Louisville Loop–Pond Creek Corridor

Shared-Use Path and Ecological Restoration Plan

HDR

Louisville Loop

Louisville Metro Parks

Table of Contents

Acknowledgements

UNITED STATES ARMY CORPS OF ENGINEERS
Lester Washington, *Louisville District Point of Contact*

LOUISVILLE METRO GOVERNMENT
Greg Fischer, *Mayor*
Mary Lou Northern, *Mayor's Office*
Milana Boz, *Metro Parks*
Margaret Brosko, *Metro Parks*
Carolyn Cromer, *Metro Parks*
Lisa Hite, *Metro Parks*
Bennett Knox, *Metro Parks*
John Swintosky, *Metro Parks, Project Manager*

LOUISVILLE METRO COUNCIL
Robert Henderson, *District 14 Representative*
Vicki Aubrey Welch, *District 13 Representative*
David Yates, *District 25 Representative*

METROPOLITAN SEWER DISTRICT
David Schaftlein, *MSD Engineering Manager*

RIVERSIDE, THE FARNSLEY-MOREMEN LANDING
Patti Linn, *Site Manager*

PLANS PREPARED BY HDR

This page intensionally left blank.

1.0 Introduction

1.1 INTRODUCTORY STATEMENT

The Pond Creek Corridor Shared-use Path and Ecological Restoration Plan is part of a larger planning effort for the development of the Louisville Loop (the Loop), an ambitious 100-mile path network planned to encircle the Louisville Metropolitan area. Louisville has a long history of respect and appreciation for community open spaces. Frederick Law Olmsted, the "Father of Landscape Architecture," and his sons John Charles and Frederick Law Olmsted Jr, designed the Parks and Parkway system for Louisville in the 1890s. This system, composed of eighteen parks and six parkways, is one of the best preserved examples of those that Olmstead's firm designed. These parks and parkways create an identity for Louisville and facilitate an active lifestyle for current residents. Similarly, the Loop would influence Louisville's future, connecting communities, encouraging economic development, and improving the overall health of Louisville. Before focusing on the Pond Creek Corridor, which would be the Loop's southwestern segment, it is important to take a step back and gain a full understanding of the Louisville Loop—it's past, present, and future.

1.2 ORIGINS OF THE LOUISVILLE LOOP

The *Cornerstone 2020 Plan* for Louisville and Jefferson County was a thorough, comprehensive land-use plan developed over a lengthy period of time in the 1990s. One element of the plan was the *Louisville & Jefferson County Multi-Objective Stream Corridor/Greenway Plan*. This plan describes the vision to develop an interconnected system of linear open space corridors and greenways that would support improved floodplain and water quality management, land stewardship, alternative transportation, recreation, and economic growth opportunities.

The *Parks and Open Space Master Plan* was another component of the Cornerstone 2020 Plan. This plan followed the aforementioned Greenway Plan and identified a wide variety of recreational facilities to be developed to meet the future needs of Louisville's growing population. Specifically, a "County Loop" trail was suggested as a linear greenway that would connect parks and open space areas to each other and to the surrounding neighborhoods. Areas that were to be connected by this loop trail include the Ohio River Corridor, the Jefferson County Memorial Forest, and Floyd's Fork. This was the genesis of what is now known as the Louisville Loop. In 2005, Louisville officials announced an ambitious multimillion dollar, multiyear "City of Parks" initiative to add thousands of acres of park land and protected green space to Louisville Metro's "greenprint." This initiative built on what Olmsted began over a century ago and was the first step toward completing Louisville's transformation into a City of Parks.

Five goals of the City of Parks initiative include the following:

Acquire and develop new park land — currently, Louisville has 122 parks that encompass over 12,000 acres of land. Recently, hundreds of acres were acquired adjacent to the Jefferson Memorial Forest, bringing its total acreage to 6,218 and making it the largest municipal urban forest in the United States. Other parks and open spaces are currently in the planning or construction phases, including Riverview Park and Portland Wharf Park along the banks of the Ohio River and the Parklands of Floyd's Fork project on the southeast side of the city.

- *Reinvest in existing parks* — since 2003, Louisville Metro Parks has completed 271 capital improvement projects worth a total of $38.5 million, and an additional 65 projects are underway.
- *Create a 100-mile paved loop around the city* — this would tie together diverse neighborhoods and parks. (Note: this goal references what is now the Louisville Loop planning effort.)
- *Celebrate natural and cultural heritage* — this would be accomplished by documenting areas holding ecological value and displaying stories of cultural and historical significance.
- *Develop and maintain partnerships with key entities* — strong ties to local businesses, developers, governmental agencies, and the Olmsted Conservancy would be critical to creating interest in future projects.

FIGURE 1.1 CHICKASAW PARK, ONE OF LOUISVILLE'S OLMSTED PARKS

PHOTO COURTESY BY LOUISVILLE OLMSTED PARKS CONSERVANCY

1.3 LOUISVILLE LOOP OVERVIEW

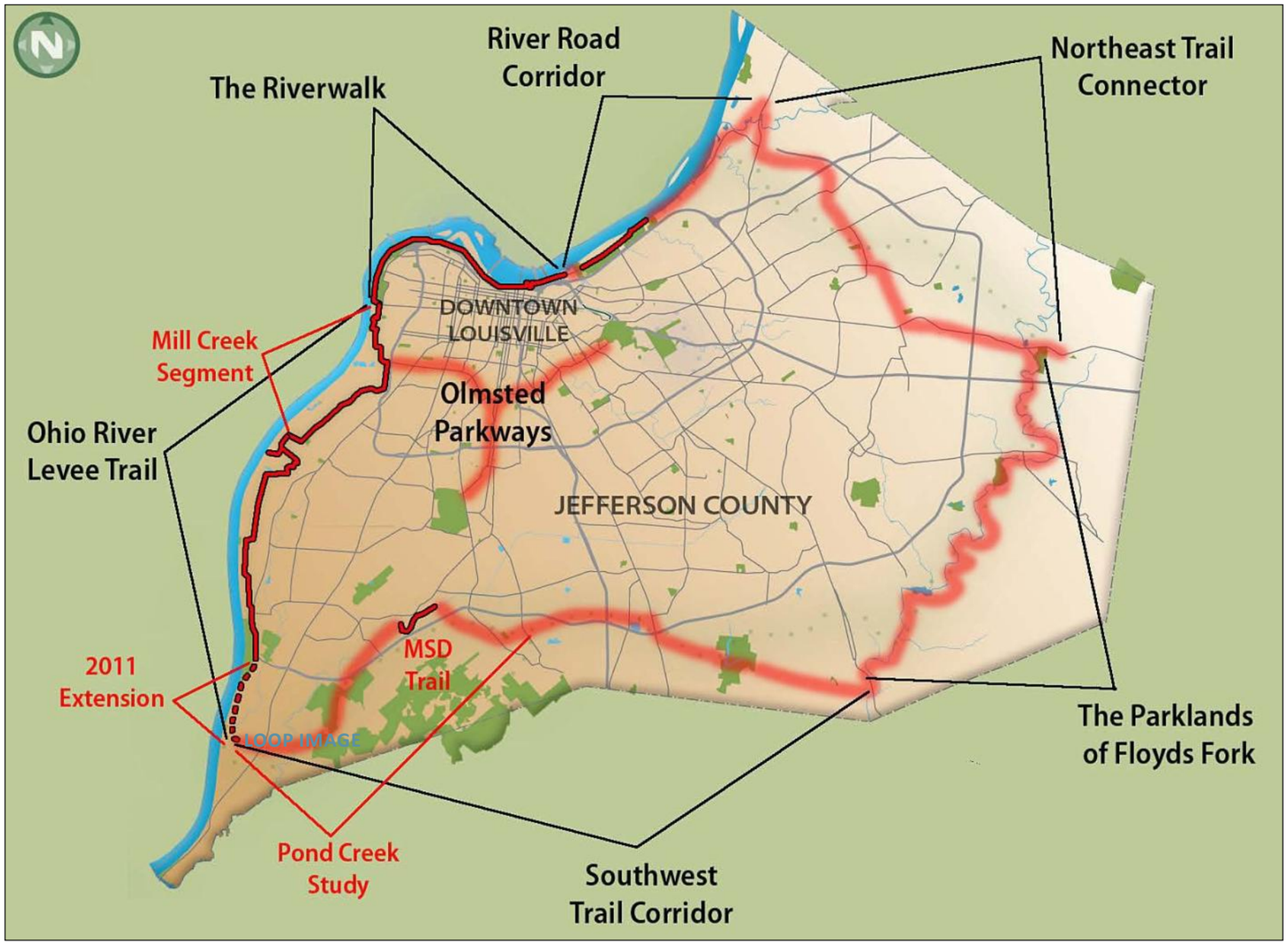
Based on the goals and objectives set forth in the *Cornerstone 2020 Plan*, the *Parks and Open Space Master Plan* and *City of Parks* initiative planning efforts began on a 100 mile shared-use path system. This system, called the Louisville Loop, would completely encircle the city and connect to the vast inventory of historic neighborhoods and parks throughout the city. A vision for the Louisville Loop was defined to reflect the following goals:

- Improve the non-motorized mobility options for pedestrians, bicyclists, transit users, and equestrians. These non-motorized mobility options would encourage community members to get out and be active while also creating an alternative transportation network.
- Encourage a wide range of users, including families, children, people with disabilities, and athletes.
- Connect to neighborhoods, schools, parks, workplaces, and commercial districts where possible to promote travel between these features and reduce vehicular traffic.
- Serve as a catalyst for economic development by increasing property values near the Loop, encouraging tourism, and providing amenities for neighborhoods and workplaces near the Loop. Studies have shown that the property values of locations within one-half mile of a trail system are 15% higher than non-adjacent property.
- Celebrate the natural and cultural history of Louisville. There are five distinct physiographic regions that the Loop is planned to traverse. These include the Ohio River Valley, the Knobs, the Shale Lowlands, the Floyd's Fork Watershed, and the Limestone Belt. Also, there are many historically significant locations and landmarks that can be highlighted along the route.
- Enrich everyday life with public art. The Loop would support installations of art in coordination with the Mayor's Advisory Committee on Public Art.

Planning for the Louisville Loop is separated into the following seven segments:

- The Riverwalk
- Ohio River Levee Trail
- Southwest Trail Corridor
- The Parklands of Floyds Fork
- Northeast Trail Corridor
- River Road Corridor
- Olmsted Parkways

FIGURE 1.2 LOUISVILLE LOOP OVERVIEW MAP



Several segments of the Louisville Loop have already been constructed, totaling nearly 27 miles in length. The Riverwalk was the first portion constructed; it connected downtown Louisville near Waterfront Park to the south side of Shawnee Park, a distance of approximately 9.0 miles. A portion of the Ohio River Levee Trail was the next section constructed; it runs from Lees Lane on the west side to Riverside, the Farnsley Moremen Landing, an 8.3 mile segment. Most recently, the Mill Creek segment, part of the Ohio River Levee Trail, was constructed; this segment connected the Riverwalk to the Ohio River Levee Trail via a series of bike lanes, sharrows, and off street pathways that total 6.5 miles in length. In late 2010, the Metropolitan Sewer District (MSD) completed a 1.5-mile segment along Pond Creek in the Southwest Trail Corridor that would likely be incorporated into the Loop. East of downtown, a 1.4-mile segment of the River Road Corridor has been constructed. During the summer of 2011, the Loop is planned to be extended south from Riverside, the Farnsley-Moremen Landing, an additional 2.5 miles along the levee to the LG&E plant on Watson Lane.

Other future segments of the Louisville Loop are currently in the planning stages, including the following:

- The *Parklands of Floyd's Fork* on the southeast side of the city would connect Bardstown Road at Broad Run Park to Shelbyville Road near the Miles Lakes of Beckley Creek Park. The plans for Floyd's Fork also include four new public parks linked by a park drive. A private, nonprofit corporation named 21st Century Parks is coordinating the development of Floyd's Fork.
- *Northeast Loop Corridor* would connect the north side of Floyd's Fork to the northern end of River Road. The planning process is ongoing although a preferred routing alignment and several alternatives have been identified. See Figure 1.3.
- *River Road Corridor* would follow the Ohio River on the west side of Louisville. Master planning is complete on this corridor, and a few segments have been constructed.
- *The Olmsted Parkways* segment would connect three of the large Olmsted Parks through the historic context of the Olmsted parkways. This parkway system is listed on the National Register of Historic Places. A master plan was completed in late 2007, and preparation of construction documents is underway. See Figure 1.4.

The segment of the potential Loop route that still needs to be studied in more detail is the remainder of the Southwest Trail Corridor that would connect Fairdale to Floyd's Fork at Bardstown Road.

FIGURE 1.3 NORTHEAST LOOP CORRIDOR

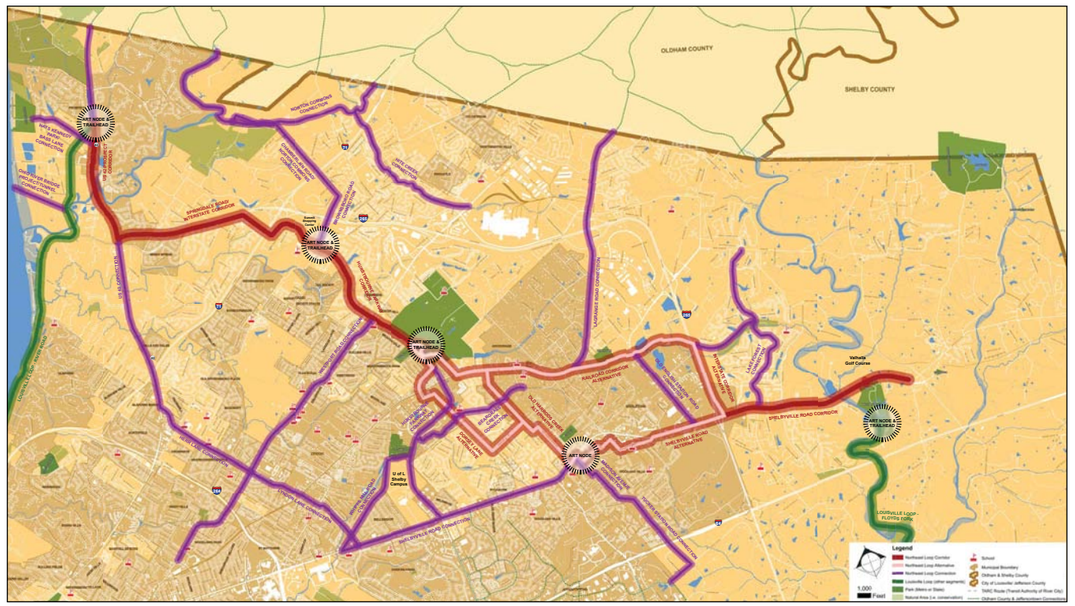


FIGURE 1.4 OLMSTED PARKWAYS MASTER PLAN

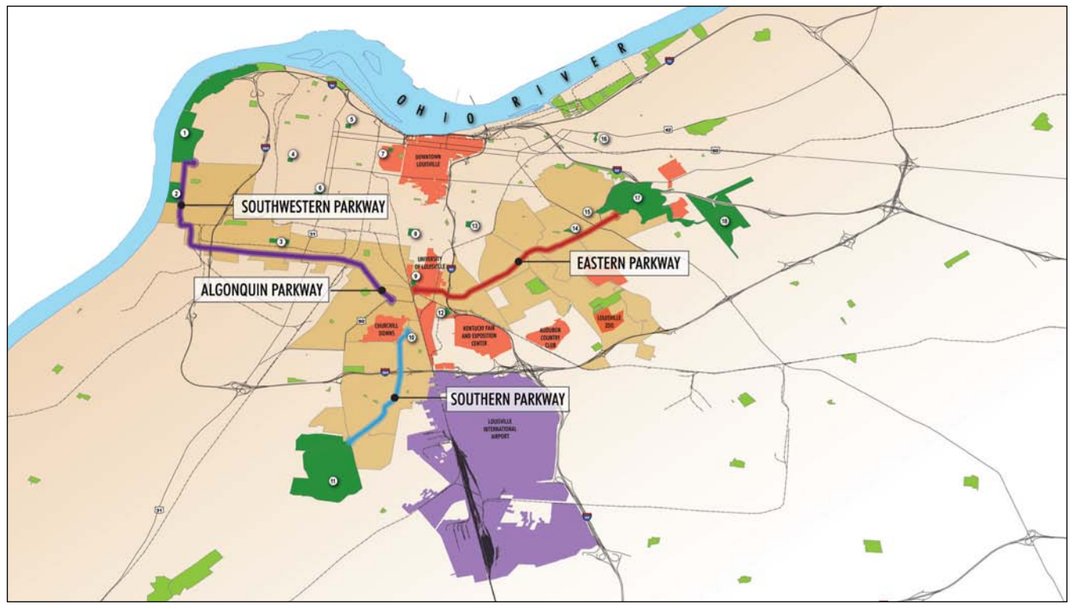
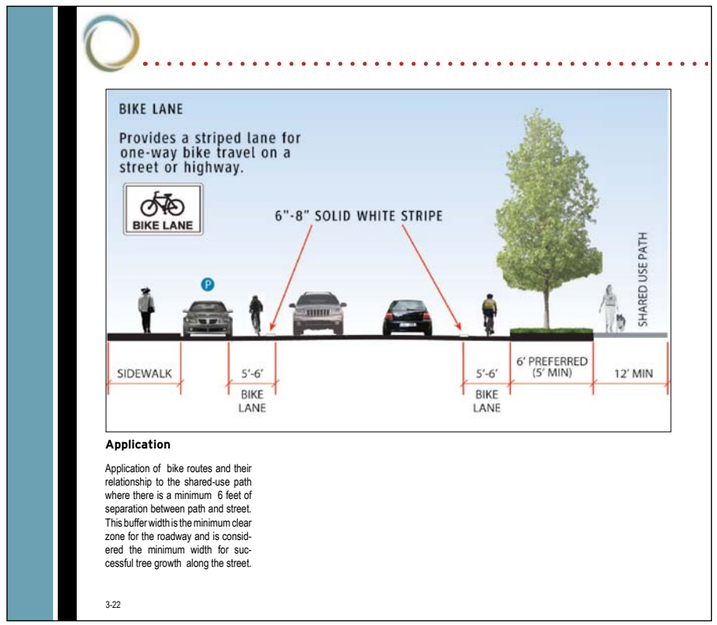


FIGURE 1.5 *LOUISVILLE LOOP DESIGN GUIDELINES, VARIOUS PAGES*



1.4 LOUISVILLE LOOP DESIGN GUIDELINES

In late 2009, a set of design guidelines were developed as the intended standard for designing and implementing the vision of the Louisville Loop. The Pond Creek Corridor Plan will draw on these guidelines to develop alignment recommendations. Key principles of these guidelines include the following:

- Develop an interconnected network of shared-use paths and on-street bikeways that would provide access to all destinations within Louisville
- Develop a complete streets approach that would guide future development to ensure that bicycle facilities as well as accommodations for pedestrians will be integrated into the community
- Design the Loop to accommodate all types and skill levels of bicyclists, from children and seniors to experienced professionals
- Design the Loop to accommodate all types of users, including pedestrians and equestrians as well as bicyclists
- Establish regulatory guidelines to meet safety requirements for users
    - Follow American Association of State Highway and Transportation Officials guidelines for design, Manual on Uniform Traffic Control Devices (MUTCD) standards for signage, Americans with Disabilities Act (ADA) for accessibility standards, and other relevant standards
- Ensure that the design would meet applicable requirements in order to qualify for certain types of funding mechanisms
- Establish aesthetic standards to create a cohesive and unified character throughout the entire Loop while still allowing variations in distinct segments
    - Establish consistency in pathway materials, site furnishings, signage, pavement markings, and support facilities
    - Incorporate opportunities for public art

The design guidelines also specify the desired materials and spatial requirements of the pathway, including the following:

- Materials — hard surface paths should be 4 inch thick asphalt over an 8 inch aggregate base
- Width — a 12-foot-wide path is desired, but a 10’ wide path is accepted. In extreme cases, an 8-foot-wide path may be used if it is properly marked
- Clear Zone — maintain a minimum 2-foot clear zone outside of the paved area. An additional 1-foot buffer beyond this applies to the placement of signs
- Clearance — 8-foot minimum vertical clearance, with the exception of the equestrian (soft-surface) paths, which should have a 12’ clearance
- Gradient — the maximum recommended grade is 5%. This may be exceeded for certain distances per the ADA guidelines

2.0 Pond Creek Project Background

2.1 PROJECT DESCRIPTION

The Louisville District of the U.S. Army Corps of Engineers (USACE), in cooperation with Louisville Metro Parks, obtained funding for planning assistance to states through Section 22 of the Water Resources Development Act. Planning assistance to states is intended to assist with planning related studies (no formal design or implementation) for a wide range of projects, including flood control and floodplain management as well as recreation master planning.

HDR was contracted by the Louisville District of USACE, in conjunction with Louisville Metro Parks, to create a conceptual shared-use path and ecological restoration plan for the Pond Creek corridor. The Pond Creek corridor begins at the southern end of the future extension of the Ohio River Levee Trail on Watson Lane and ends at National Turnpike and Fairdale Road in Fairdale, a direct distance of just over 9 miles. The study area for the shared-use path portion of the project included a 2-mile-wide region centered on the Metro Park's preferred route, which is identified in the 2008 *Pond Creek and Mill Creek Recreational Concept Plan* (See Figure 2.1).

The Pond Creek Corridor Shared-Use Path and Ecological Restoration Plan's scope of work included conceptual analysis of the possible shared-use path alignments within the Pond Creek corridor; identification of potential ecosystem restoration opportunities along Pond Creek; and initial determination of environmental, cultural, historical, and archaeological resources within the path and ecosystem restoration zones.

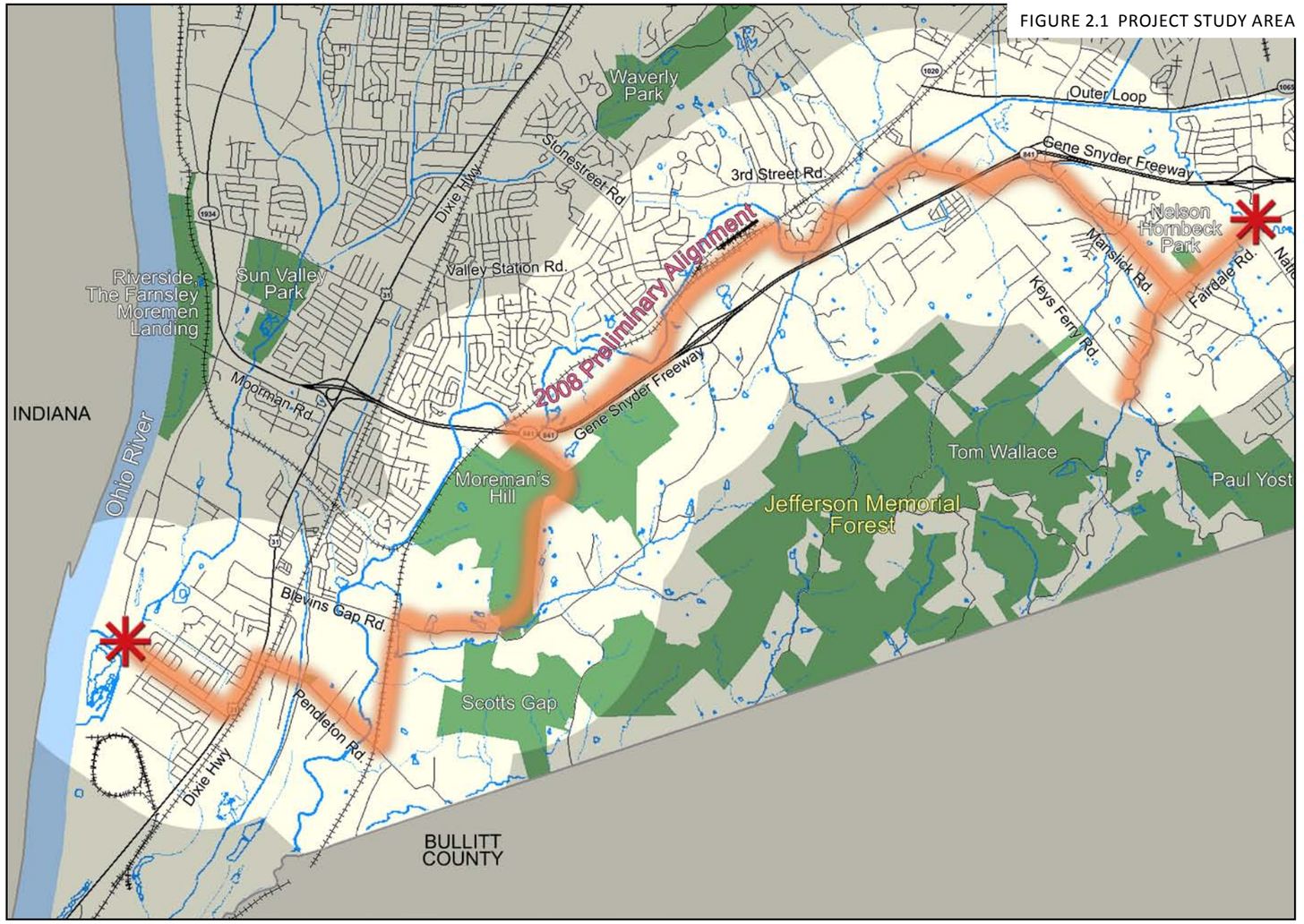


FIGURE 2.1 PROJECT STUDY AREA

2.2 PREVIOUS STUDIES OF THE POND CREEK CORRIDOR

In 2008, a study was completed that created the *Pond Creek and Mill Creek Recreational Concept Plan*. This project identified four alternatives for pathway routing that would connect the Ohio River Levee Trail to McNeely Park, with additional connections to the Jefferson Memorial Forest. The trail analysis process included team input from the USACE, Metro Parks, and MSD. The USACE Cost Effectiveness and Incremental Cost Analyses (CEICA) model was utilized to analyze the costs and benefits of each of the trail segments. Trail Experience Units (TEUs) were calculated as a way to measure the connection between people and places along the potential segments of the trail. Opportunities for ecological restoration were evaluated and highlighted for future study. The study lists recommendations for future analysis that include engaging the public in the planning process. As a result of this recommendation, public involvement is a key aspect of the current Pond Creek Corridor Plan and would play a critical role in determining the manner in which this portion of the Louisville Loop is aligned through the Southwest Corridor.

