector B south from the from the limits of the Greenfield development to connect to Byrne Road. Consider roundabout intersections as deemed appropriate to reduce traffic congestion and improve intersection safety.

T5. When development warrants, consider expansion of bus service to accommodate existing and new residential and business development in the area. Bus service could also link the Greenfield development to the future Fish Hatchery Road BRT line.

T6. Concurrent with future development, consider constructing multi-use paths to connect the Greenfield development to the existing multi-use path to the northwest on Nobel Drive.

T7. Include a multi-use path through a new Moraine Edge Corridor to connect through and beyond the study area to the east and west.

T8. Require that the right-of-way for Whalen Road and Caine Road is reserved for future connections.

T9. Ensure the safety and convenience for bicyclists and pedestrians are prioritized with any future road or intersection projects.

T10. Consider adding bike lanes or a multi use path to Syene Road within the Greenfield development and along new collector roads Collector A and B (see **Figure 4.10**).