2.3 CONCURRENT PROJECTS

Several other projects are underway within the study corridor or are otherwise related to the Louisville Loop:

- *Fairdale Neighborhood Plan and Roundabout* — this neighborhood plan was developed for Fairdale in 2006. The plan's vision for Fairdale was a mixed use village serving as a gateway to the Jefferson Memorial Forest. The plan called for a roundabout located at the Manslick Road, Fairdale Road, and Mitchell Hill Road intersections to enhance traffic movement, provide on-street parking, and improve accessibility to the businesses in the village center. The Fairdale Roundabout is currently under design and has been approved by the Kentucky Transportation Cabinet. See Figure 2.2.
- *Southwest Greenways* — this project will be a system of shared-use paths, bike lanes, sidewalks, and soft-surface paths that will connect neighborhoods to business districts, community centers, historic and cultural sites, and parks. These pathways would ultimately connect to the Louisville Loop to create a more elaborate network of connectivity within the surrounding neighborhoods.
- *Olmsted Parkways Bicycle/Pedestrian Improvements* — this project involves the design and construction of a shared-use path along Southern Parkway, Algonquin Parkway, and Southwestern Parkway. Although not part of the main loop that would circle the city, these parkways would provide connections to the Loop from some of the gems of the Olmsted parks in the city, primarily Iroquois Park, Cherokee Park, and Shawnee Park
- *Wayfinding Master Plan* — this plan promotes health and fitness by improving access, safety, function, education, and overall user experience for the existing portions of the Louisville Loop. The master plan will identify key locations for signs that will orient potential users to various amenities and landmarks around the Louisville Loop. These decisions will set a precedent for how the ensuing sections of the Loop are signed.
- *Jefferson Memorial Forest Master Plan* — this master plan, developed in 2009, was intended to guide future development and improvements at the Jefferson Memorial Forest. The primary goals were to enhance visitor experiences, improve management of natural areas, and increase revenue opportunities. The plan explores ways to strengthen connections with the community, provides conceptual designs for major activity areas, and recommends other park-wide improvements and initiatives. A conceptual image of the adopted master plan can be found in Figure 2.3.

FIGURE 2.2 PROPOSED FAIRDALE ROUNDABOUT

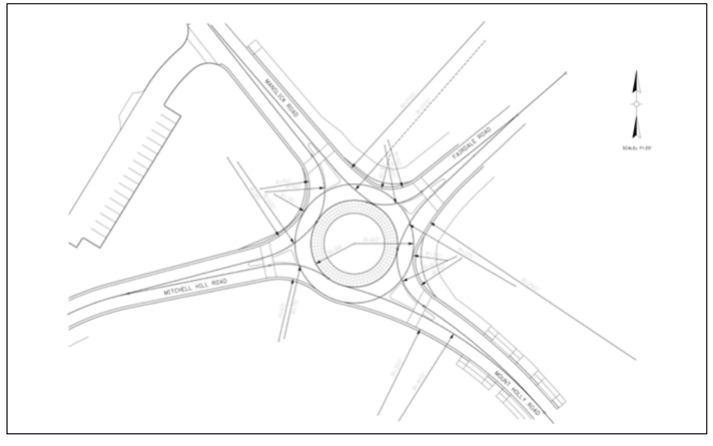


FIGURE 2.3 JEFFERSON MEMORIAL FOREST MASTER PLAN

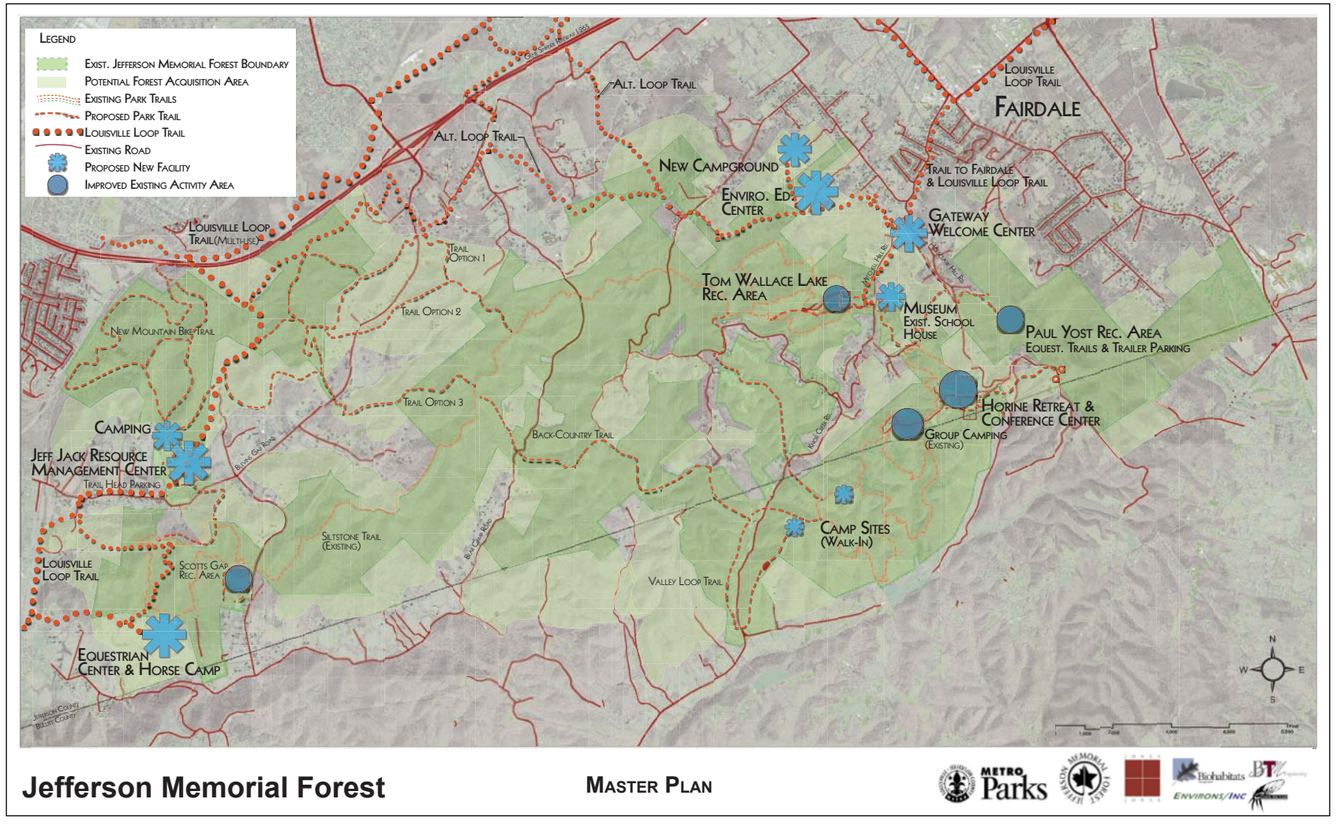


FIGURE 2.4 LOUISVILLE LOOP

2.4 PROJECT GOALS AND OBJECTIVES

The goals and objectives of the Pond Creek Corridor Shared-Use Path and Ecological Restoration Plan are as follows:

- Identify a preferred alignment for the future development of a shared-use path that would eventually become part of the 100-mile Louisville Loop. This alignment would connect to the future extension of the Ohio River Levee Trail at Watson Lane, and would end at National Turnpike and Fairdale Road.
- Identify a preferred alignment for a soft-surface path suitable for equestrian use that would connect the Jefferson Memorial Forest to surrounding equestrian facilities.
- Develop an alignment that maximizes path usership by connecting the corridor's population centers to key destinations, such as schools, parks, and commercial districts.
- Develop an alignment that achieves a proper balance between cost, land acquisition, and environmental sensitivity, user experience.
- Analyze the conditions of Pond Creek and its related tributaries in order to identify potential opportunities for ecological restoration along their courses.
- Incorporate public participation into all stages of the planning process.

This page intensionally left blank.

3.0 Shared-Use Path Planning Process

3.1 PLANNING PROCESS AND METHODOLOGY

3.1.1 KICKOFF MEETING

Upon receipt of the notice to proceed in late August, 2010, a kickoff meeting was held with USACE and Metro Parks staff on September 16, 2010. During this meeting, a background summary of previous work within and surrounding the project corridor was discussed, applicable data was requested, key milestones were determined, and a study area tour was conducted. The study area tour provided a glimpse of the general appearance of the potential shared-use path corridor as well as identified areas to revisit at a later time for closer inspection.

3.1.2 DATA GATHERING AND BASE MAP PREPARATION

Previous planning studies (as detailed in Sections 1.4, 2.2, and 2.3) were gathered and researched to establish a foundation on which to begin this planning. A base map was developed using the Louisville/Jefferson County Information Consortium (LOJIC) database of GIS information. Base map information included aerial photography, topography, floodplains, parcel lines, publicly owned lands, utility easements, and wetlands. These base maps were used to establish an initial familiarity with the site and to identify preliminary shared-use path routes for future study.

3.1.3 PUBLIC MEETING #1: INTRODUCTION AND INFORMATION GATHERING

An initial public meeting was held on October 19th, 2010 at Riverside, the Farnsley Moremen Landing; approximately 40 people attended the meeting. Metro Parks information specialist helped craft meeting plans and press releases (this process was also done for each subsequent public meeting). The meeting was broken into two different sessions—a presentation and an open house. The presentation included information on the Louisville Loop as well project specific information, such as study limits, goals and objectives, and timeline. The open house session provided an opportunity for the public to comment on the proposed corridor and offer feedback on potential routes to consider. Please review the Technical Memo dated 6/22/2012 for presentation materials and public comments from the initial Public Meeting.

3.1.4 FIELD WORK

Fieldwork occurred on two different trips: October 18th through the 20th, 2010, and December 8th through the 10th, 2010. The initial field session examined routes identified in previous studies and routes identified during an initial analysis of existing conditions. Methods of field examination included windshield surveys of routes adjacent to roadways and walking surveys of potential routes inaccessible by vehicle. The second fieldwork session included a reexamination of the viable routes identified in the initial field session as well as the exploration of the new routes suggested at the initial public meeting. Each route was assessed using a predetermined set of criteria, which was then recorded on an evaluation sheet. Evaluation criteria included the following: type of trail (bike lane, off-street, soft-surface), safety, user experience, opportunities, connectivity, ownership, right-of-way, topography, constraints, potential for soft-surface paths, potential for trailhead, and cost considerations. These evaluation sheets were used later to help analyze the viability of each route.

FIGURE 3.1 PUBLIC MEETING #2

3.1.5 DEVELOPMENT OF INITIAL SUB-ROUTES

The first step in the development of the alternative shared-use path alignments was the mapping of 49 sub-routes. These sub-routes are the building blocks of the final pathway alignment; they represent shorter path segments that, when combined, could provide a continuous route from Watson Lane to National Turnpike. The sub-routes are the culmination of fieldwork and analysis; they represent a comprehensive list of the locations within the study that are suitable for shared-use path development. Further discussion of the 49 sub-routes can be found in Section 3.4.1.

3.1.6 PUBLIC MEETING #2: PRESENTATION OF INITIAL SUB SEGMENTS

The second public meeting was held on February 15th, 2011, at Riverside, the Farnsley Moremen Landing; approximately 55 people attended the meeting. The purpose of the meeting was twofold: to educate the public on the pathway planning process and to receive public comment on the likes and dislikes of the 49 sub-routes. The meeting began with a presentation that included a status of the project, a description of the site's opportunities and constraints, and a brief discussion of the 49 sub-routes. An open house session followed the presentation. The open house allowed the public to take a closer look at the opportunities and constraints as well as comment on the initial 49 sub-routes. Four maps showing the various sub-routes were placed on tables around the room; a moderator at each table took public comment on the various 49 sub-routes. Public input from this meeting allowed the planning team to place priority on certain sub-routes and omit the less desirable routes. Please review the Technical Memo dated 6/22/2012 for presentation materials and public comments from the second Public Meeting.

3.1.7 DEVELOPMENT OF THE THREE ALTERNATIVE ALIGNMENTS

Three distinct options for aligning a shared-use path from Watson Lane to National Turnpike were developed based on feedback from the second public meeting, Metro Parks staff input, and sub-route analysis. The alignments were assembled using the best of the 49 sub-routes. The alignments take different approaches to crossing major barriers, such as the Dixie Highway and the Gene Snyder Freeway. Each alignment has positives and negatives, striking different balances between user experience, safety, cost, land acquisition, and environmental sensitivity. An analysis of the three alternatives can be found in Section 3.4.2.

3.1.8 PUBLIC MEETING #3: PRESENTATION OF THE PRELIMINARY ALIGNMENTS

The third and final public meeting was held on October 6th, 2011 at Riverside, the Farnsley Moremen Landing; approximately 20 people attended the meeting. The meeting had a similar format to the previous public meeting, and included a presentation and an open house format. The presentation included a status of the project, a quick review of the opportunities and constraints, and an in depth review of all three alignments. The open house provided an opportunity for the public to comment on the preliminary alignments. Meeting materials included four scroll maps that the public could write notes on, preliminary alignment overview board showing the 3 alignments together with a summary matrix, and a handout that included a project preliminary alignment summary. Final public comment played a significant role in determining the final recommended alignment. Please review the Technical Memo dated 6/22/2012 for presentation materials and public comments from the third public meeting.

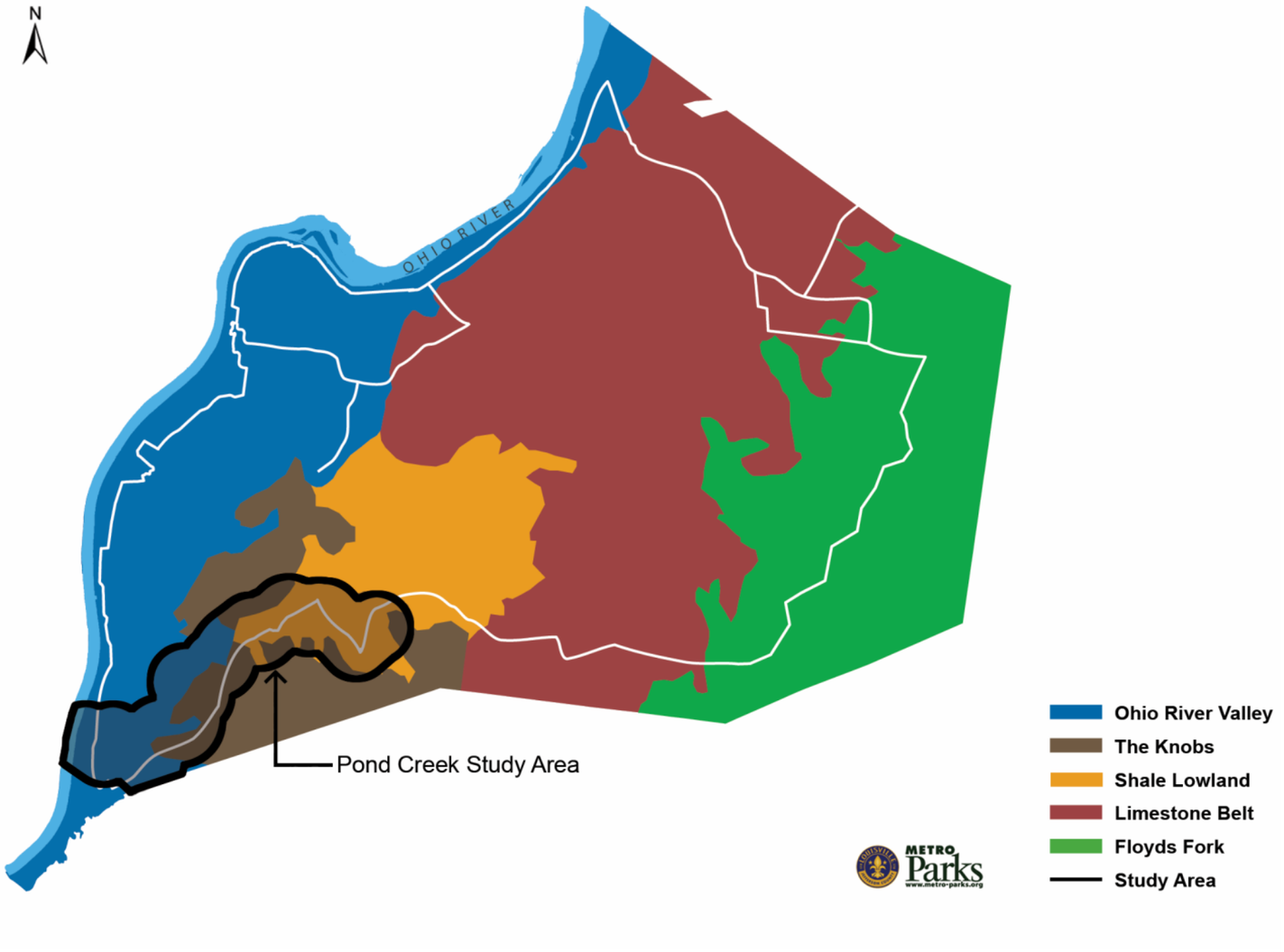
3.2 EXISTING CONDITIONS

The Pond Creek Corridor study area is located within the southwestern corner of Jefferson County. This portion of the county includes a variety of land uses including the Jefferson Memorial Forest, rural horse farms, dense single family subdivisions, industrial properties, and the Fairdale and Dixie Highway commercial districts. The area is both serviced and compartmentalized by several major transportation corridors including the Dixie Highway, the Gene Snyder Freeway, and the P&L and CSX railroad lines. The LG&E power plant anchors the southwest end of the corridor; its tall stack and ever-present steam clouds dominate the southwestern skyline. This varied pattern of land uses provides a dynamic pathway environment that offers excellent opportunities for connectivity.

The natural environment is as equally diverse as the built environment, encompassing three different physiographic regions: the Ohio River Valley, the Shale Lowlands, and the Knobs. The Ohio River Valley is the floodplain of the Ohio River and is characterized by generally flat topography, rich soil, and diverse plant and wildlife. The Shale Lowlands, a region once known as the “wet woods,” is an area where underlying geology has created a region of wetlands, creeks, and generally poor drainage that is prone to flooding. The Knobs region is characterized by extremely steep slopes that emerge dramatically from the surrounding lowlands. Much of the Knobs are forested; they escaped development because of their topographical severity. The Jefferson Memorial Forest is located within the Knobs Physiographic Region. The physiographic regions have been used as an organizational element for the Louisville Loop; shared-use path identity, signage, and methods of way finding change as the pathways enter new physiographic regions. Diversity in the natural environment would enhance path user experience.

The study area’s existing conditions were evaluated and analyzed in order to determine the most appropriate and suitable routes for inclusion in the Louisville Loop. The opportunities and constraints of the pathway corridor have driven the decisions made throughout the planning process. Routes were selected to take advantage of the study area’s opportunities while minimizing exposure to its constraints.

FIGURE 3.2 PHYSIOGRAPHIC REGIONS OF JEFFERSON COUNTY



3.2.1 SITE OPPORTUNITIES

Opportunities include population centers, destinations, available right-of-way/ publicly owned lands, scenic environments, existing crossing points at major roadways, streams, railroads, and the Pond Creek Corridor. Discussion of each opportunity is as follows:

- *Population Centers & Destinations* — the study area includes a good mix of residential neighborhoods, commercial districts, schools, and parks. The project area has significant neighborhoods on the north and south side of the Gene Snyder Freeway. These residential areas would serve as a source of path users; the success of the shared-use path would depend on accessing these population centers. However, tapping into the neighborhoods is not enough; the path alignment must also tie to destination points, giving the residential population incentives to use the path. The path would be both a recreational amenity and a transportation system providing a means for families to bike to a park, children to walk to school, and adults to commute to work. The project area's most significant destinations are shown on Figure 3.8 and listed below:
  - Schools — Watsonville Elementary School, Stonestreet Elementary School, Fairdale Elementary School, South Park TAPP, Frost Middle School and Fairdale High School
  - Parks — Jefferson Memorial Forest, Medora Park, Nelson Hornbeck Park, new park land at former sand quarry.
  - Commercial Districts at Dixie Highway and Fairdale
- *Public Lands* — the use of existing publicly owned lands would reduce the amount of land acquisition from private property owners, thereby saving the project a considerable amount of time and money. Metro Parks' property, public schools, and road right-of-way are the primary publicly held lands available for shared-use path development. Park properties and schools are also excellent trail heads since parking lots already exist in these locations. Utility corridors and land owned by the MSD and Riverport, a quasi-governmental economic development agency may be available for use with appropriate inter-agency agreements.
- *Scenic Landscapes* — the project area is home to some very scenic landscapes, including the Pond Creek corridor, the Jefferson Memorial Forest, ponds/ wetlands, and bucolic horse farms. Path routing should take advantage of these landscapes to provide a varied and scenic user experience. While it is important to route paths through the natural landscapes, care should be taken to avoid negatively impacting these areas.

FIGURE 3.3 POTENTIAL DESTINATION: FAIRDALE HIGH SCHOOL

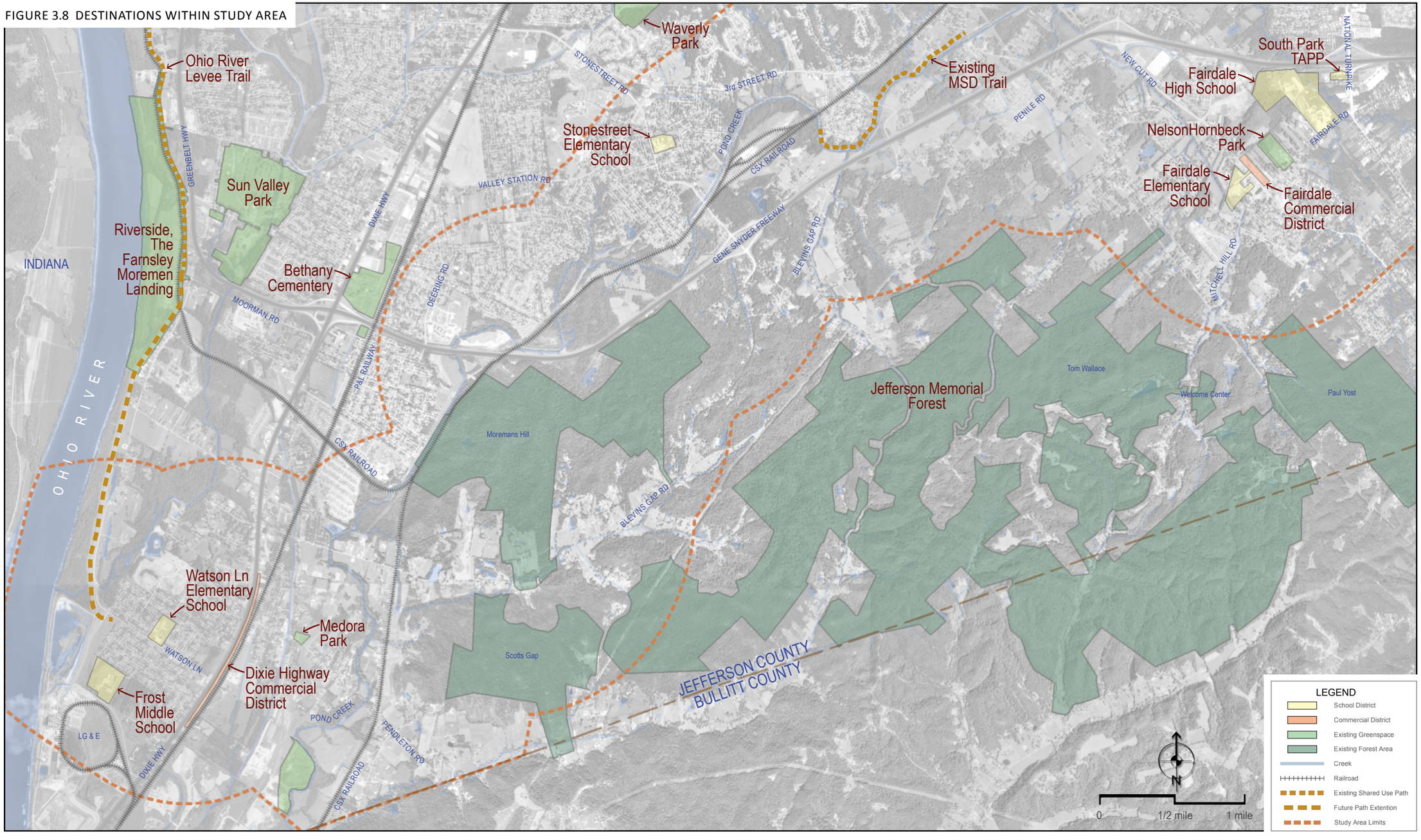
FIGURE 3.4 POTENTIAL DESTINATION: FAIRDALE COMMERCIAL DISTRICT

FIGURE 3.5 POTENTIAL DESTINATION: NELSON HORNBECK PARK

FIGURE 3.6 OPPORTUNITY: SCENIC FARM LAND

FIGURE 3.7 OPPORTUNITY: RESIDENTIAL NEIGHBORHOOD

FIGURE 3.8 DESTINATIONS WITHIN STUDY AREA



- *Jefferson Memorial Forest* — the Jefferson Memorial Forest is perhaps the corridor's greatest opportunity. It is the largest urban forest in the US, covering 6,218 acres. The Forest is managed by Metro Parks and includes a welcome center (on Mitchell Hill Road), the Tom Wallace Recreation Area (large lake, picnicking, and camping), the Horine Center (conference space, environmental education, and campgrounds), the Paul Yost Recreation Area (equestrian trails and picnicking), horse trails, 35 miles of hiking trails, and thousands of acres of preserved forested wilderness. A Forest Master Plan, completed in 2009, provides recommendations for renovations and expansion of facilities, including a new campground, resource management center, environmental education facility, and equestrian center. The Jefferson Memorial Forest provides the following opportunities: it contains some of the most scenic land in Louisville, it is publicly owned land that could be available for trail alignment, and it is a major destination that would attract a significant number of trail users. Most of the land within the forest is located within the Knobs Physiographic Region, so the terrain is extremely steep. Fortunately, there are areas along the forest's perimeter (including the property on Blevins Gap Road that is planned to be the Jeff Jack Resource Management Center) where topography is less steep and therefore more suitable for shared-use path development.
- *Pond Creek Corridor* — the Pond Creek corridor provides a scenic, linear corridor for pathway alignment. The corridor was evaluated for physical and ecological functions and potential restoration concepts. The restoration concepts presented here would provide opportunities for flood risk reduction, water quality improvements, and in-channel and riparian habitat. Combining a shared-use path system and stream restoration into one project would improve funding opportunities and share costs for land acquisition, and the resulting project would provide recreational, ecological, and flood risk benefits. In addition, Pond Creek, from the Northern Ditch Cutoff downstream prior to the flood gates at the Ohio River presents an opportunity for the development of a water trail along Pond Creek. With properly positioned ingress and egress access points, Pond Creek is usable by flat boat, canoe, or kayak. The implementation of a water trail would provide for an entirely different user experience, meet a different recreation need, and provide a means to connect the community to Pond Creek. A detailed evaluation of potential barriers to a water trail would need to be performed to assure safe passage.
- *Cultural Resources* — cultural resources, such as historic architecture can provide an opportunity to enhance educational opportunities and community connection to the location. Identifying these locations could increase pathway user experience. However, care must also be taken to not disturb the integrity of a cultural resource.
- *Public Transit* — public transit is an important corridor asset that could be utilized to increase ridership of the shared-use path. Path users can use the path system, in conjunction with public transit to have greater mobility within the community. In 2010, the Transit Authority of River City (TARC) was recently awarded a federal grant to designate a temporary "Discover the Loop" bus route that provided access to various points along the Loop. The busses were equipped to hold 6 bicycles, and were branded with the Discover the Loop logos. Although this was a temporary service, it could become permanent as the Loop continues to develop.

FIGURE 3.9 SITE OPPORTUNITY: JEFFERSON MEMORIAL FOREST

FIGURE 3.10 SITE OPPORTUNITY: POND CREEK CORRIDOR

FIGURE 3.11 SITE OPPORTUNITY: PUBLIC TRANSIT

- *Existing Crossings* — the crossing of major roadways and railroads is one of the project's greatest routing challenges. Existing grade-separated or signalized crossing locations typically provide the best opportunity for overcoming these barriers and will be the most influential factor in determining routing options. Existing crossing locations are inexpensive alternatives to new bridges, tunnels, or signalized intersections. Regulatory permission may also be easier to obtain at existing crossing locations. Some of these crossings would have to undergo upgrades or improvements in order to make them adequate for pathway use. The following is a list of the key existing crossing locations. The project area's existing crossings of major roads and railroads shown in Figure 3.16 and are listed below :
  - Gene Snyder Freeway
    - Underpass used by CSX Railroad, East of Deering Road
    - Corrugated Steel Tunnel to Former Sand Quarry
    - Watsonville Underpass
    - Greyling Overpass
    - Manslick Overpass
  - Dixie Highway
    - Watson lane
    - Pendleton Road
  - P&L Railway
    - Richie Lane
    - Lewis Lane
    - Private Drive north of Watson Lane
    - Pendleton Road
  - CSX Railroad
    - Pendleton Road
    - Blevins Gap Road
    - Below trestle at Pond Creek east of Autumn Lake
    - Below trestle at former sand quarry
    - Stonestreet Road
    - Lamborne Boulevard

FIGURE 3.12 CROSSING OPPORTUNITY: TUNNEL BELOW GENE SNYDER FWY

FIGURE 3.13 CROSSING OPPORTUNITY: P&L RAILROAD AT PENDLETON RD

FIGURE 3.14 CROSSING OPPORTUNITY: DIXIE HWY AT WATSON LN

FIGURE 3.15 CROSSING OPPORTUNITY: CSX RAILROAD AT STONESTREET RD

FIGURE 3.16 CROSSING LOCATIONS WITHIN STUDY AREA

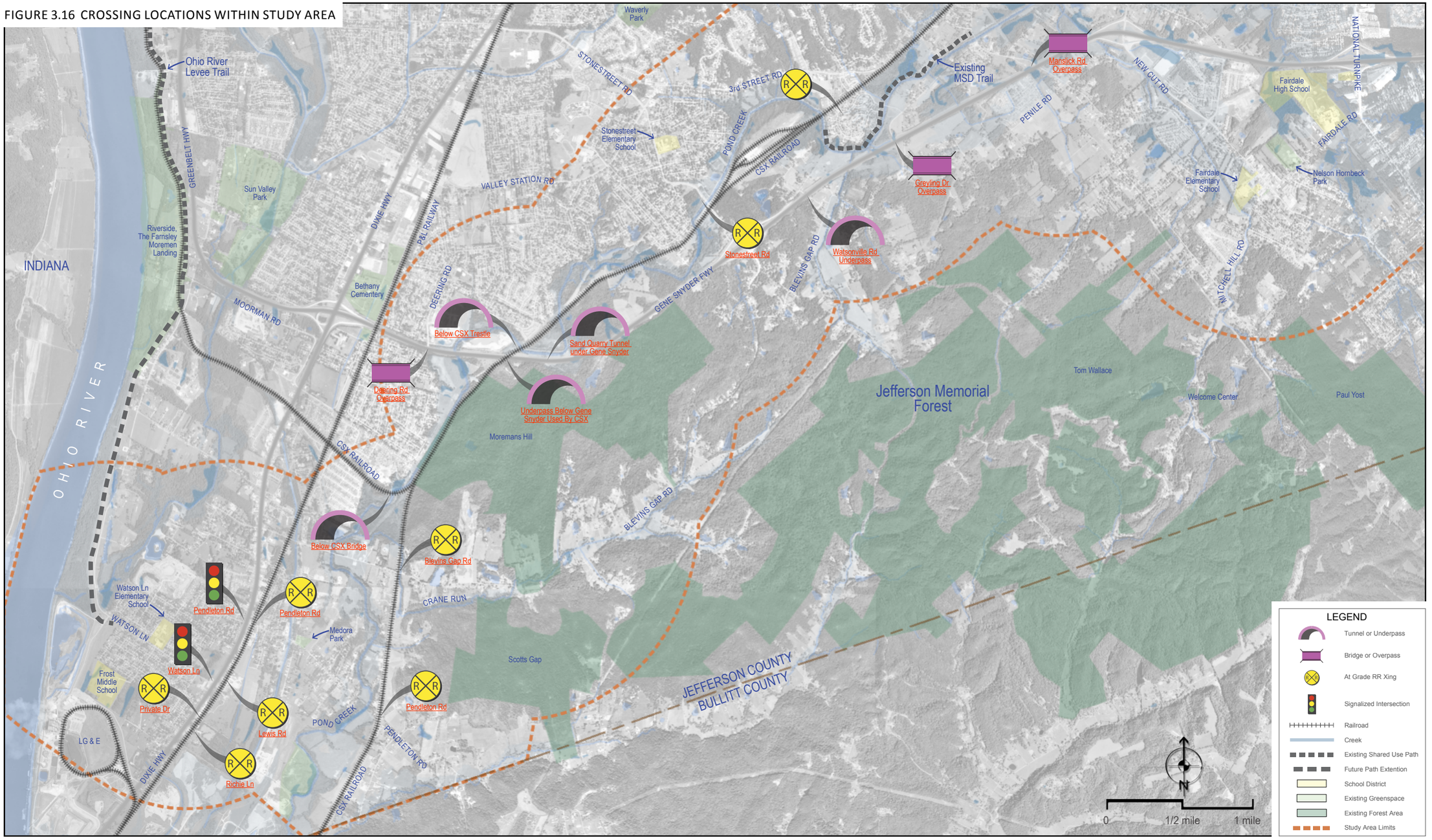


FIGURE 3.17 BARRIER TO PATH CIRCULATION: DIXIE HIGHWAY

FIGURE 3.18 BARRIER TO PATH CIRCULATION: CSX RAILROAD CORRIDOR

FIGURE 3.19 BARRIER TO PATH CIRCULATION: GENE SNYDER FWY

FIGURE 3.20 POTENTIAL UTILITY CONFLICTS

3.2.2 SITE CONSTRAINTS

Constraints include barriers to pathway circulation (roadway, railroads, and waterways), driveway crossings, utility conflicts, limited right-of-way, steep topography, wetlands, and flood zones:

- *Barriers to path circulation* — the primary challenge of this project is finding safe inexpensive crossings of the major roadways and railroads that bisect the site. These major transportation corridors have fueled the area's growth but have also created barriers that isolate neighborhoods and encourage automobile dependence. Major roadways include the Gene Snyder Freeway, Dixie Highway, and, to a lesser extent, Stonestreet Road and New Cut Road. The Gene Snyder Freeway is a 4-lane, limited-access, high-speed state highway. Currently, the only way to cross this highway is to either cross over the top (via pedestrian bridge or overpass) or to cross under (via tunnel or underpass). The Dixie Highway is a 4 lane, 50 mph state route that is also an imposing barrier to pathway flow. Several signalized crossings of the Dixie Highway exist within the study area. Ideally, a grade-separated crossing would be provided to cross this type of roadway; however, the feasibility of this is limited due to cost, narrow right of way, and lack of topographic advantages. Stonestreet Road (a minor arterial roadway) and New Cut Road (a primary collector roadway) are two-lane roadways with significant traffic (average daily traffic is 18,300 vehicles for Stonestreet Road and 11,400 vehicles for New Cut Road). Crossing these roads would require new traffic signals.

  Two different railroad corridors (the P&L Railroad and CSX Railroad) fall within the study area and, depending on alignment options, may be crossed multiple times. P&L and CSX are private companies that tightly control their right of way. Shared-use paths are generally not allowed to cross into railroad right-of-way unless they cross perpendicularly at existing crossings. The process for initiating a new crossing is a long, arduous, expensive task that is best avoided when possible; the use of existing crossing locations eases the process. Paths running parallel to, and within, the right of way of active rail corridors are rarely permitted by the private railroad companies.

  Residential and commercial driveways are significant safety concerns due to the increased risk for pedestrian and automobile conflicts. Automobiles turning into or backing out of driveways often do not see fast moving bicycles. Pathway sections that are adjacent to roadways within dense residential neighborhoods encounter this issue. Several roadways within the project area have limited pathway route potential due to an abundance of driveways.

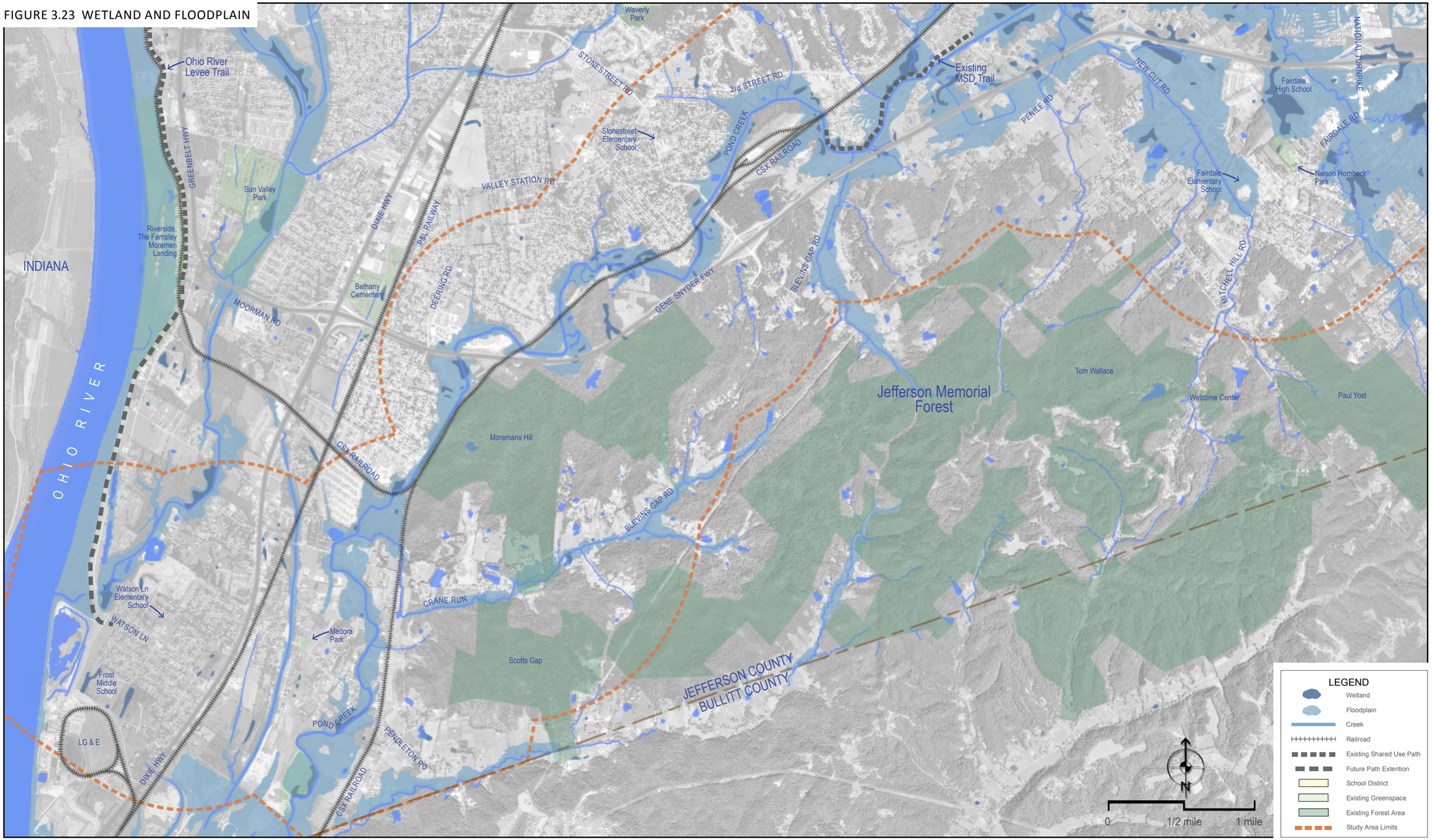
- *Utilities* — utility infrastructure, particularly utility poles, located within road right-of-way are potential conflicts for path routing. Typically, utilities are located along one side of the roadway; poles can therefore often be avoided by using the opposite side of the road. Some road corridors, such as Watson Lane, have wide enough right-of-ways to accommodate shared-use paths and existing poles. If existing utilities cannot be avoided, relocations of these utilities would be necessary; the relocation of utilities is an expensive and time consuming process.

- *Land Ownership* — public lands, such as parks, schools, and road right-of-way, should be used as much as possible; however, the acquisition of private land is necessary to connect Watson Lane to National Turnpike with a shared-use path. Louisville Metro's preferred approach is to acquire necessary land from willing land owners. In order to minimize impacts to private properties, routes would be placed at the edges of properties or along interfaces with roads, streams, and railroad corridors.
- *Topography* — areas with steep topography are not suitable for shared-use paths. The ADA and the American Association of State Highway and Transportation Officials both have guidelines that place restrictions on the maximum longitudinal and cross slopes of trails. For the purposes of this study, a 5% maximum running slope was targeted to meet the most stringent ADA guidelines. Fortunately, the topography within the study area is generally flat; however, many areas within the Jefferson Memorial Forest (the Knob Physiographic Region) can be very steep, with slopes exceeding a 65% gradient. A 5% route may be achievable in these areas but at considerable construction costs and disturbance to the natural environment.
- *Wetlands* — wetlands can be considered both an opportunity and a constraint for pathway planning. They are typically very scenic areas that rank high among user experience and offer potential for environmental education. However, they are also specialized ecosystems that are sensitive to disturbance, and they are heavily regulated by the USACE. Boardwalks are the standard means for traversing wetlands; they can be elevated above the flood zone and can be constructed with minimal disturbance. Unfortunately, boardwalks are quite costly. Pathway routing through wetland areas does not need to be avoided but should be done carefully and deliberately to maximize user experience and minimize disturbance. See Figure 2.3 for wetland locations.
- *Flood Zones* — pathway alignments within flood zones can have significant maintenance issues: flood waters may periodically inundate the path and deposit mud and debris on the pathway surfaces or, in extreme situations, may completely wash away the pavement. Flood zones are heavily regulated by both local and Federal agencies, which restrict quantities of fill material and the types of structures that can be placed within the floodplains and floodways. Careful planning and design can satisfy the regulatory hurdles and minimize the impacts of flooding by setting the pathway elevation at the appropriate level (in relation to the flood elevations) and by establishing adequate setbacks from the stream itself. Stream corridors can make excellent routes for shared-use paths when flood zones are taken into account during the design process. See Figure 2.3 for floodplain locations.

FIGURE 3.21 PRIVATE PROPERTY ADJACENT TO POND CREEK

FIGURE 3.22 WETLANDS WITHIN STUDY AREA

FIGURE 3.23 WETLAND AND FLOODPLAIN



This page intensionally left blank.

3.3 TYPICAL SECTIONS

The following typical sections are snapshots of the various shared-use path conditions that would occur within the study area. Ten different typical sections would occur: path adjacent to road, path within commercial zone, sharrow (road with special shared bike/automobile lane pavement markings) with an adjacent sidewalk, path adjacent to the Gene Snyder Freeway, path within forest, path within field, path adjacent to creek, path within wet areas, path adjacent to railroad, and soft-surface path. These sections illustrate the typical character of the shared-use path by showing context/setting, path width, buffer zones, and offsets. The typical sections in this Plan are based on the typical sections in the *Louisville Loop Design Guidelines*. A written summary of the advantages and disadvantages of each pathway section accompanies each graphic. Please note that these typical sections are keyed into the individual segment maps (in the following chapter) using the following symbology:

(Refers to typical section A)

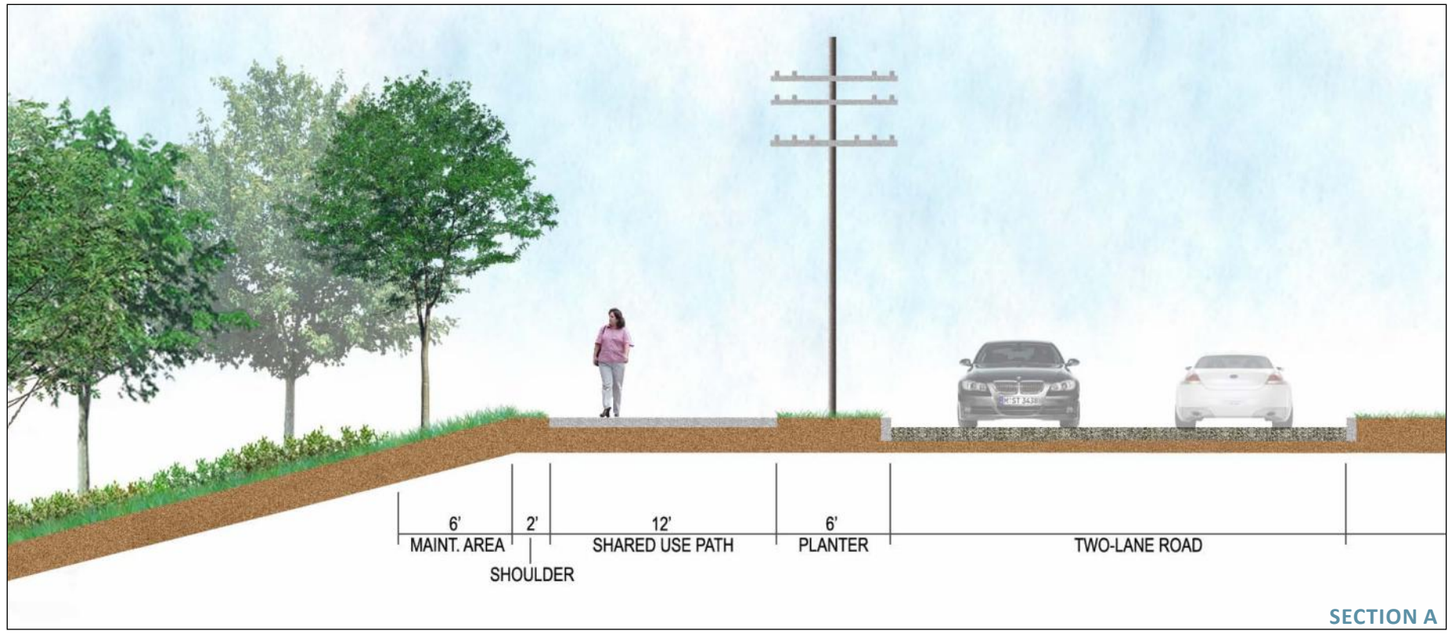
SECTION A: PATH ADJACENT TO ROAD

ADVANTAGES

- The use of available right-of-way minimizes the need for land acquisition; roadways provide direct routes to population and commercial centers; pathways along roadways are highly visible, which minimizes security concerns.

DISADVANTAGES

- Conflicts with driveways create safety issues; utilities within right-of-ways create potential conflicts; the path user's experience along roadways is typically poor due to noise, safety, and lack of scenery.



SECTION A

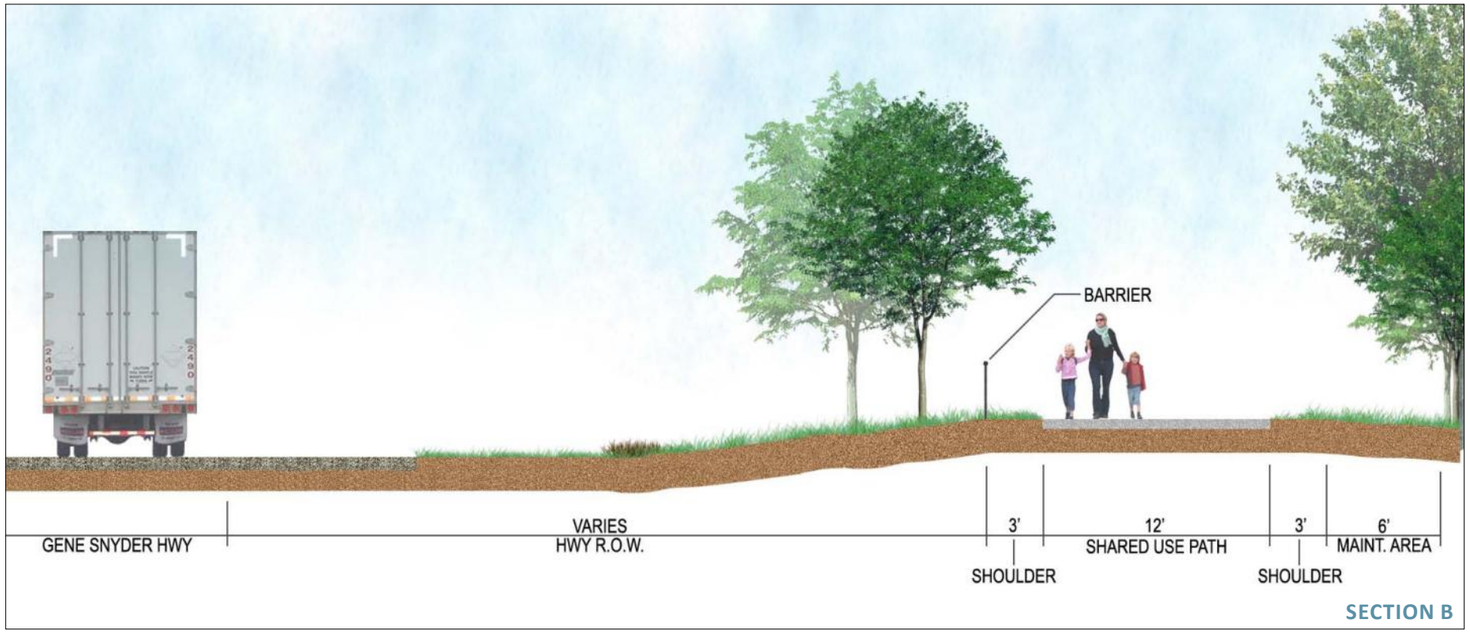
SECTION B: PATH ADJACENT TO GENE SNYDER FREEWAY

ADVANTAGES

- Land adjacent to freeways is often easier to acquire- the addition of a narrow shared-use path corridor along a property edge already compromised by the freeway, is not typically viewed as a negative impact to the character and value of the property (unless the property is small).
- Driveway and cross street conflicts are minimal along the Gene Snyder Freeway.

DISADVANTAGES

- Pathway user experience is poor due to lack of scenery and noise.
- Significant separation/barriers are required from travel lanes.
- It is more likely that private land acquisition will be required because the use of the freeway right of way itself is less desirable due to proximity to the travel lanes and the burden of additional permitting requirements associated with its use.



SECTION B

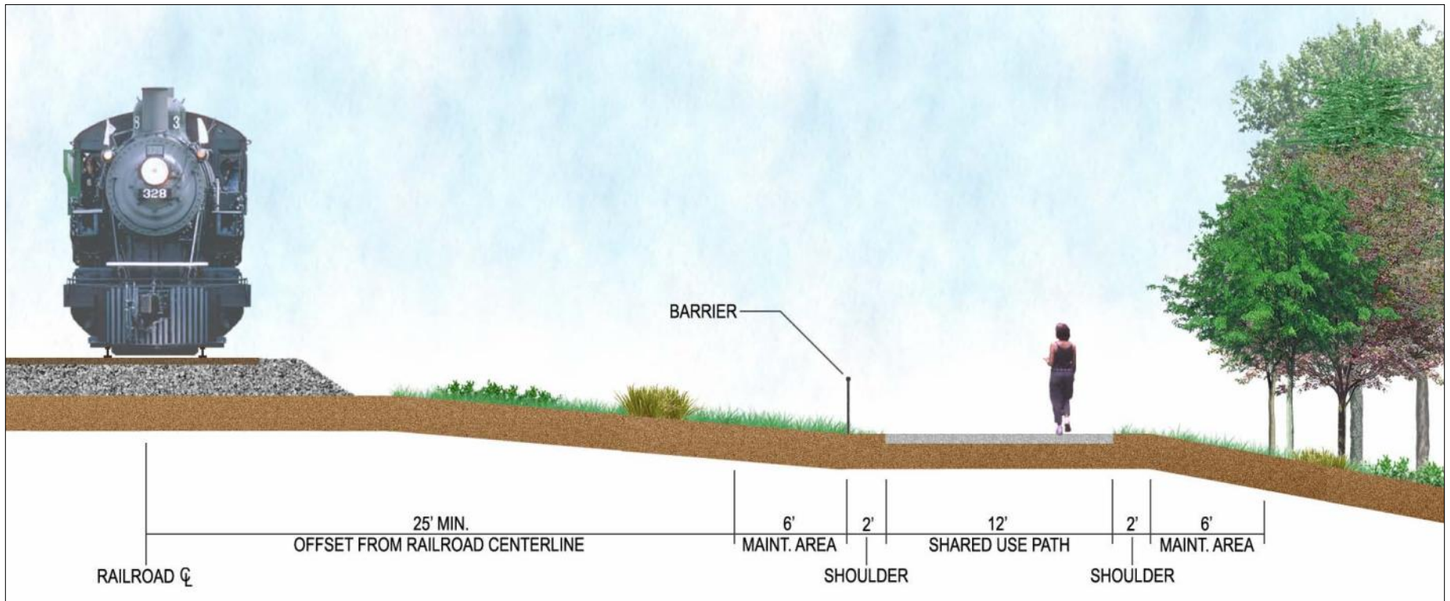
SECTION C: PATH ADJACENT TO RAILROAD

ADVANTAGES

- Railroad corridors provide cleared, typically flat, routes that require minimal disturbance for construction.
- Private land along railroad is often less valuable to property owners and therefore easier to acquire.
- Driveway and cross street conflicts are limited along the railroad right-of-way.

DISADVANTAGES

- Significant separation/barriers are required between the path and the track.
- The use of active railroad right-of-way for a path corridor is often not allowed by private railroad companies, so private land acquisition is probable.



SECTION C

SECTION D: PATH WITHIN FOREST

ADVANTAGES

- Pathway user experience is high due to scenery.
- The undeveloped forest has minimal vehicular and utility conflicts.

DISADVANTAGES

- There is steep topography (particularly in the Jefferson Memorial Forest).
- Pathway construction may cause disturbance to environmentally sensitive areas.
- Forested properties are often isolated from population centers.

SECTION D

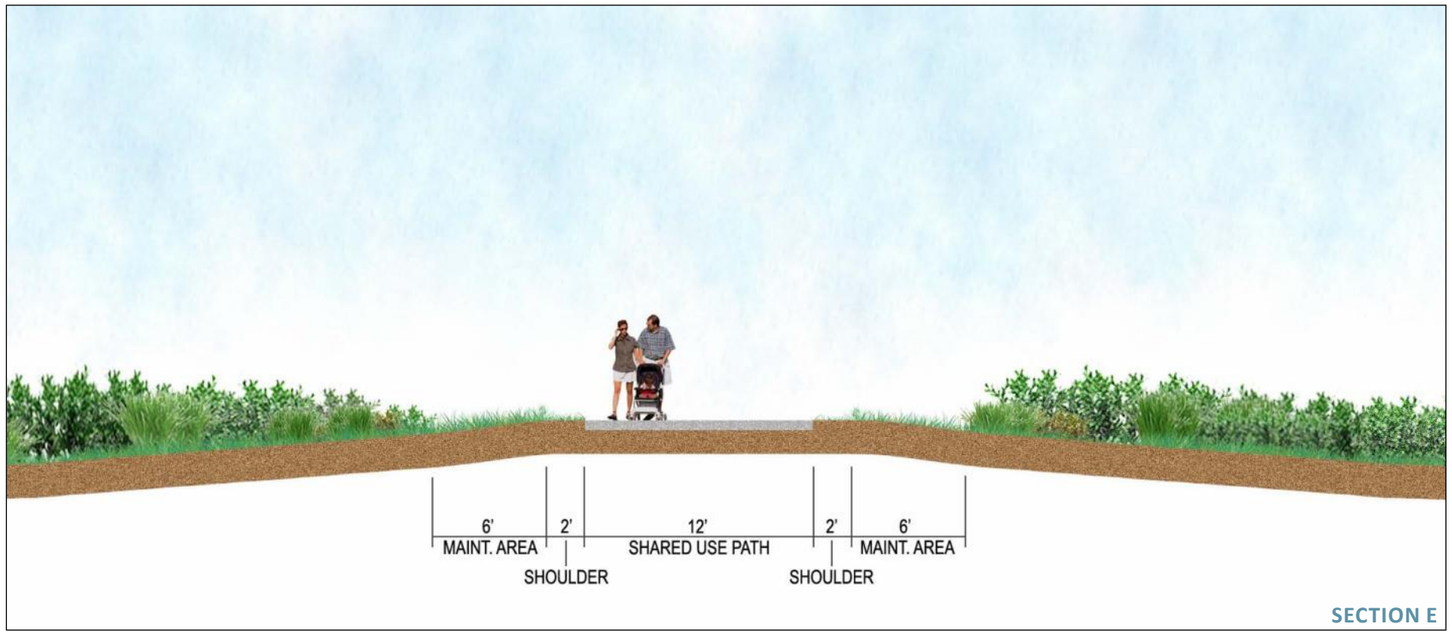
SECTION E: PATH WITHIN FIELD

ADVANTAGES

- Pathway user experience is high due to scenic open fields.
- Undeveloped fields have minimal vehicular and utility conflicts.
- Pathway construction within open fields causes minimal landscape disturbance.

DISADVANTAGES

- Open fields are often isolated from population centers.
- The lack of shade creates hot pathway experience during summer months, although the addition of tree plantings could help to reduce temperatures along the path.



SECTION E

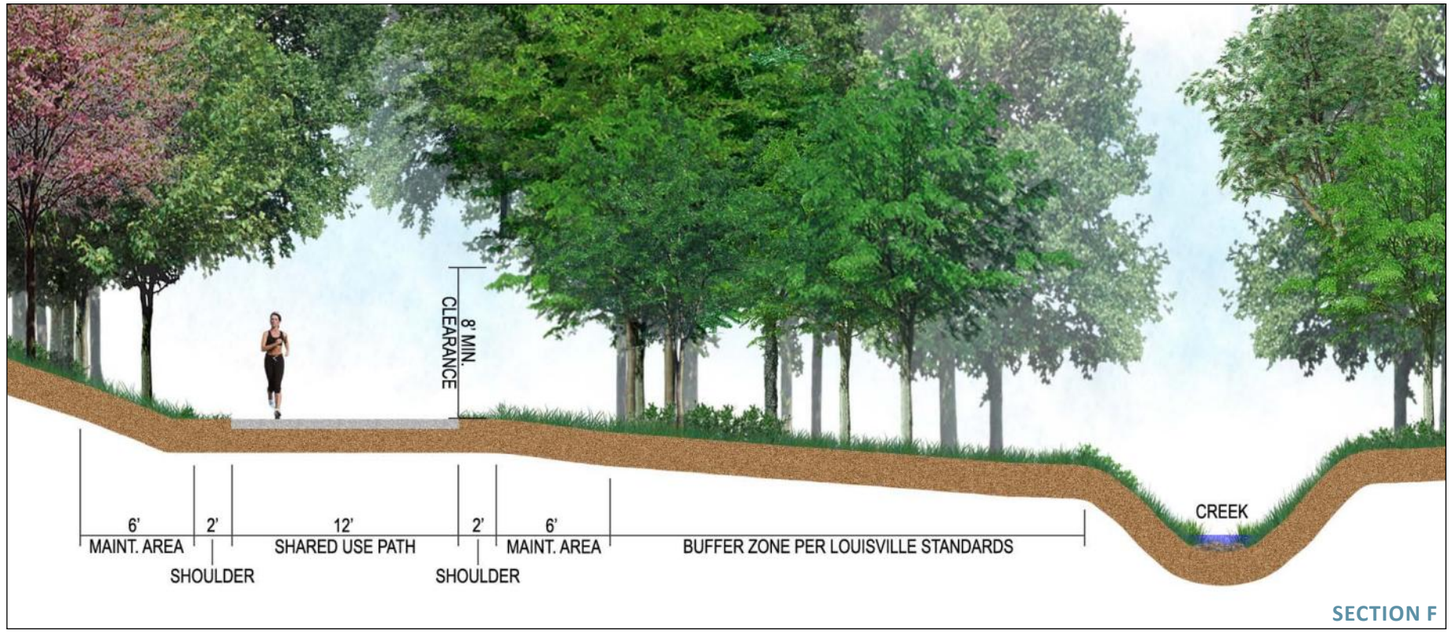
SECTION F: PATH ADJACENT TO CREEK

ADVANTAGES

- Pathway user experience is high due to scenic creek corridor.
- Riparian zones offer opportunities for environmental education.
- Creek corridors have minimal vehicular and utility conflicts.

DISADVANTAGES

- Flood zones within creek corridors create potential maintenance issues.
- Pathway construction may cause disturbance to environmentally sensitive areas.



SECTION F

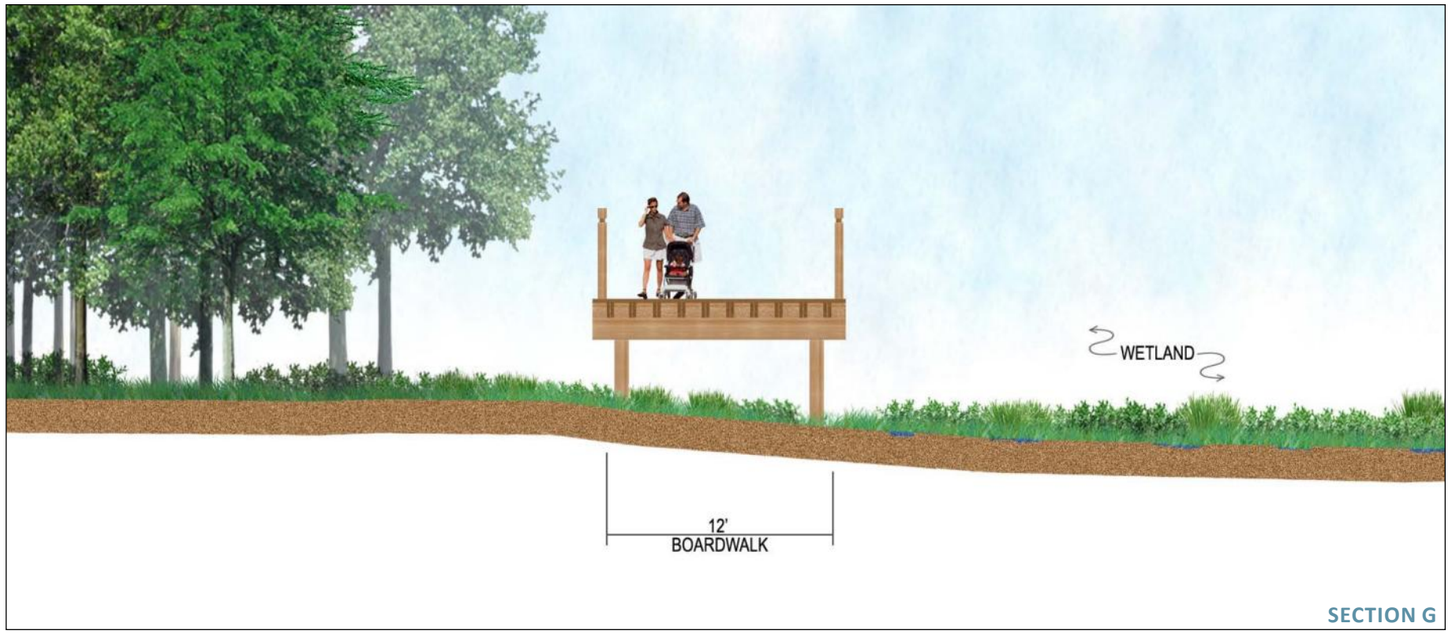
SECTION G: PATH WITHIN WET AREA

ADVANTAGES

- Pathway user experience is high due to scenic wetland landscape.
- Wetlands offer opportunities for environmental education.
- Wetland areas are undeveloped and have minimal vehicular and utility conflicts.

DISADVANTAGES

- Flooding is common within wetland areas and may pose potential maintenance issues.
- Pathway construction within wetlands is expensive, highly regulated, and may cause disturbance to environmentally sensitive areas.



SECTION G

SECTION H: SHARROW WITH ADJACENT SIDEWALK

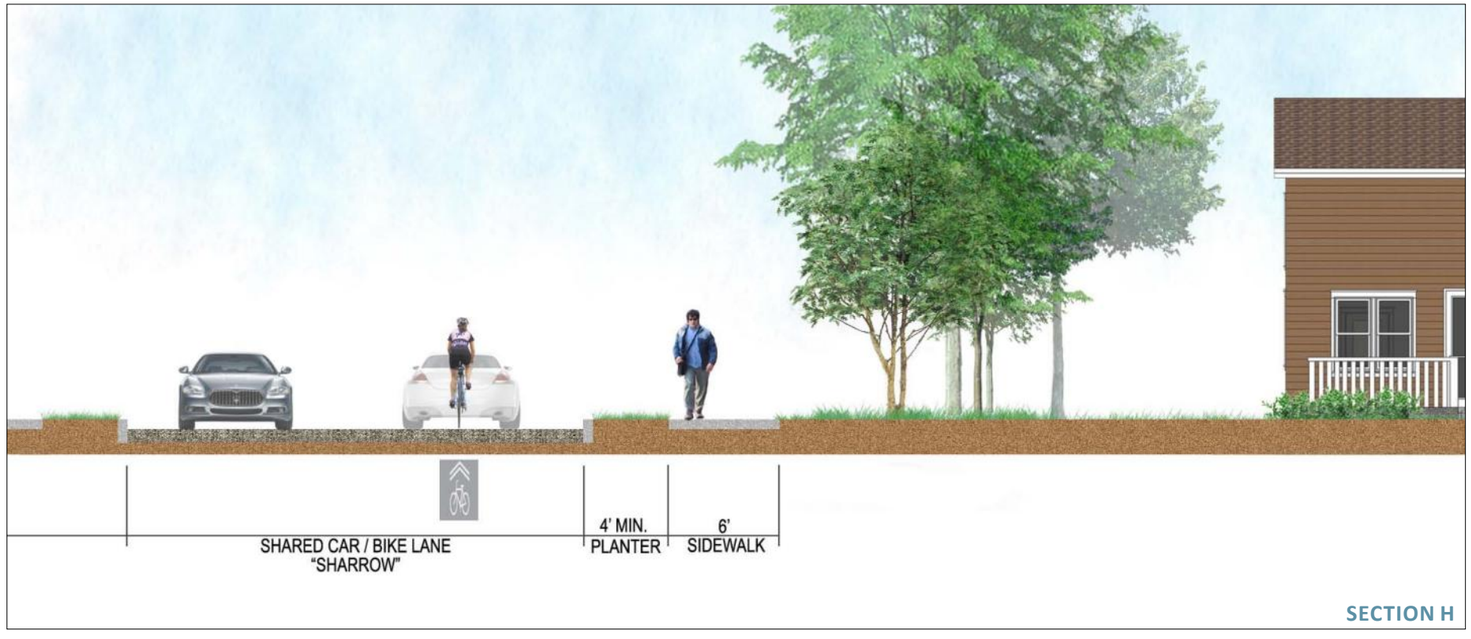
ADVANTAGES

- Sharrows require minimal construction costs and property acquisition.

DISADVANTAGES

- A shared automobile and bicycle lane creates potential safety conflicts between automobiles and bicyclists.
- Pathway user experience is poor due to limited scenery and safety concerns.
- Sharrows are limited to roadways with low traffic volumes.

Sharrow pavement markings are placed on the road, and are used as a reminder to motorists to share the road with cyclists.



SECTION H

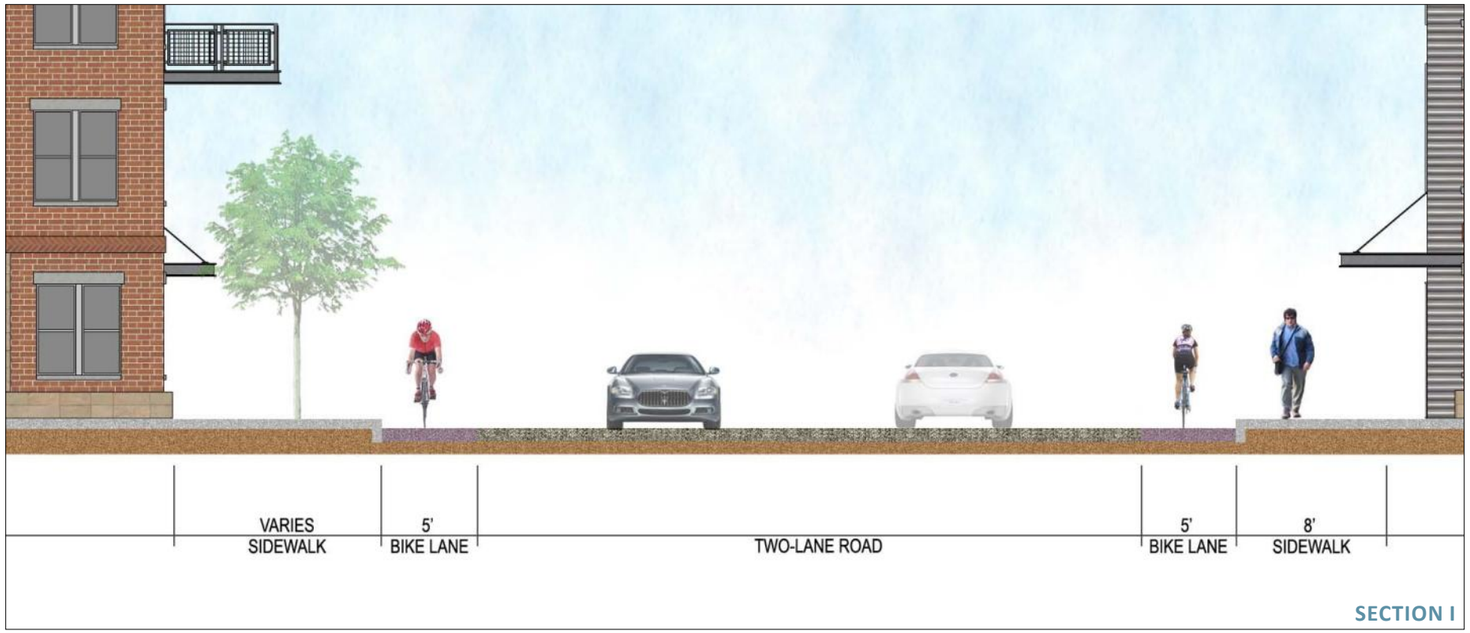
SECTION I: PATH WITHIN COMMERCIAL DISTRICT (BIKE LANE)

ADVANTAGES

- Commercial zones are potential destinations for pathway users
- Pathways within commercial zones spur economic development
- Bike lanes are an inexpensive means of providing separation between cyclists and automobiles
- Bike lanes require less space than cycle tracks

DISADVANTAGES

- Conflicts with commercial driveways create safety issues
- Land acquisition costs are higher in commercial zones
- High pedestrian activity within commercial zones requires physical separation of cyclists from pedestrians
- Utilities within right-of-ways create potential conflicts
- Bike lanes provide a low level of bicycle/automobile separation
- Bike lanes must be on both sides of roadway, which causes one bike lane to be on a different side of the road than the shared-use path .



SECTION I

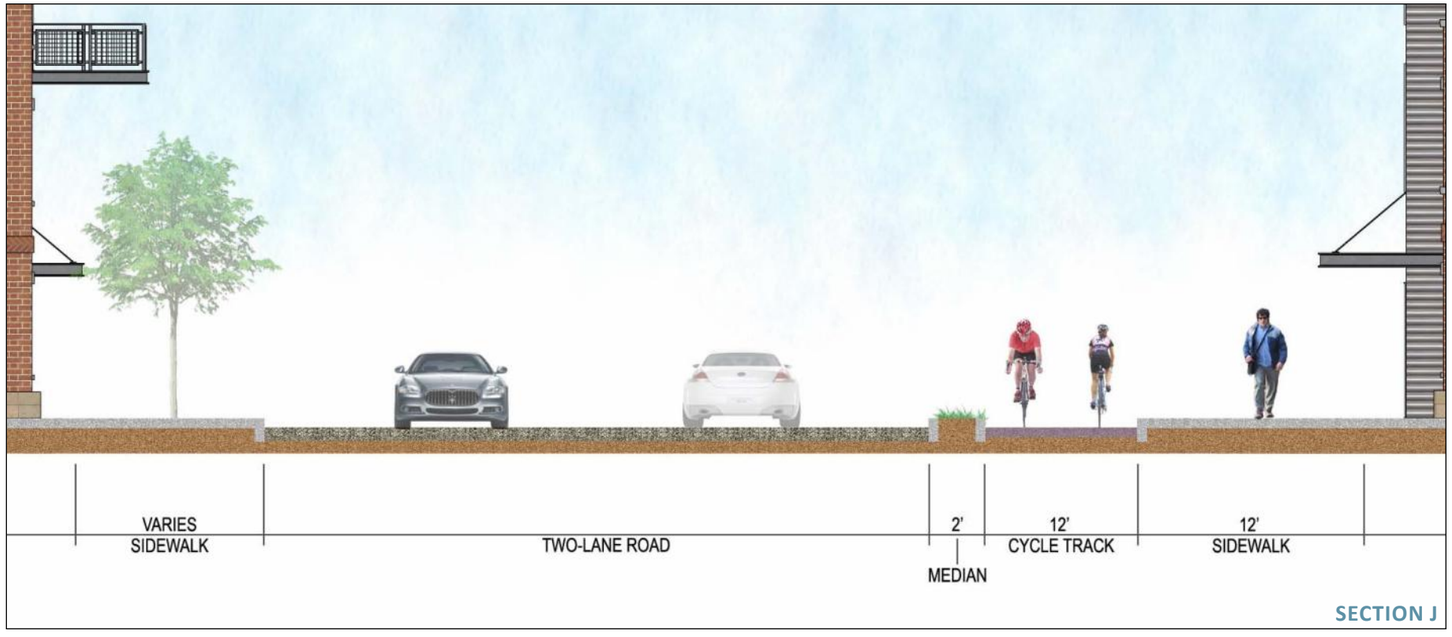
SECTION J: PATH WITHIN COMMERCIAL DISTRICT (2 WAY CYCLE TRACK)

ADVANTAGES

- Commercial zones are potential destinations for pathway users
- Pathways within commercial zones spur economic development
- Cycle tracks provide physical separation between automobile traffic and bike traffic which is safer than a bike lane, and therefore encourage more bike use
- 2 way cycle tracks can be on same side of road as pedestrian trail
- Cycle tracks are most appropriate in locations with long blocks, few side streets, and few driveways.

DISADVANTAGES

- Conflicts with commercial driveways create safety issues
- Land acquisition costs are higher in commercial zones
- High pedestrian activity within commercial zones requires physical separation of cyclists from pedestrians
- Utilities within right-of-ways create potential conflicts
- Cycle tracks are expensive to construct
- Cycle tracks require more right of way than bike lanes
- 2 way cycle tracks require special signalization at intersections



SECTION J

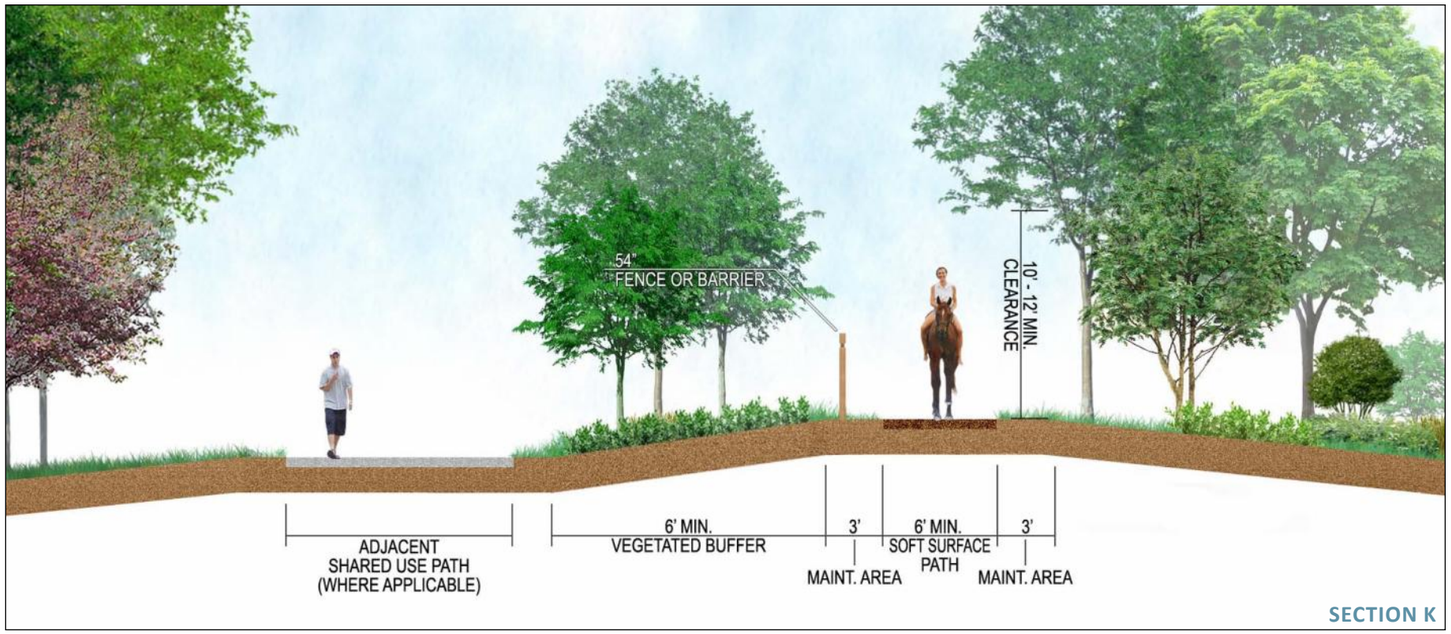
SECTION K: SOFT-SURFACE PATH

ADVANTAGES

- Soft-surface path construction is inexpensive and minimally invasive.
- Soft-surface paths are easier to install in areas with steeper topography because path widths are narrower and grades over 5% are allowable.

DISADVANTAGES

- The soft path surface limits potential use — it cannot be used by cyclists using road bikes, rollerbladers, or people with disabilities.
- Soft-surface paths require increased maintenance to combat erosion and maintain surfacing.



SECTION K

3.4 DEVELOPMENT OF SHARED-USE PATH ALIGNMENTS

3.4.1 INITIAL SUB-ROUTE DEVELOPMENT

The original limits of the shared-use path alignment study included a 2-mile corridor centered on the Metro Parks preferred route identified in the *2008 Pond Creek and Mill Creek Recreational Concept Plan*. In order to accommodate several potential routing options, the original 2-mile buffer study area was slightly expanded to capture the Jefferson Memorial Forest. During the initial stages of the route development process, the study area was broken into four zones so the corridor could be analyzed in detail. The four zones are as follows:

- Zone 1 — Watson Lane to Blevins Gap Road
- Zone 2 — Blevins Gap Road to Stonestreet Road
- Zone 3 — Stonestreet Road to Penile Road/Blevins Gap Road (eastern side of Blevins Gap Road)
- Zone 4 — Fairdale Road to National Turnpike

Within each of these zones, sub-routes of varying length (ranging from 700 feet to 4.74 miles) were developed to connect intermediate destinations within each zone. For example, five different sub-routes were developed to get from the proposed trail head at Watson Lane to different Dixie Highway crossing points. A total of 49 sub-routes were identified in the study area. These 49 sub-routes would be the building blocks of the final alignment; they would be combined in different ways to create a complete alignment from Watson Lane to National Turnpike.

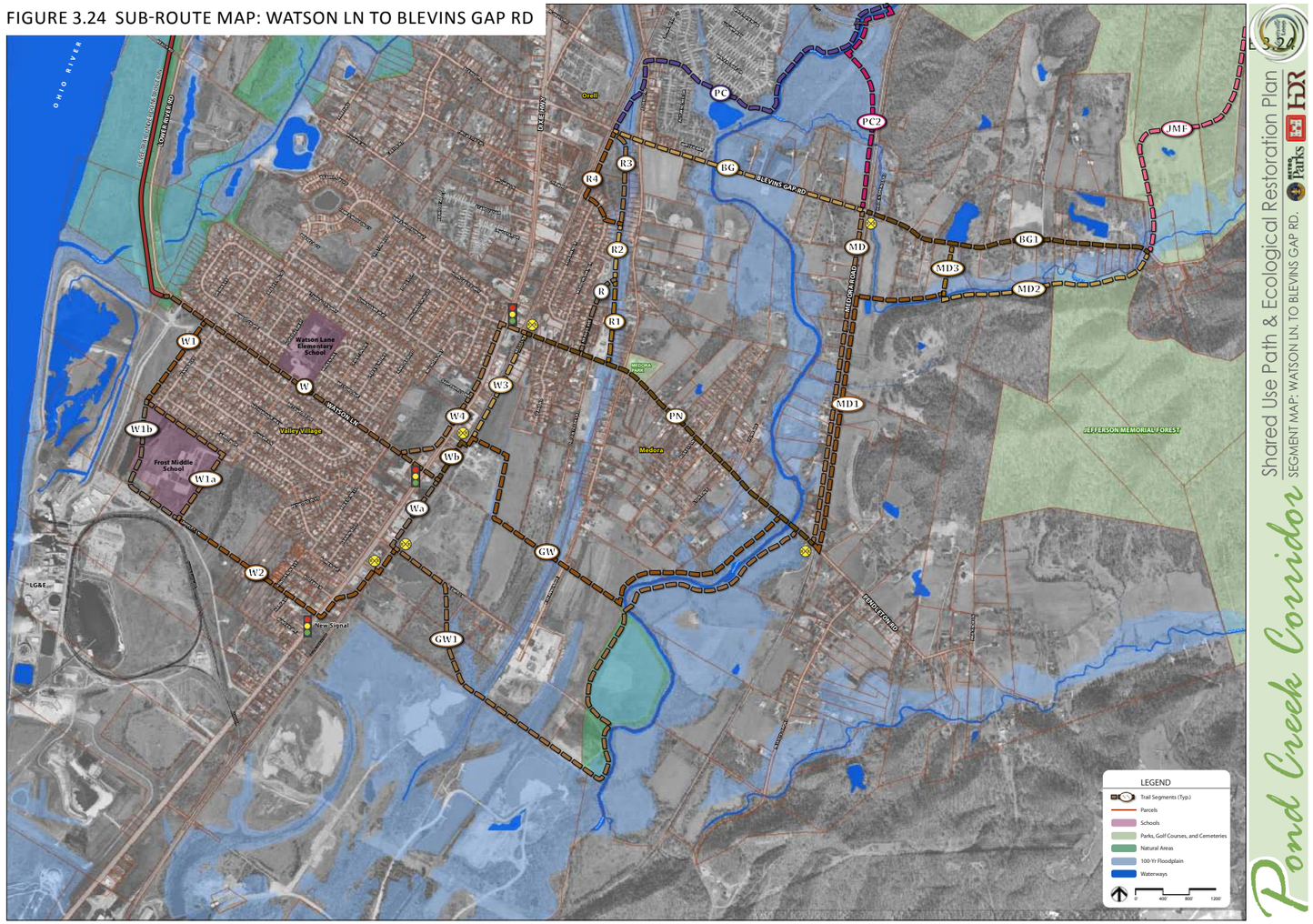
Potential sub-routes were identified using a combination of the following: information presented in previous studies, consultation with Metro Parks, suggestions made at the initial public meeting, analysis of aerial photography and GIS information, and consultation with the Louisville Bike Club. Once the potential sub-routes were identified, they were analyzed and field checked to determine their path route potential. Several segments were eliminated during the analysis process: Keys Ferry Road, Bearcamp Road, Scotts Gap Road, Third Street Road, Valley Station Road, Stonestreet Road, and Deering Road. Below is a description of the criteria used in the analysis of each routing option:

- Type of path system most appropriate for the corridor, be it a bike lane, sharrow, off-street path, or soft-surface path for equestrians.
- Safety issues, including the number of traffic lanes, the posted speed limit, and average daily traffic counts (ADT) for a potential roadway segment.
- User Experience, including scenic views, noise issues, and generally whether it would be an enjoyable segment to traverse.
- Cost considerations, including potential costly engineering issues like relocating utility poles, changing the storm drainage features, addition of traffic signals, intersection reconstruction, or the need for new bridges.
- Opportunities as described in the Existing Conditions Section: connectivity, available right-of-way, and barrier crossing locations.
- Constraints as described in the Existing Conditions Sections: Barriers to path circulation, utilities, land ownership, topography, wetlands, and flood zones.

The analysis developed at the sub-route level has been incorporated into the analysis of the three alternative alignments, which is described in detail in Section 3.4.2.

Four maps were developed for the second public meeting to illustrate the 49 sub-routes (see Figure 3.24 for an example). Each of the four maps represented a study area zone. The sub-route names related to a distinguishing characteristic of the route, for example the "W" routes related to Watson Lane. The four sub-route maps can be found in the Public Meeting #2 section of the Technical Memo regarding public meeting materials dated 6/22/2012.

FIGURE 3.24 SUB-ROUTE MAP: WATSON LN TO BLEVINS GAP RD



3.4.2 DEVELOPMENT OF PRELIMINARY ALIGNMENT OPTIONS

Three distinct alignment options were developed by combining the best of the 49 sub-routes. The melding process incorporated feedback from the public, input from Metro Parks Staff, and additional analysis of the 49 sub-routes. Much of the same analysis criteria used during the development of the sub routes were also used in the development of the three alternate alignments. The following criteria were analyzed: crossing of barriers, safety, connectivity, user experience, environmental impacts, land acquisition potential, and construction costs. Another influential factor in the determination of the three alternative alignments was route diversity because each route needed to be a distinct option. Diversity between routes was achieved by incorporating three different but viable Gene Snyder Freeway crossings. These crossing locations were the most critical criteria in determining the three alignments and influenced how the remainder of each alignment was developed. Each alignment has positives and negatives, striking different balances between user experience, safety, cost, land acquisition, and environmental sensitivity.

The following section presents each of the three alignments in detail. Alignments are designated A, B, and C; each of the three alignments has been broken into nine segments. Written analysis accompanies a map and character photos. The written analysis includes route descriptions, descriptions of the existing conditions (such as key roadway characteristics, crossings, utilities, topography, and environmental concerns), and discussions of the information critical to the segment's path route suitability (safety, connectivity, available right-of-way, and user experience). See Figure 3.25 for a description of the presentation format. Following the analysis of each alignment's individual segments, the three overall alignments will be summarized and compared together. The intent of the comparison is to provide information necessary to eventually determine one final preferred alignment. This preferred alignment may not necessarily be any of the three alignments presented here but may also be a combination of the three. The development of a final preferred alignment is a future task.

FIGURE 3.25 ALIGNMENT PRESENTATION FORMAT

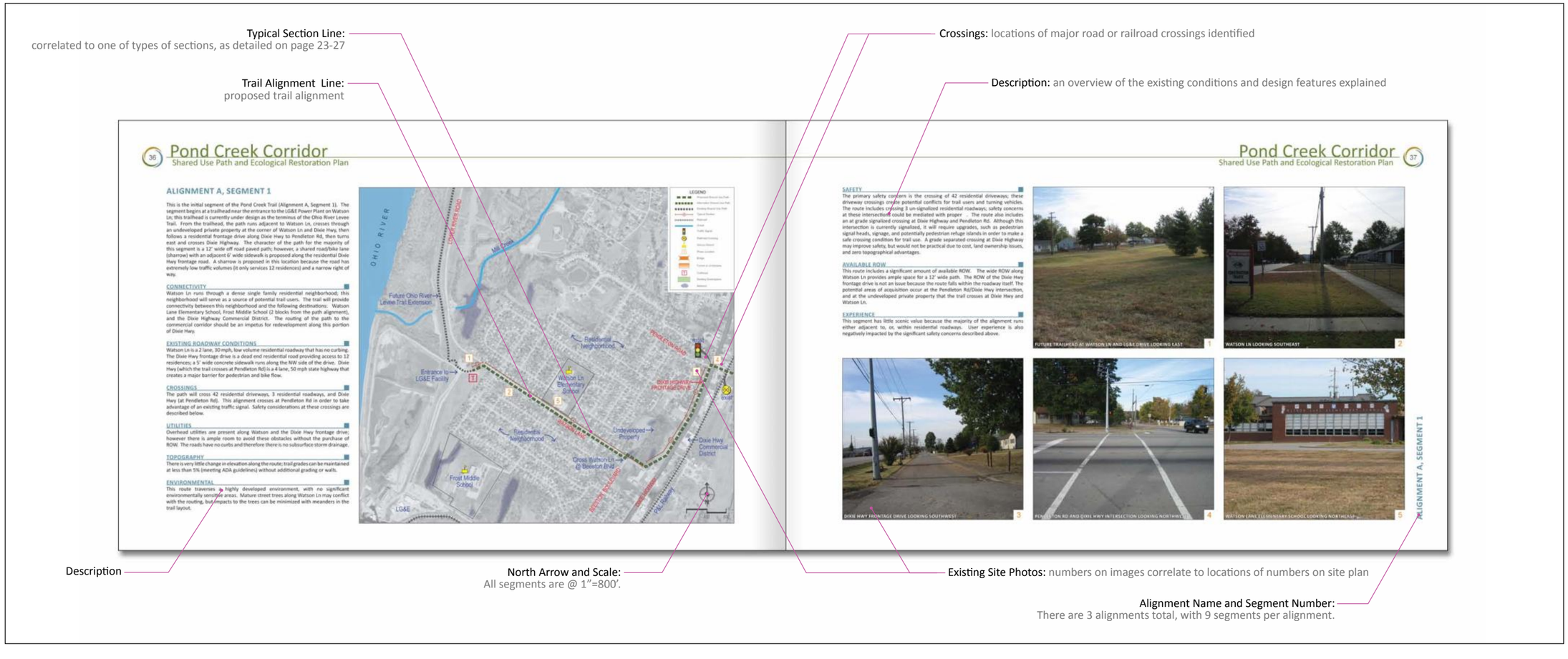
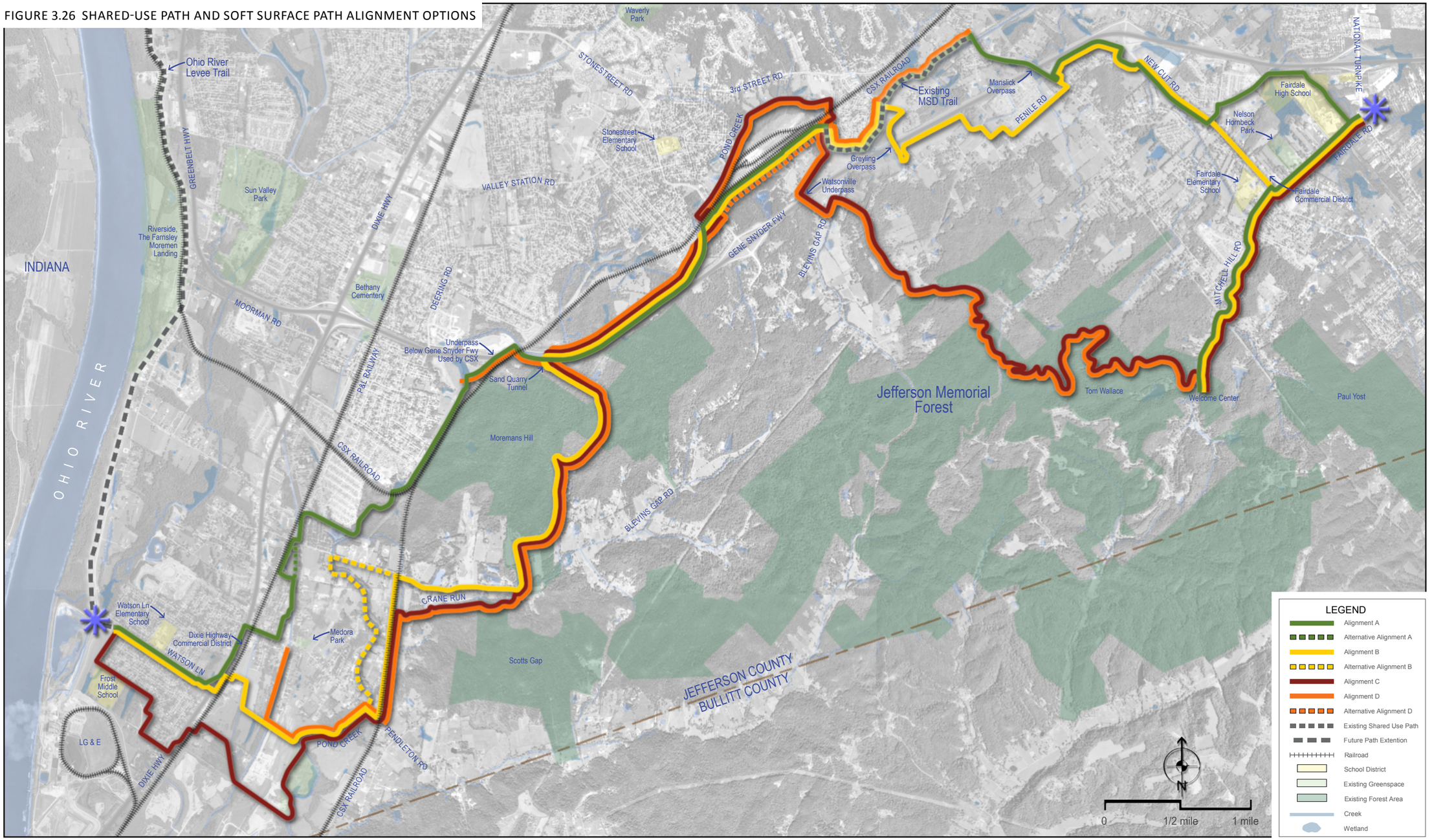


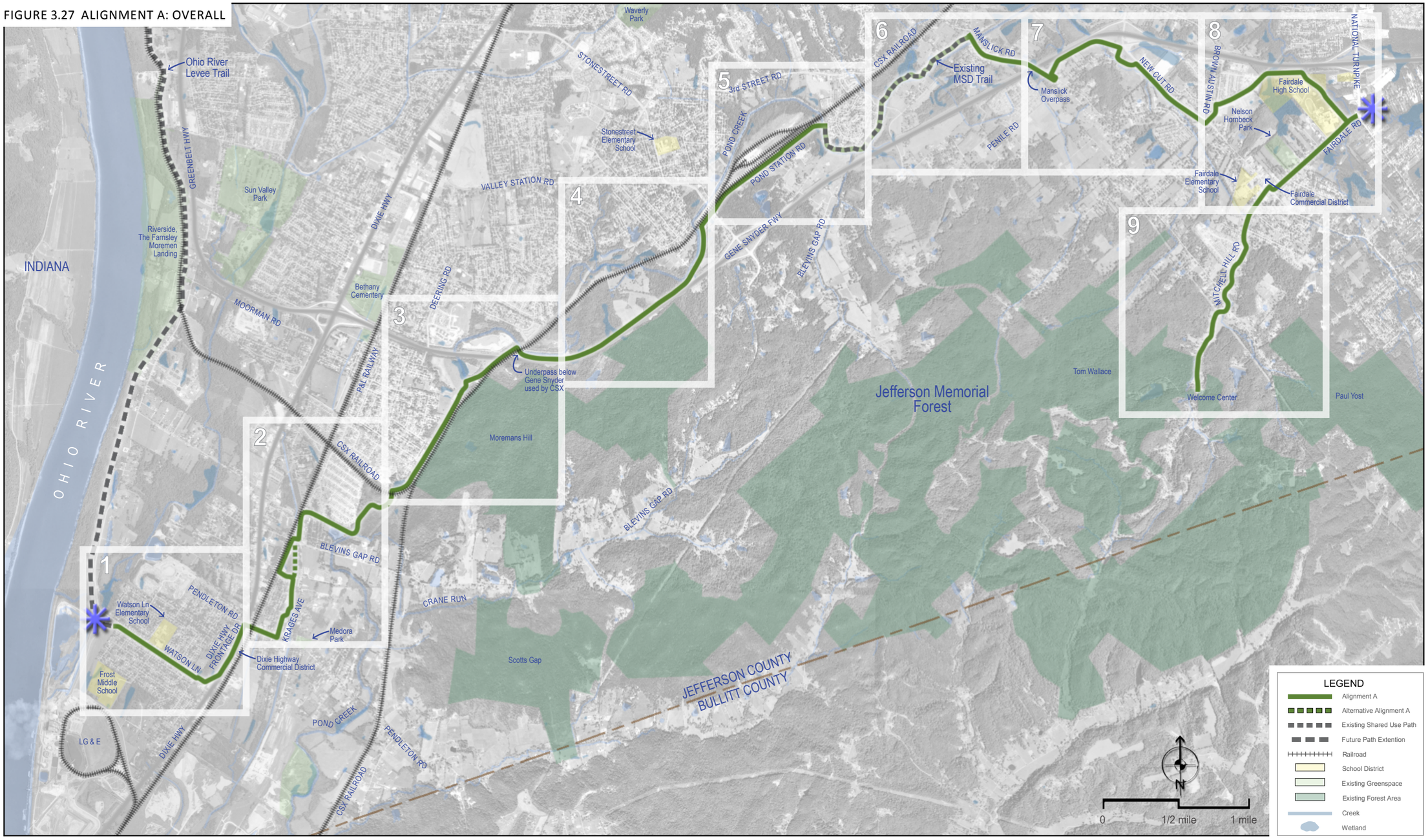
FIGURE 3.26 SHARED-USE PATH AND SOFT SURFACE PATH ALIGNMENT OPTIONS



Alignment A

Alignment A is 13.36 miles in length, the shortest of the three alignments. This alignment (as with all three alignments) is routed through a diverse environment including residential neighborhoods, creek corridors, woodlands, and open fields. It would provide excellent connectivity to the surrounding neighborhoods, and would be the only route to connect to the Autumn Lake Mobile Home Estates and the large development adjacent to Deering Rd on the southwest of Gene Snyder Hwy. The alignment would provide connectivity between these neighborhoods and the following destinations: Watson Lane Elementary School, Frost Middle School, Fairdale High School, Dixie Hwy Commercial District, Nelson Hornbeck Park, and the MSD Trail. A spur trail would provide connectivity to Fairdale Elementary School, the Fairdale Commercial District, and the Jefferson Memorial Forest Welcome Center. The alignment utilizes an existing signalized intersection at Pendleton Road to cross the Dixie Highway. The Gene Snyder Highway is crossed in two locations: the western location utilizes an existing underpass (utilized by CSX), and the eastern crossing follows the overpass at Manslick Road. The primary alignment is routed around the Fairdale commercial corridor to avoid significant driveway issues on Manslick Rd; however a spur trail does provide access to the commercial center.

FIGURE 3.27 ALIGNMENT A: OVERALL



ALIGNMENT A

ALIGNMENT A, SEGMENT 1

Segment 1 of Alignment A would begin at a trailhead near the entrance to the LG&E Power Plant on Watson Lane; this trailhead is currently under design as the terminus of the Ohio River Levee Trail. From the trailhead, the segment would parallel Watson Lane; cross through an undeveloped private property at the corner of Watson Lane and Dixie Highway; follow a residential frontage drive along Dixie Highway to Pendleton Road; turn east, and end on the east side of Dixie Highway.

This segment includes the following typical sections:

- *Typical Section G: Path within field* — proposed through grassy fields between trailhead and Watson Lane and Watson Lane and the Dixie Highway frontage road.
- T*ypical Section A: Path adjacent to road* — proposed along Watson Lane (a two-lane, 30 mph, low volume residential roadway).
- *Typical Section H: Sharrow with adjacent sidewalk* — proposed along the residential Dixie Highway frontage road (a low volume dead-end road that services 12 residences).
- *Typical Section E: Path within field* — proposed to cut across open fields between the trailhead and Watson Lane and between Watson Lane and the Dixie Highway frontage drive.

CONNECTIVITY

Watson Lane runs through a dense, single family residential neighborhood. The path would provide connectivity between this neighborhood and the following destinations: Watson Lane Elementary School, Frost Middle School (4 blocks from the path alignment), and the Dixie Highway Commercial District. The routing of the path to the commercial corridor should be an impetus for redevelopment along this portion of Dixie Highway.

CROSSINGS

The path would cross 42 residential driveways, 2 residential roadways, and Dixie Highway (at Pendleton Road). Dixie Highway is a 4-lane, 50 mph state highway that creates a major barrier for pedestrian and bike flow. This alignment would cross at Pendleton Road in order to take advantage of an existing traffic signal. Safety considerations at these crossings are described below.

UTILITIES

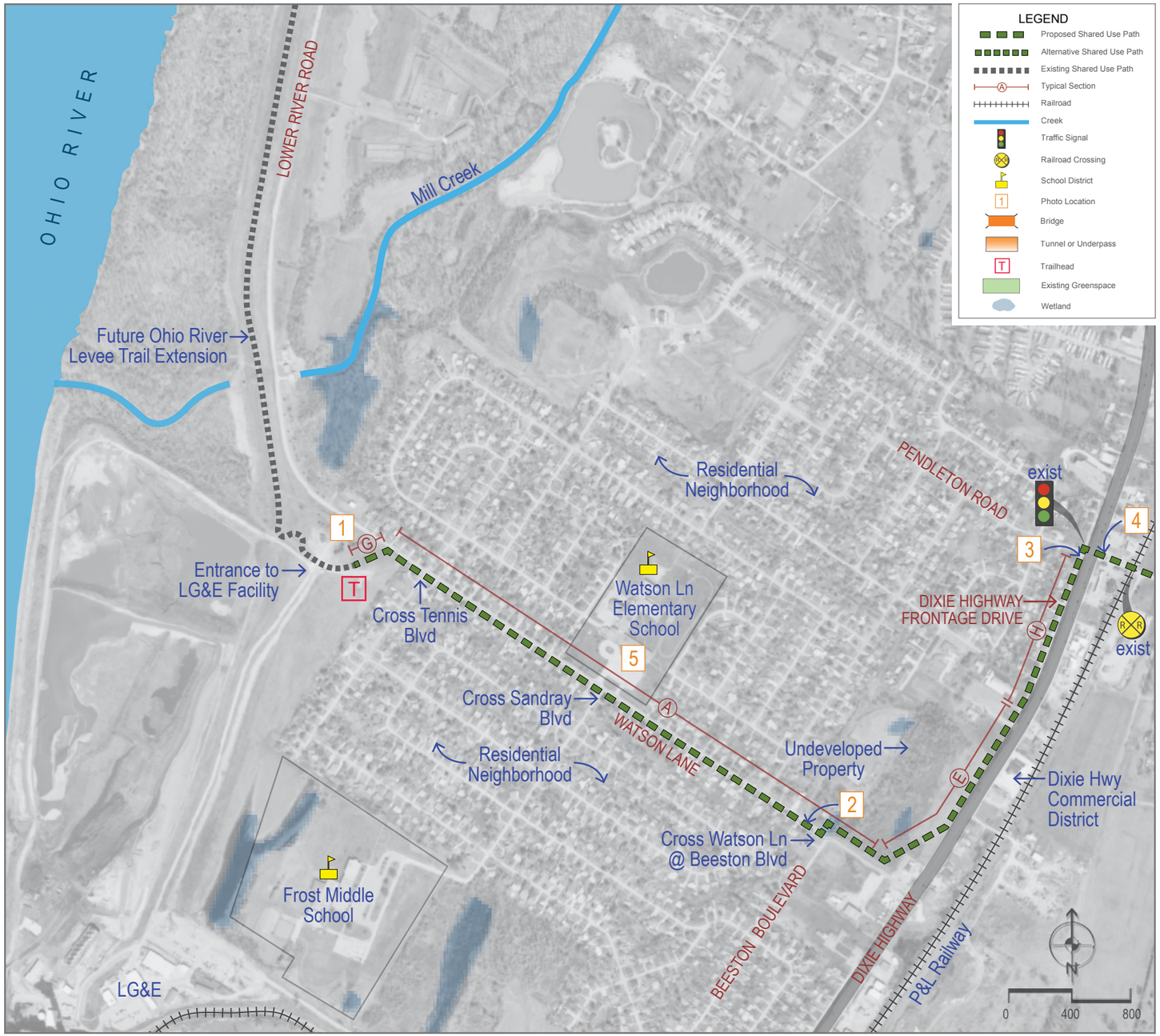
Overhead utilities are present along the south side of Watson Lane and the east side of Dixie Highway frontage drive; however, there is ample room to avoid these obstacles without purchasing ROW. The roads have no curbs; therefore, there is no subsurface storm drainage.

TOPOGRAPHY

There is very little change in elevation along the route; path grades could be maintained at less than 5% (meeting ADA guidelines) without additional grading or walls.

ENVIRONMENT

This route would traverse a highly developed environment with few environmentally sensitive areas. Wetlands are located on the undeveloped property that the path crosses, but these can be avoided.



SAFETY

The primary safety concern is the crossing of 42 residential driveways; these driveway crossings create potential conflicts for path users and turning vehicles. The segment would include crossing 3 unsignalized residential roadways; safety concerns at these intersections could be mediated with proper signage. The segment also includes an at-grade, signalized crossing at Dixie Highway and Pendleton Road. Although this intersection is currently signalized, it would require upgrades, such as pedestrian signal heads, signage, and perhaps pedestrian refuge islands, which would make a safe crossing condition for path use. A grade-separated crossing at Dixie Highway may improve safety but would not be practical due to cost, land ownership issues, and zero topographical advantages.

AVAILABLE RIGHT OF WAY

This segment would include a significant amount of available ROW. The wide ROW along Watson Lane provides ample space for a 12-foot-wide path. The ROW of the Dixie Highway frontage drive would not be an issue because the path would be a sharrow, and would therefore be located within the roadway itself. The potential areas of acquisition would occur at the Pendleton Road/Dixie Highway intersection and at the undeveloped private property the path crosses at Dixie Highway and Watson Lane.

EXPERIENCE

This segment would have little scenic value because the majority of the alignment runs either adjacent to or within residential roadways. User experience would also be negatively impacted by the significant safety concerns described above.


FUTURE TRAILHEAD AT WATSON LN AND LG&E DRIVE LOOKING EAST 1


WATSON LN LOOKING NORTHWEST 2


DIXIE HWY FRONTAGE DRIVE LOOKING SOUTHWEST 3


PENDLETON RD AND DIXIE HWY INTERSECTION LOOKING NORTHWEST 4

WATSON LANE ELEMENTARY SCHOOL LOOKING NORTHEAST 5

ALIGNMENT A, SEGMENT 2

Segment 2 of Alignment A would begin at the intersection of Pendleton Road and Dixie Highway. The route would head southeast along Pendleton Road; turn north along Krages Avenue to Weaver Run; continue north along Weaver Run for approximately one-quarter of a mile; turn west on to Meadowlawn Drive; continue on Meadowlawn Drive to the P&L Railroad corridor; follow the railroad to Orell Road; turn east through the Autumn Lake Mobile Home Estates to Pond Creek; head north along Pond Creek; and terminate at an underpass below the CSX corridor. An optional alignment is proposed in which the path, rather than turning away from Weaver Run, would continue along the creek through an undeveloped wooded property to Blevins Gap Road, turn west along Blevins Gap Road, and reconnect to the main alignment at the P&L Railroad corridor.

This segment would include the following typical sections:

- *Typical Section A: Path adjacent to road* — proposed along Pendleton Road (a two-lane, 35 mph roadway with narrow right-of-way).
- *Typical Section H: Path as sharrow with adjacent sidewalk* — proposed along Krages Avenue (a dead-end residential roadway with no curbing or sidewalks) and Meadowlawn Drive (a residential road with no curbing or sidewalks).
- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek and Weaver Run.
- *Typical Section C: Path adjacent to railroad* — proposed along P&L corridor.
- *Typical Section G: Path within wet area* — proposed within floodplain forest between Meadowlawn Drive and Blevins Gap Road.
- *Typical Section E: Path within field* — proposed at various locations.

CONNECTIVITY

The segment would run through Autumn Lakes Mobile Estates and the single family residential community along Pendleton Road. Medora Park, a small neighborhood park operated by Metro Parks, would be located within 2 blocks of the path and could serve as a potential trailhead. This segment, in conjunction with Segment 1, would provide access from these neighborhoods to the Dixie Highway commercial corridor and Watson Lane Elementary School, which serves this neighborhood.

CROSSINGS

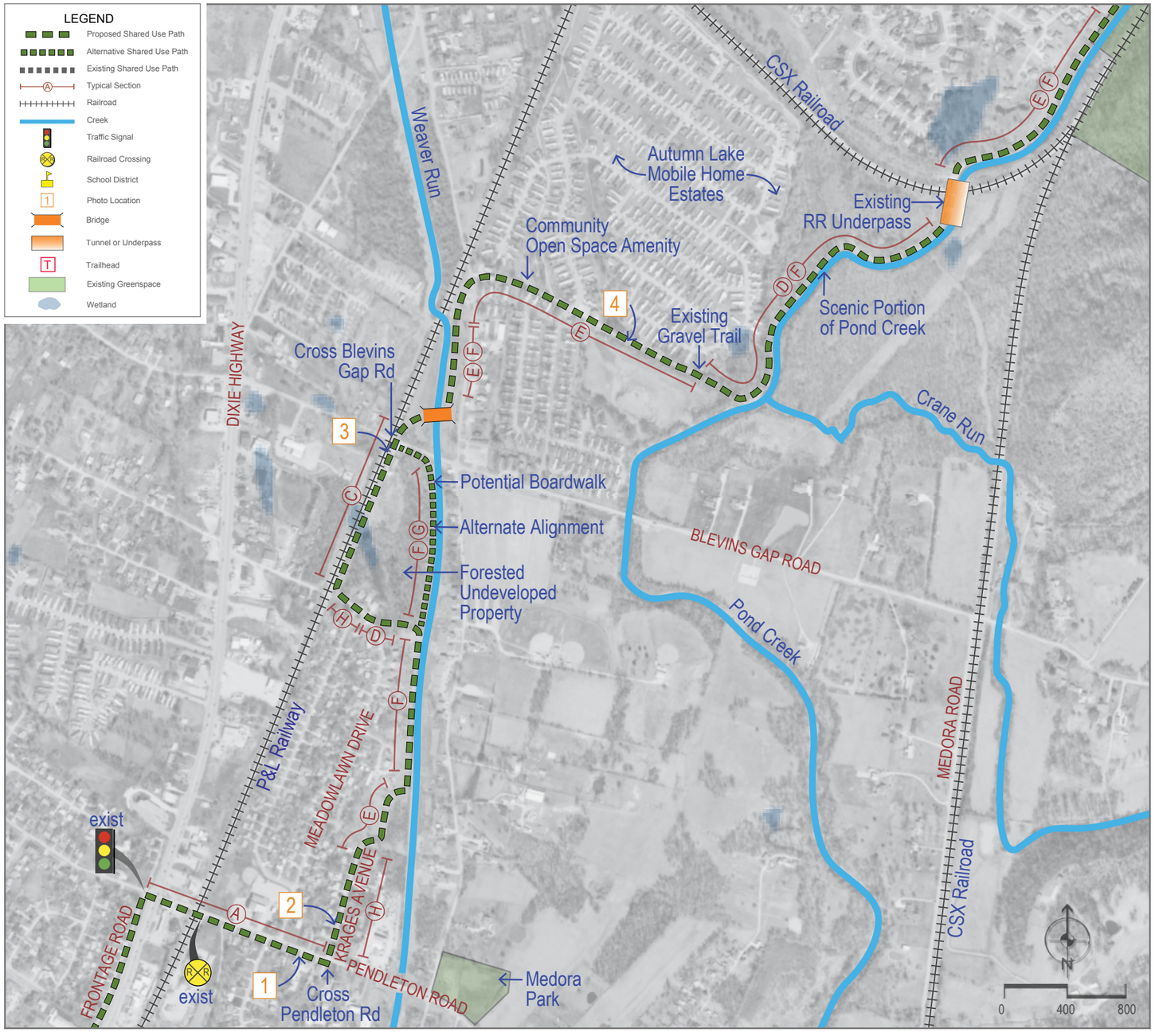
The P&L Railroad would be crossed at Pendleton Road; this existing crossing would require upgrades and widening to accommodate a shared-use path . The path would cross 7 residential driveways along Pendleton Road and would also cross 4 minor roadways (Diane Avenue, Pendleton Road, Blevins Gap Road, and Orell Road) at unsignalized locations.

UTILITIES

Overhead utilities are present along the north side of Pendleton Road, the west side of Krages Avenue, the east side of Meadowlawn, and the east side of the P&L Railroad ROW.

TOPOGRAPHY

Topography is relatively flat along this corridor, with one exception: a significant drop in elevation separates the Pond Creek corridor from the Autumn Lakes Estates.



ENVIRONMENT

This path would run adjacent to 2 creek corridors, including Weaver Run, a small channelized stream, and Pond Creek. The section of Pond Creek east of Autumn Lake is undeveloped and has substantial forested riparian areas. The portion of Pond Creek that is near the existing gravel trail through Autumn Lakes Mobile Home estates could serve as an access point for a Pond Creek Water Trail. The alternative alignment, which would continue to follow Weaver Run rather than Meadowlawn Drive, would pass through a forested floodplain. Wetland areas are located along the P&L Railroad ROW and along Pond Creek.

SAFETY

The primary safety concern is the crossing of 7 residential driveways along Pendleton Road; these driveway crossings create potential conflicts for path users and turning vehicles. The Orell Road and Blevins Gap Road crossings do not occur at intersections, these “midblock” crossings would require special signage, striping, and perhaps flashing beacons to alert drivers of the pathway crossing. The sharrows along Krages Avenue and Meadowlawn Drive would be a minor safety concern due to mixing of bicycle and automobile traffic, but because traffic volumes are so light on these roadways, there would be little potential for bicycle and automobile conflict.

AVAILABLE RIGHT-OF-WAY

This route would require a significant amount of land acquisition. The Pendleton Road right-of-way (ROW) is too narrow to accommodate a 12-foot-wide path with appropriate offsets. A sharrow along Pendleton, rather than an off-road path, would alleviate some of the need for acquisitions. The segment within Autumn Lakes Mobile Home Estates would take advantage of an existing trail through the development’s common space, which could minimize acquisition. The segment along Krages Avenue would be a sharrow, which could require minimal acquisition for sidewalk installation. The remainder of the segment would be on private property and would require acquisition.

EXPERIENCE

The user experience along this segment would be mixed. The portions of the segment that would follow the creeks would rate high for user experience, while the portions of the path that would run along roadways and through the middle of the Autumn Lakes Mobile Home Estates would rate lower.


PENDLETON RD LOOKING WEST 1

KRAGES AVE LOOKING NORTH 2


P&L RAILROAD LOOKING SOUTHWEST FROM BLEVINS GAP RD 3


EXISTING PATH WITHIN AUTUMN LAKES MOBILE HOME COMMUNITY 4

ALIGNMENT A, SEGMENT 3

Segment 3 of Alignment A would begin at the CSX underpass at Pond Creek, east of Autumn Lake Mobile Home Estates; from there, the segment would run north along Pond Creek; turn east, bridge over Pond Creek at the large parcel adjacent to the Gene Snyder Freeway, and continue northeast under the Gene Snyder Freeway via an existing underpass used by CSX Railroad. The segment would then head east along the Gene Snyder Freeway, and terminate at an existing timber CSX Railroad trestle.

This segment includes the following typical situations:

- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek through the southeast side of a single family residential development and through Metro Parks Property adjacent to the highway.
- *Typical Section E: Path within field* — proposed through residential back yards and pasture land en route to the Gene Snyder Freeway Crossing.
- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed along the existing dirt road through a meadow (also parallels Pond Creek).
- *Typical Section C: Path adjacent to railroad*— proposed along the CSX corridor underneath the Gene Snyder Freeway.

CONNECTIVITY

The segment would cross the southeast side of a large single family neighborhood that is located adjacent to Deering Road, on the southwest side of the Gene Snyder Freeway; right-of-way purchase would be necessary to provide a connection to the neighborhood's road network. This segment would also provide connectivity to a newly acquired Metro Parks property at the former Flynn Brothers Sand quarry. The segment would also enable connectivity across the Gene Snyder and CSX lines, linking the communities that are isolated from one another due to these major transportation barriers.

CROSSINGS

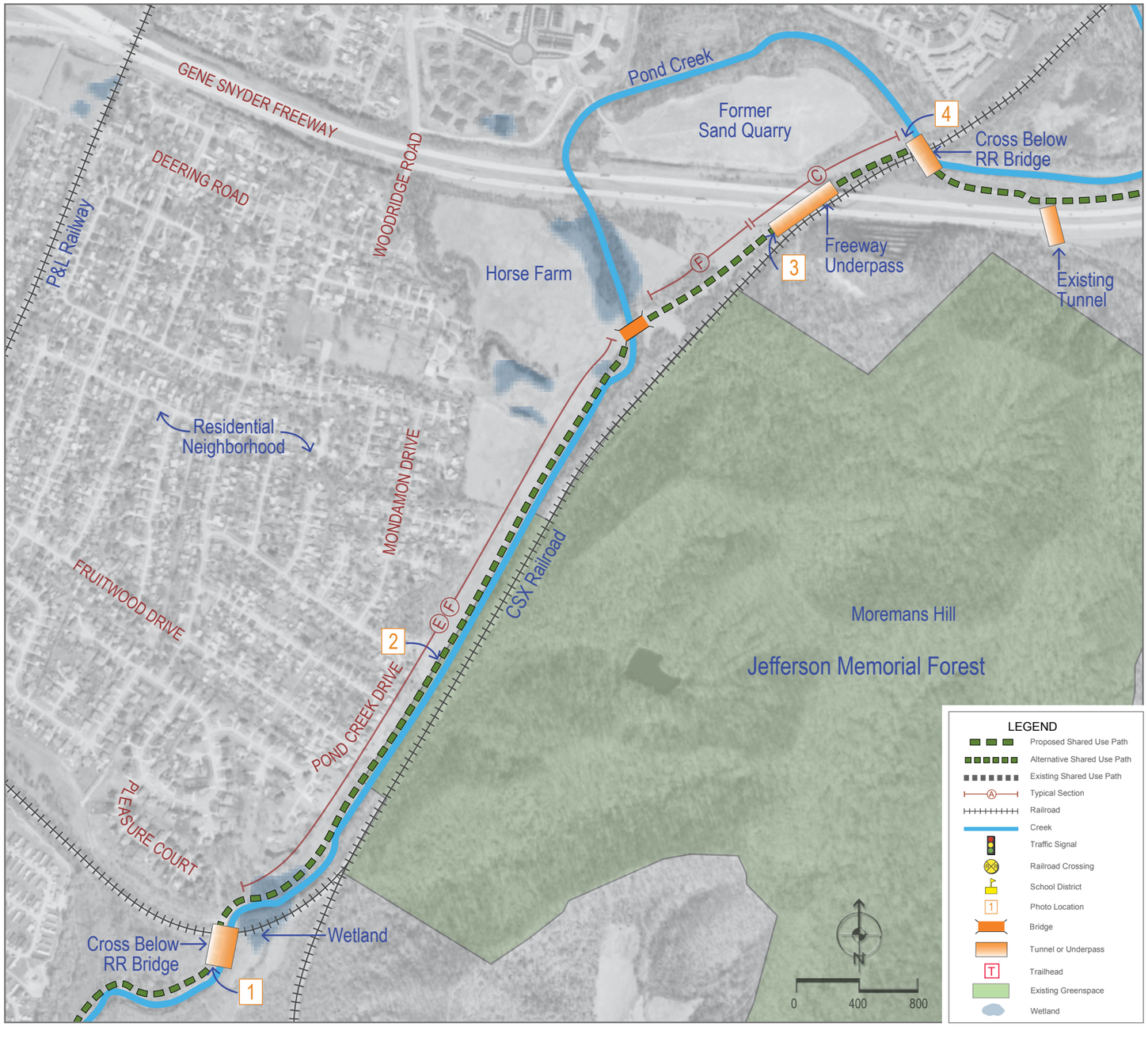
The CSX railroad would be crossed at an existing underpass east of the Autumn Lake Mobile Home Estates. There would be plenty of clearance at this crossing. Pond Creek would be crossed with a proposed clear span bridge at private property adjacent to the Gene Snyder Freeway. The Gene Snyder Freeway would be crossed at an existing underpass that is also used by the CSX railroad; this crossing would require upgrades and CSX coordination.

UTILITIES

Utilities are not a significant issue for this segment.

TOPOGRAPHY

There is very little change in elevation along the route; path grades can be maintained at less than 5% (meeting ADA guidelines) without additional grading or walls.



ENVIRONMENT

The majority of the segment would be adjacent to Pond Creek. The creek (right bank) forms the rear property line of single family residential lots, and a significant amount of the riparian zone has been cleared and grassed as yard space. The left bank has a fairly steep slope leading up to the CSX rail lines. The acquisition of a corridor along Pond Creek could enable potential stream restoration opportunities. The elevation of the path in relation to floodplain elevation must be considered during the design process. Two wetland areas are located along Pond Creek.

SAFETY

Safety conditions would be good along this segment; all major crossings would be grade separated with no vehicular conflicts.

AVAILABLE RIGHT-OF-WAY

This route would require a significant amount of land acquisition. This segment would cross through a dense single family residential neighborhood and would therefore touch many parcels. Although only a narrow strip of property would be needed from each parcel, the sum of the pieces would be significant. The large number of parcels involved would make the acquisition process more difficult; the unwillingness of one property owner to sell a portion of his or her property could derail the viability of the entire segment.

EXPERIENCE

The user experience along this segment would be high due to the lack of safety issues and the good scenic value of Pond Creek and the pasture land.

CSX RAILROAD BRIDGE 1

POND CREEK CORRIDOR LOOKING NORTHEAST 2

GENE SNYDER BRIDGE OVER RAILROAD LOOKING NORTHEAST 3

CSX RAILROAD TRESTLE LOOKING SOUTHEAST 4

ALIGNMENT A, SEGMENT 4

Segment 4 of Alignment A would begin at the timber CSX trestle at the former Flynn Brothers sand quarry, which is now Metro Parks' property. The route would run east along the Gene Snyder Freeway for approximately 1.25 miles, head northeast along Pond Creek to the CSX corridor, follow the CSX corridor, and terminate at to the intersection of Stonestreet Road and Pond Station Road.

This segment includes the following typical sections:

- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed along the highway, and would pass through forested wet areas, steep forested knobs, and open pasture land.
- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek within forest and wet areas.
- *Typical Section C: Path adjacent to railroad* — proposed along CSX corridor through open wet areas.

CONNECTIVITY

This segment would provide connectivity to the newly acquired Metro Parks property at the former Flynn Brothers sand quarry. A short spur trail could provide connectivity to the adjacent residential development on the northern side of the Gene Snyder Freeway, adjacent to Deering Road. This is a large development that includes both single family and multifamily residential units.

CROSSINGS

The CSX Railroad would be crossed at an existing timber trestle on the newly acquired Metro Parks property. This is a fairly narrow crossing condition that may result in a shoulder width below the typical condition. Vertical clearance would be adequate.

UTILITIES

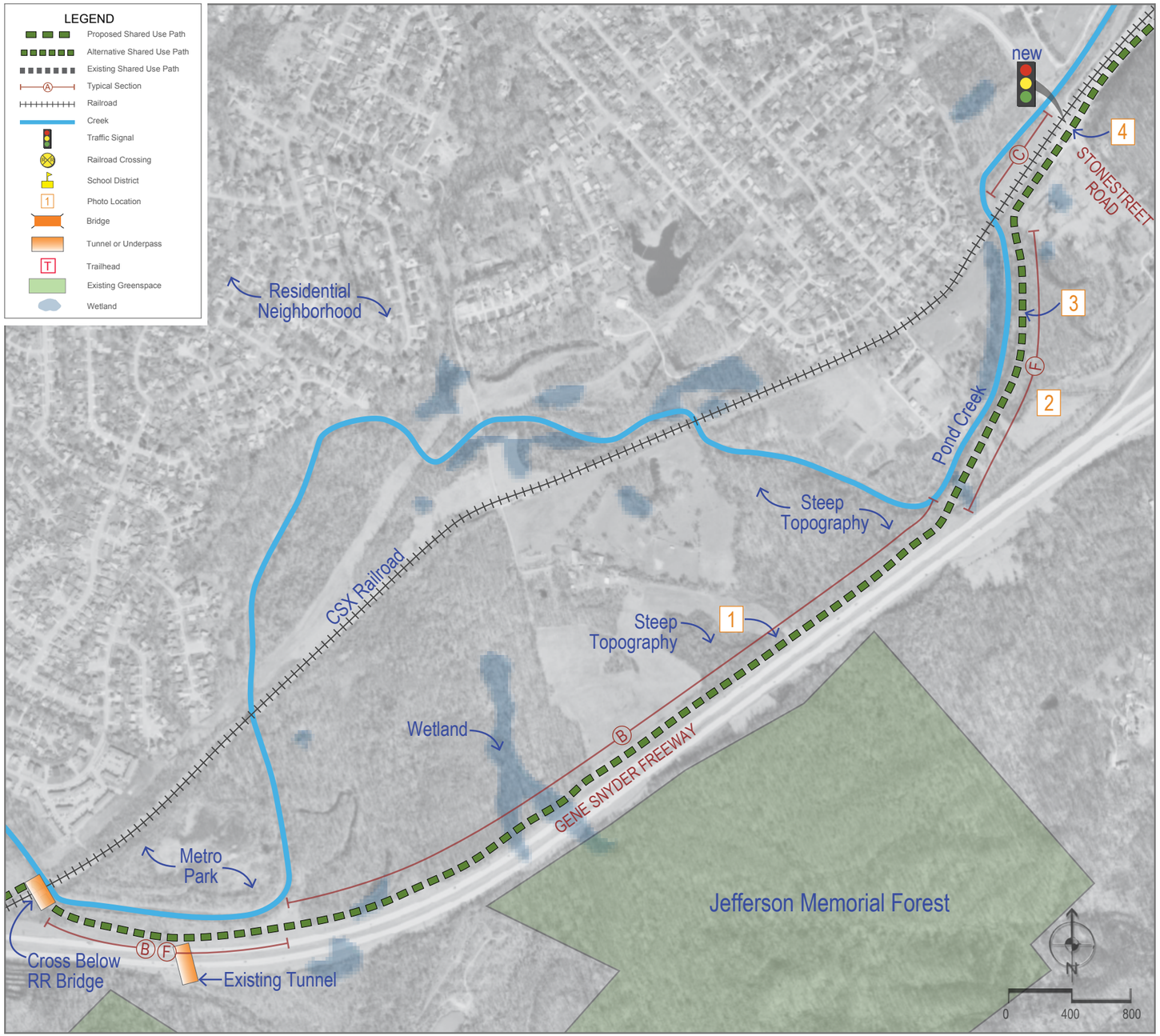
Utilities would not be a significant issue for this segment.

TOPOGRAPHY

The path would cross 2 small forested knobs as it parallels the highway — significant grading and/or walls would be needed to achieve a 5% grade.

ENVIRONMENT

Because the majority of this segment would be along the Gene Snyder Freeway, environmental opportunities or constraints are limited. However, the portions of this segment that would be along Pond Creek would offer the potential for stream restoration opportunities. In addition, some stream restoration work was completed on a tributary to Pond Creek south of the existing tunnel. Wetlands are located along the left bank of Pond Creek south of the railroad underpass just south of Stonestreet Road.



SAFETY

Safety conditions would be good along this segment; all major crossings would be grade separated with no vehicular conflicts.

AVAILABLE RIGHT-OF-WAY

Metro Parks owns the former sand quarry property on the north side of the Gene Snyder Freeway, and the Metropolitan Sewer District (MSD) owns another property on the north side of the Gene Snyder Freeway. The remainder of the corridor would require land acquisition. The portion of the segment along the Gene Snyder Freeway may be placed on the highway right-of-way if the private property owners are not be willing to sell a portion of their property. Coordination with the Kentucky Transportation Cabinet (KYTC) would be necessary to use the Gene Snyder ROW.

EXPERIENCE

Path user experience along the Gene Snyder Freeway would be fair to poor depending on the buffer width between the path and the highway. The portions of path along Pond Creek would have high user experience due to good scenic value and lack of safety issues.

GENE SNYDER ROW LOOKING SOUTHWEST 1

PRIVATE PROPERTY ADJACENT TO GENE SNYDER 2

POND CREEK LOOKING SOUTH 3

STONESTREET RD/POND STATION RD INTERSECTION LOOKING NORTHWEST 4

ALIGNMENT A, SEGMENT 5

The segment would begin at a proposed traffic signal at the intersection of Stonestreet Rd and Pond Station Rd. The segment would run northeast along Pond Station Rd; continue northeast along the CSX corridor; cross Pond Creek; turn southeast and continue along Pond Creek; and terminate at the existing MSD Trail along Pond Creek.

The following typical sections are included in the segment:

- *Typical Section A: Path adjacent to road* — proposed along Pond Station Road, a two-lane private industrial road that provides access to shipping warehouse and a paintball facility.
- *Typical Section C: Path adjacent to railroad* — proposed to follow CSX corridor through forested floodplain.
- *Typical Section F: Path adjacent to creek* — proposed to follow Pond Creek.

CONNECTIVITY

The segment would provide a direct connection to the existing MSD Trail along Pond Creek. A spur trail from the Pond Station Road intersection, headed northwest could provide connectivity to Stonestreet Elementary School (which is approximately ½ mile away) and to the large residential developments that connect to Stonestreet Road.

CROSSINGS

Stonestreet Road (a 35 MPH minor arterial roadway with 2 travel lanes and a central turn lane) would be crossed at the Pond Station Road intersection. This crossing would require the installation of traffic signals, pedestrian signal heads, and signage. This is currently a busy intersection which would help to justify the installation of traffic signals. Pond Creek would be crossed requiring a long span pedestrian bridge

UTILITIES

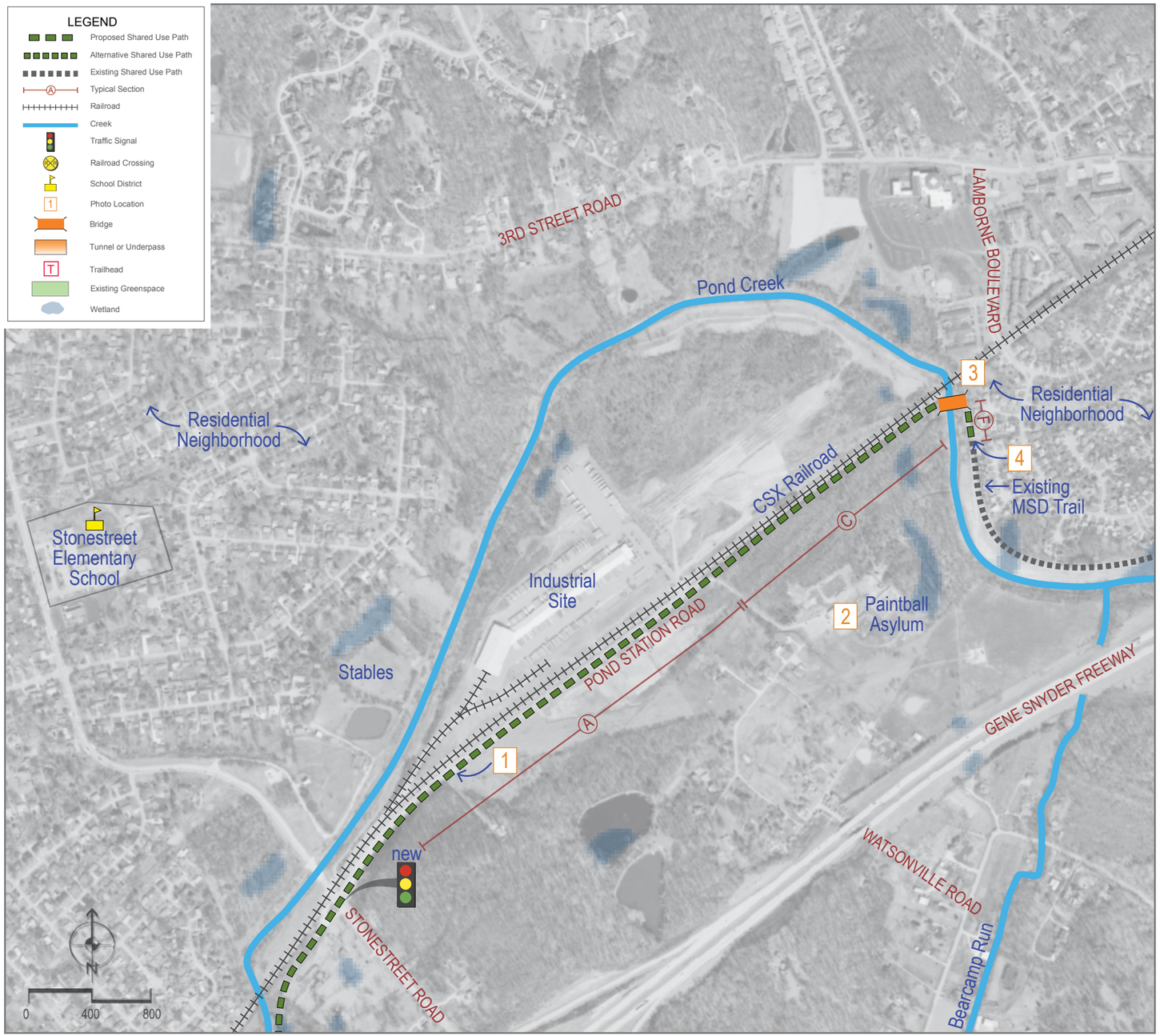
Utilities are not a significant issue for this segment.

TOPOGRAPHY

Topography is generally flat along this segment; however the crossing of Pond Creek may require a ramping system to get the bridge above floodplain elevation. The segment of path adjacent to Pond Creek has significant cross slopes which would require significant grading or walls.

ENVIRONMENT

The majority of this segment would be adjacent to the CSX rail line and Pond Station Road. The potential for environmental opportunities for this portion of the segment is limited as the eastern portion of the segment utilizes the existing MSD Trail and channel improvements that were completed in 2010. Flooding is a significant issue along Pond Creek, and care should be taken to set the bridge and path at the appropriate levels to avoid frequent flood damage.



SAFETY

Truck traffic is significant along Pond Station Road; there is a constant flow of 18 wheel trucks that access the warehouse. This high level of traffic creates a significant traffic safety issue as trucks turn left onto Stonestreet Rd at an unsignalized intersection. No driveways are currently present along the east side of Pond Station Rd; however a future planned development will change this condition.

AVAILABLE RIGHT-OF-WAY

This route would be entirely within private property, including Pond Station Rd which is a private roadway. Most of the properties are large and industrial, which could facilitate an easier acquisition process.

EXPERIENCE

The user experience along this segment would be poor along Pond Station Road due to truck traffic and poor scenery. Once the segment leaves Pond Station Rd, the user experience would improve as the path runs along the railroad (through a forested floodplain) and along Pond Creek.

POND STATION RD LOOKING NORTHEAST 1

PAINTBALL ASYLUM 2

CSX RAILROAD TRESTLE OVER POND CREEK LOOKING SOUTHWEST 3

MSD TRAIL TERMINUS LOOKING SOUTH 4

ALIGNMENT A, SEGMENT 6

This segment would begin at the existing MSD trail along the east side of Pond Creek. The segment would follow the existing trail for approximately 1.5 miles; turn southeast on West Manslick Road; cross over Pond Creek/Southern Ditch; and continue to Greyling Drive; cross to opposite side of West Manslick Road at the Greyling intersection; turn southeast and continue along the northeast right of way line of West Manslick Road.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — proposed along West Manslick Road, a two-lane, 35 mile per hour collector road that carries just over 7,000 vehicles per day.
- *Typical Section F: Path adjacent to creek* — would follow the existing MSD trail on the east/north side of Pond Creek.

CONNECTIVITY

This segment would have great access to the neighborhoods that surround it, especially the neighborhood surrounding Lamborne Boulevard. The two existing MSD trailheads would make this particular segment an integral access point to the Louisville Loop.

CROSSINGS

The segment would require a significant pedestrian bridge over Southern Ditch /Pond Creek adjacent to West Manslick Road. The segment would cross three roadways (Lamborne Boulevard, West Manslick Road, and Kessler Drive) and thirteen driveways along West Manslick Road. Concerns associated with these crossing are discussed in the Safety Section below.

UTILITIES

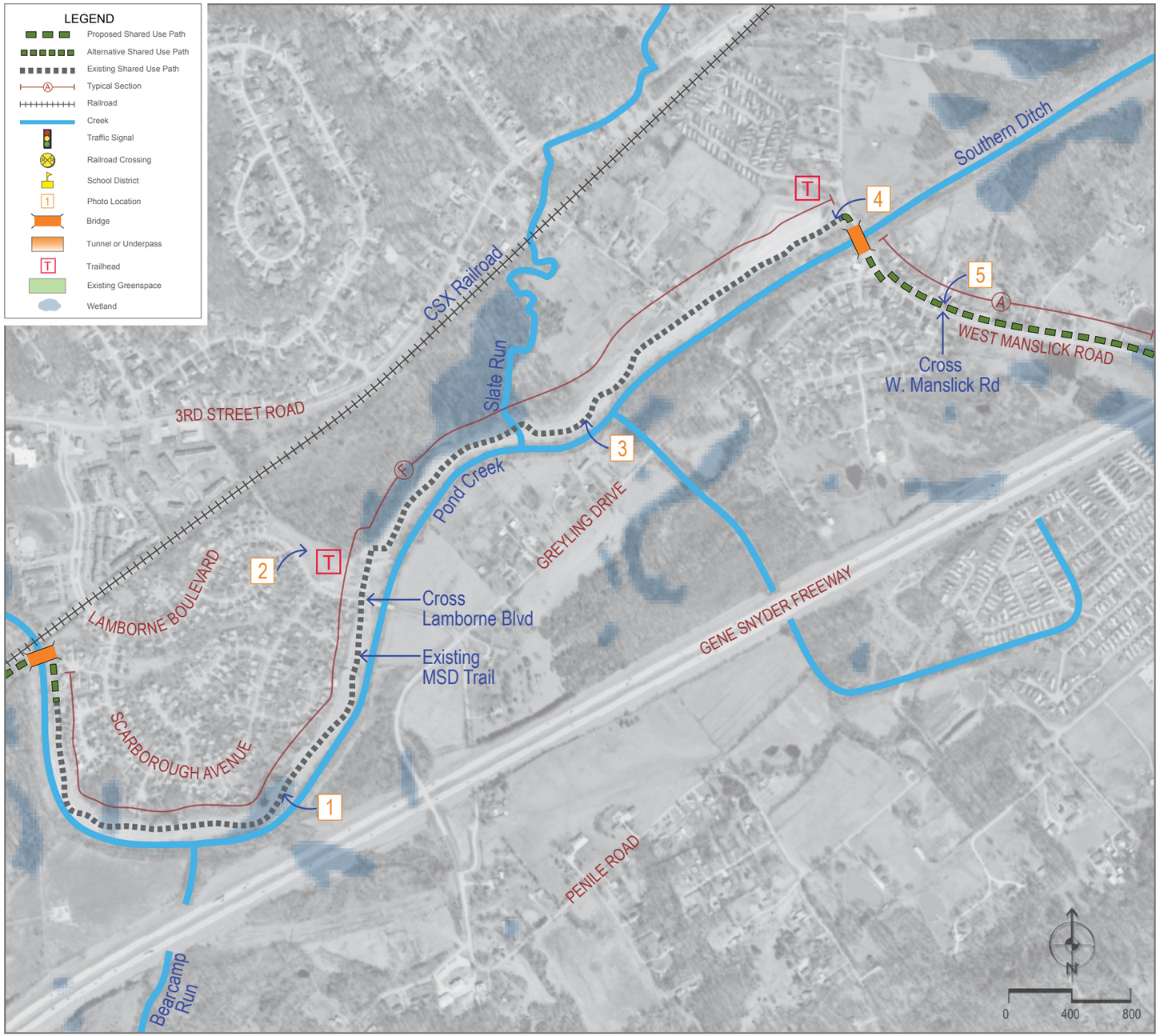
Overhead utilities are present along West Manslick Road which may require relocations or acquisition of additional property to avoid conflicts.

TOPOGRAPHY

There would be little change in elevation along the route; path grades could be maintained at less than 5% (meeting ADA guidelines) without additional grading or walls.

ENVIRONMENT

The trail and channel improvements along Pond Creek that were completed in 2010 provide an opportunity for environmental interpretation. Flooding is a significant issue along this portion of the trail; portions of the existing path may need to be relocated to higher elevations to avoid flood damage and periodic path closures.



SAFETY

The primary safety concern would be the crossing of Lamborne Boulevard and West Manslick Road. Lamborne Boulevard is currently crossed by the existing MSD trail segment; it is a midblock crossing that is not well marked. An enhanced crosswalk design (signage, markings, and flashing beacons) would be required to improve safety conditions of this existing crossing. The West Manslick Road crossing at the Greyling Drive intersection would also require an enhanced crosswalk design, or potentially a traffic signal if traffic volumes prove it is warranted. In addition to the roadway crossings, the 13 driveway crossings would also pose a safety concern. Proper signage, marking and site distance would improve safety at these crossings.

AVAILABLE RIGHT-OF-WAY

This segment would take advantage of the existing MSD Trail and its available right of way. Right of way challenges would occur along West Manslick Road which has a narrow right of way.

EXPERIENCE

This segment of the alignment could be very nice to experience as it follows the amenity of Pond Creek for a mile and a half. There is a high scenic value for the existing section of the MSD trail as the path winds along with the creek and views of residential areas are pretty well buffered due to a topographic separation.


MSD TRAIL LOOKING SOUTH 1


MSD TRAILHEAD @ LAMBORNE BLVD 2


MSD TRAIL LOOKING NORTHEAST 3


MSD TRAILHEAD @ W. MANSLICK RD 4


W. MANSLICK RD LOOKING WEST 5

ALIGNMENT A, SEGMENT 7

Segment 7 would begin along West Manslick Road, just north of the Gene Snyder Freeway. The route would cross the freeway and Salt Block Creek; ramp down from the bridge; take a u-turn and follow the West Manslick Road right of way back towards the Gene Snyder Freeway; turn northwest and parallel the freeway right-of-way; turn south on the former New Cut Road right of way; turn east along Old New Cut Road; cross New Cut Road at a proposed signal; turn southeast and follow the east side of New Cut Road to the southeast side of Brown Austin Road.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — would follow West Manslick Road (two-lane, 35 m.p.h.), Old New Cut Road (two-lane, 35 m.p.h.), New Cut Road (two-lane and central turn lane, 45 m.p.h.), and Brown Austin Road (two-lane residential road).
- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed on private property adjacent to freeway through forest and open fields.
- *Typical Section F: Path adjacent to creek* — proposed along short segments of Salt Block Creek and Big Bee Lick Creek.

CONNECTIVITY

This segment would provide pedestrian connection across the Gene Snyder Freeway, and would connect to a large neighborhood just to the north of the New Cut Road intersection with Brown Austin Road, which contains several hundred homes.

CROSSINGS

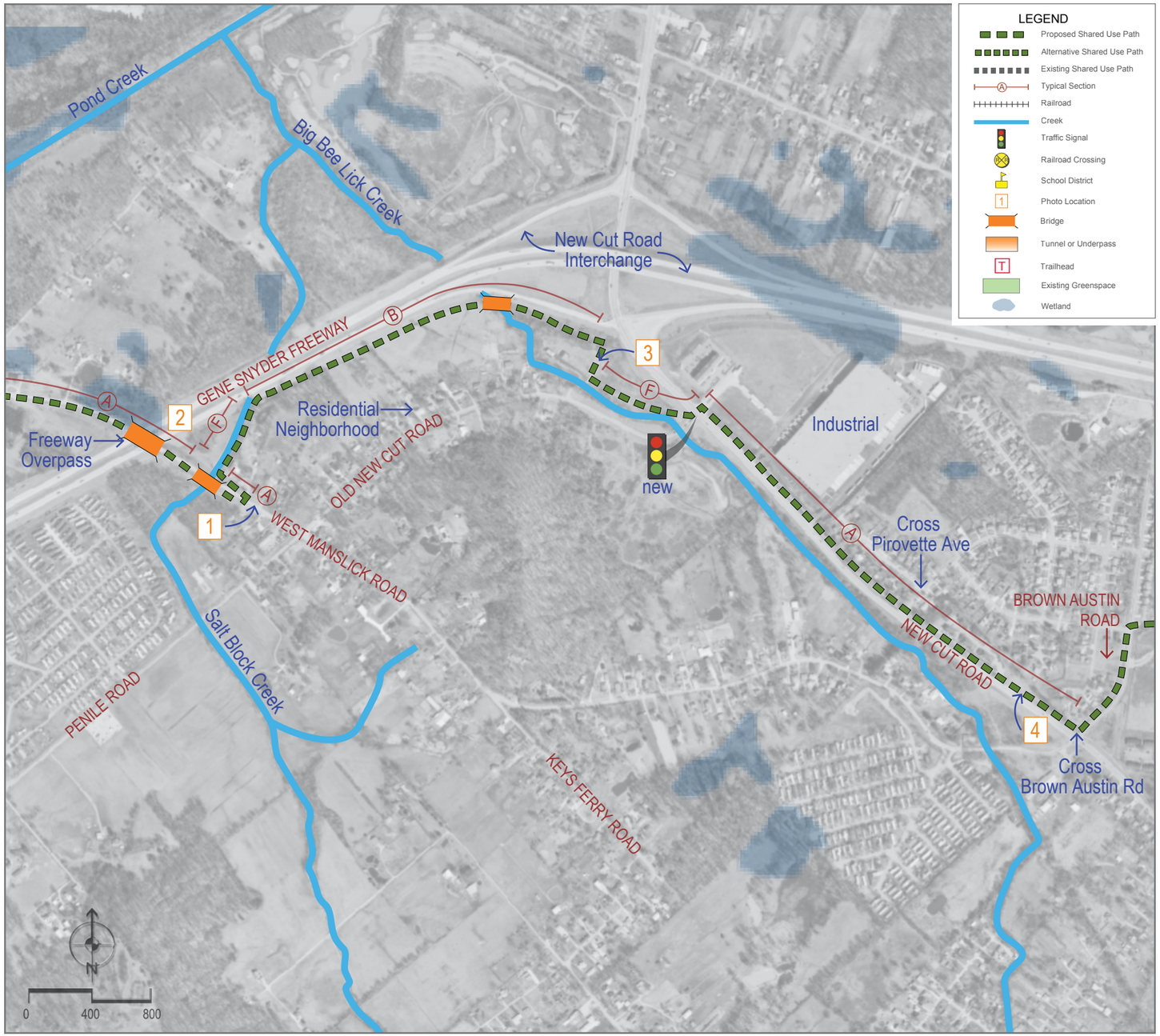
The Gene Snyder Freeway crossing would require an approximate 300 foot long pedestrian bridge, constructed adjacent to West Manslick Road. Three other roadway crossings would also have to be addressed, these occur at New Cut Road, Pirouette Avenue, and Brown Austin Road. The route also includes five driveway crossings (including three driveways leading to a hotel and industrial uses). A creek crossing over Salt Block Creek would require an extension of the existing culvert and another over Big Bee Lick Creek would require a pedestrian bridge.

UTILITIES

This segment would cross underneath overhead utility lines in several locations, but they would not be a significant obstacle for the development of the segment.

TOPOGRAPHY

Topography would be an issue at both approaches to the bridge over the Gene Snyder Freeway. The shoulders are not currently wide and flat enough to accommodate a path, so additional fill material and potentially walls would be required to construct the path approach to the pedestrian bridge. Additionally, the grade of the path up to the bridge should be 5% maximum.



ENVIRONMENT

This segment would follow Salt Block Creek and Big Bee Lick Creek for short distances. Most of the segment would fall within land that is classified as 100-year floodplain. Several wetlands are located near the potential crossing of the Gene Snyder Freeway.

SAFETY

The crossing of New Cut Road would be the most significant safety consideration. This crossing would require the installation of a signalized pedestrian crossing due to the width of the road (approximately 60'), traffic volume (11,400 vehicles per day), and vehicular speeds. The signal design would have to be coordinated with an adjacent signal in close proximity at the Gene Snyder off-ramp. In addition to the crossing of New Cut Road, the hotel/industrial driveway crossings along New Cut Road would create potential conflicts for path users and turning trucks and cars.

AVAILABLE RIGHT-OF-WAY

West Manslick Road appears to have sufficient ROW in order to construct a shared-use pathway. The entire route shown between West Manslick Road and New Cut Road would be on private property and a linear right of way corridor would have to be acquired. An alternative would be to acquire the appropriate width from the Kentucky Transportation Cabinet (KYTC) as the corridor would follow the current right of way of the Gene Snyder Freeway. New Cut Road has a wide right of way ranging from 120 feet to over 200 feet, which will easily accommodate a shared-use pathway.

EXPERIENCE

This segment would have very little scenic value as a majority of the length would either parallel a busy collector roadway or would follow the high speed Gene Snyder Freeway ROW. The New Cut Road crossing would also be difficult because it is so wide.

W. MANSLICK RD LOOKING NORTHWEST 1

GENE SNYDER ROW LOOKING EAST 2

FORMER NEW CUT RD LOOKING SOUTHWEST 3

NEW CUT RD LOOKING NORTHWEST 4

ALIGNMENT A, SEGMENT 8

This segment would begin on the southeast corner of Brown Austin Road; head northeast, cross over Pheasant Road, turn northeast onto a gas easement; continue on the gas easement between a series of newly constructed residential development to the Fairdale High School property; turn west and continue parallel to the freeway; turn southeast and follow the school's east property line; turn northeast at Fairdale Road; continue adjacent to Fairdale Road to the end of the study area at the Fairdale Road/National Turnpike intersection. A spur alignment would continue southwest along Fairdale Road; connect to the Fairdale commercial district; cross Manslick Road; and follow Mitchell Hill Road towards the Jefferson Memorial Forest.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road*— this section would apply to portions along Brown Austin Road (two-lane residential road), Fairdale Road (two-lane, 35 m.p.h.), and Mitchell Hill Road (two-lane, 35 m.p.h.).
- *Typical Section B: Path adjacent to Gene Snyder Freeway* — this would occur on the north side of Fairdale High School through an open field and small woodland.
- *Typical Section E: Path within field* — proposed within the Autumn Lakes Mobile Home Community, along the east side of Fairdale High School, and the area between Brown Austin Road and the north side of Fairdale High School.
- *Typical Section F: Path adjacent to creek* — proposed along Wilson Creek on Fairdale High School property and along Big Bee Lick Creek along Mitchell Hill Road.
- *Typical Section I/J: Path within commercial district* — proposed through Fairdale.

CONNECTIVITY

This segment would provide good connectivity to many destinations within the study area, including: Fairdale High School, Nelson Hornbeck Park, the Fairdale commercial district, Fairdale Elementary School, Fairdale Public Library, and the neighborhood surrounding Brown Austin Road.

CROSSINGS

Two creek crossings (Wilson Creek and Big Bee Lick Creek) would both require pedestrian bridges. Roadway crossings would occur at Pheasant Road, West Manslick Road at the proposed Fairdale roundabout, Caple Avenue, and Chieftain Drive. Approximately 34 driveway crossings would have to be traversed.

UTILITIES

Overhead power lines and power poles exist on both sides of Fairdale Road and Mitchell Hill Road which could become an issue in the placement of the potential pathway. Drainage structures on Fairdale Road would have to be modified.

TOPOGRAPHY

This segment would have few topographical challenges; however, one challenging location would be along the gas easement near Brown Austin Road. Longitudinal grades and cross slopes would have to be addressed through grading or the construction of a series of retaining walls to follow this easement.

ENVIRONMENT

100 year floodplain exists along the entire portion of the segment that follows New Cut Road and along the entire stretch within the Fairdale High School property. The path would follow Wilson Creek, which could offer restoration opportunities through school property. A wetlands area, adjacent to the freeway could offer environmental education opportunities.

SAFETY

Significant safety concerns would occur along the spur path alignment within the Fairdale Commercial District where there are multiple, long (almost continuous) curb cuts that access the various businesses within the district. These curb cuts would need to be condensed to reduce the number of potential conflicts. The driveway crossings along Fairdale Road and Mitchell Hill Road would also be a concern.

AVAILABLE RIGHT-OF-WAY

Available Right of Way includes property associated with Fairdale High School, Nelson Hornbeck Park, and the road right of way along Brown Austin Road. The segment would also take advantage of the gas easement adjacent to Pheasant Road, which should be more easily acquired than private property. Right of way challenges would occur along Fairdale Road and Mitchell Hill Road where existing right of way widths do not appear adequate to accommodate the path and its associated offsets and shoulder widths.

EXPERIENCE

The user experience for this segment would be mixed. A fair user experience would occur along the gas easement and the Fairdale High School property due to fair scenery and good safety conditions. A fair to poor user experience would occur along Fairdale Road and Mitchell Hill Road due to safety concerns with driveways.

GAS EASEMENT LOOKING NORTH 1

GENE SNYDER ROW LOOKING EAST 2

FAIRDALE HIGH SCHOOL LOOKING NORTHWEST 3

FAIRDALE RD/ W MANSLICK RD INTERSECTION LOOKING NORTHEAST 4

ALIGNMENT A, SEGMENT 9

This segment would begin on east side of Mitchell Hill Road, just south of Chieftain Drive; continue south along Mitchell Hill Road; cross to the west side of Mitchell Hill Road at the Babe Drive intersection; continue along the west side of Mitchell Hill Road; cross back to the east side of Mitchell Hill Road at the Holsclaw Hill Road intersection (the future Jefferson Memorial Forest Welcome Center will be located at this intersection); continue south along the east side of Mitchell Hill Road to the current Jefferson Memorial Forest Welcome Center.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — proposed along Mitchell Hill Road (two-lane, 35 m.p.h.)
- *Typical Section F: Path adjacent to creek* — proposed parallel to Big Bee Lick Creek along Mitchell Hill Road.

CONNECTIVITY

This segment would connect users to the Jefferson Memorial Forest Welcome Center (both the current location and the future location). In addition, this segment is adjacent to several residential areas that surround Mitchell Hill Road.

CROSSINGS

There would be several roadway crossings along this alignment: two Mitchell Hill Road crossings and one Keys Ferry Road crossing. Nine residential driveways would also be crossed. This segment would cross Big Bee Lick Creek which would require a pedestrian bridge.

UTILITIES

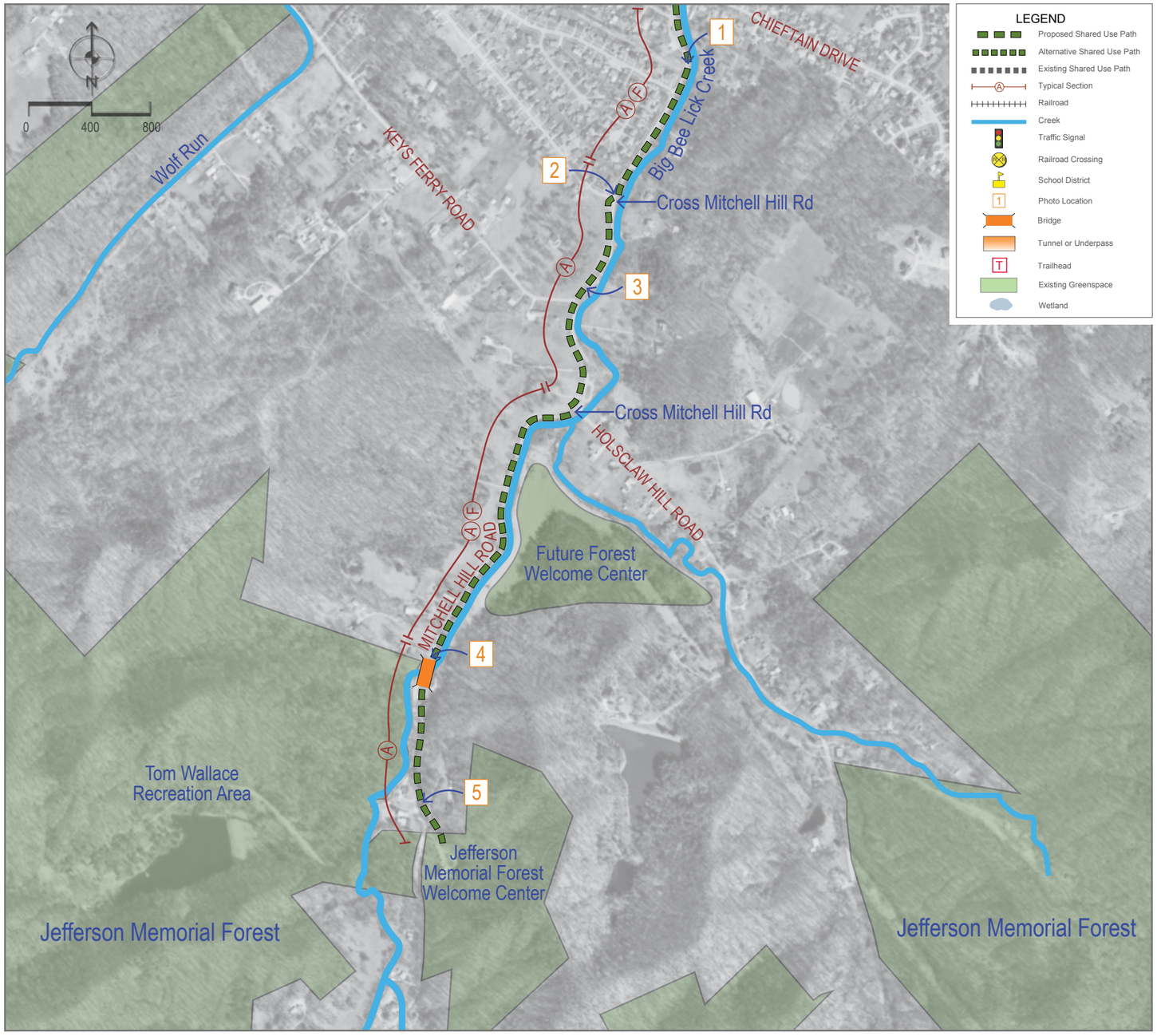
Overhead utilities exist along Mitchell Hill that could be avoided without relocation.

TOPOGRAPHY

The slope drops off significantly from the edge of the pavement along Mitchell Hill Road and would require grading or walls. These locations are primarily located in areas where the roadway parallels Big Bee Lick Creek.

ENVIRONMENT

Big Bee Lick Creek runs along the east side of Mitchell Hill Road and could be a scenic amenity for the path and an opportunity for stream restoration.



SAFETY

Potential vehicular conflicts would occur at the Mitchell Hill Road crossings, both of which would be at intersections that are stop controlled for the cross streets but not for Mitchell Hill Road. These crossings would require enhanced crosswalk improvements such as in pavement signal lights or flashing beacons in addition to signage and striping. The Holsclaw Hill Road intersection could potentially be turned into a four way stop condition if traffic analysis demonstrates that it is warranted after construction of the future welcome center.

AVAILABLE RIGHT-OF-WAY

The route would take advantage of the parcel at the Holsclaw Hill intersection that is owned by Metro Parks for the future forest welcome center. The right of way along Mitchell Hill Road is variable; in most locations, right of way acquisition would be necessary to install the path with appropriate roadway clearance.

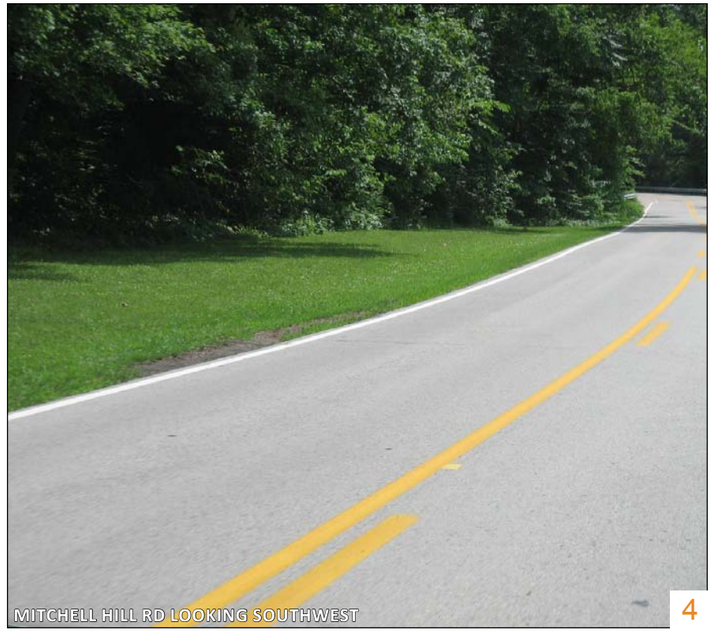
EXPERIENCE

The user experience for this segment would be fair. Although the path would follow a roadway for the entire length, Mitchell Hill Road is narrow and carries a low volume of traffic, so the adjacent roadway would not significantly impact the experience. The scenic value of this segment would be fairly high as there are few residential units and good views of the Jefferson Memorial Forest.


MITCHELL HILL RD/ HOLLY HILLS DR INTERSECTION LOOKING SOUTHWEST 1


MITCHELL HILL RD/ BABE DR INTERSECTION LOOKING SOUTHWEST 2


MITCHELL HILL RD/ KEYS FERRY RD INTERSECTION LOOKING SOUTHWEST 3

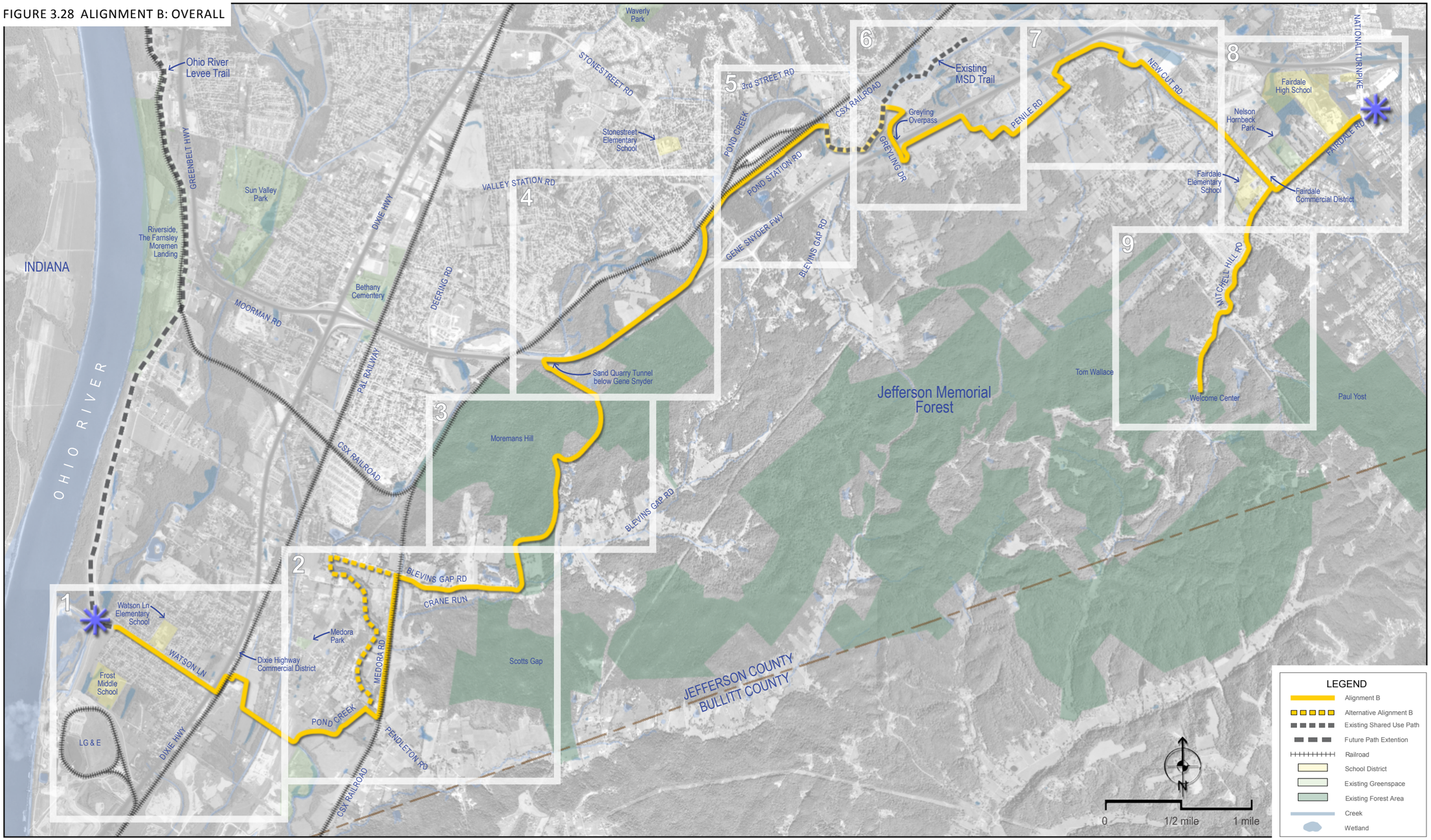

MITCHELL HILL RD LOOKING SOUTHWEST 4


MITCHELL HILL RD LOOKING SOUTHWEST 5

Alignment B

Alignment B is 15.62 miles in length, and ranks second in length among the three alignments. This alignment (as with all three alignments) is routed through a diverse environment including residential neighborhoods, creek corridors, woodlands, and open fields. It would provide good connectivity to the surrounding neighborhoods, and to the following destinations: Watson Lane Elementary School, Frost Middle School, Fairdale High School, Fairdale Elementary School, the Fairdale Commercial District , Dixie Hwy Commercial District, Nelson Hornbeck Park, and the MSD Trail. A spur trail would provide connectivity to the Jefferson Memorial Forest Welcome Center. The alignment utilizes an existing signalized intersection at Watson Lane to cross the Dixie Highway. Alignment B is routed through the scenic Riverport land on south side of Dixie, which is a safer, more attractive, and affects fewer property owners than the Pendleton Rd alternative. However, gaining access to this property is difficult due to limited P&L Railroad crossings; Alignment B utilizes an existing private driveway to cross the P&L railroad, which may be difficult to accomplish due to permitting restrictions from the railroad company. The Gene Snyder Highway is crossed in two locations: the western location utilizes an existing tunnel that once provided access to a sand quarry, and the eastern crossing follows the overpass at Greyling Drive. This route goes through the Fairdale commercial district, which would be difficult to accomplish in its current condition; however, a shared-use path through the village center could be incorporated into potential redevelopment of the village center.

FIGURE 3.28 ALIGNMENT B: OVERALL



ALIGNMENT B

ALIGNMENT B, SEGMENT 1

The segment would begin at a trailhead near the entrance to the LG&E Power Plant on Watson Lane; this trailhead is currently under design as the terminus of the Ohio River Levee Trail. From the trailhead, the path would run along Watson Lane; cross Dixie Highway; turn northeast at the P&L railroad right of way; follow the railroad corridor through the back side of several private parcels; turn southeast at a private driveway crossing of the P&L railroad; turn northwest (just after crossing the railroad tracks); continue along the railroad corridor; turn southeast at the end of the industrial property; meander along property lines through undeveloped farm land; cross Weaver Run; and terminate at Pond Creek.

The following typical sections would be included in the segment:

- *Typical Section A: Path adjacent to road* — proposed along Watson Lane (two-lane, 30 m.p.h, low volume residential roadway with wide right-of-way).
- *Typical Section C: Path adjacent to railroad* — proposed along the P&L railroad, behind small parcels on Dixie Highway.
- *Typical Section E: Path within field* — proposed through grassy field between trailhead and Watson Lane, and through open farm land east of Dixie Highway

CONNECTIVITY

Watson Lane runs through a dense single family residential neighborhood. The path would provide connectivity between this neighborhood and the following destinations: Watson Lane Elementary School, Frost Middle School (4 blocks from the path alignment), and the Dixie Highway Commercial District. The routing of the path to the commercial corridor should be an impetus for redevelopment along this portion of Dixie Highway.

CROSSINGS

The path would cross 44 driveways, 3 residential roadways, Dixie Highway (at Watson Lane), and the P&L railroad crossing at a private driveway. Dixie Highway (which the path crosses at Pendleton Road) is a 4 lane, 50 mph state highway that would create a major barrier for pedestrian and bike flow. The railroad crossing would require significant coordination with P&L to get permission to convert this crossing from a private driveway to a public crossing. The railroad crossing would require widening, and, potentially, signalization. Safety considerations of the various crossings are described below.

UTILITIES

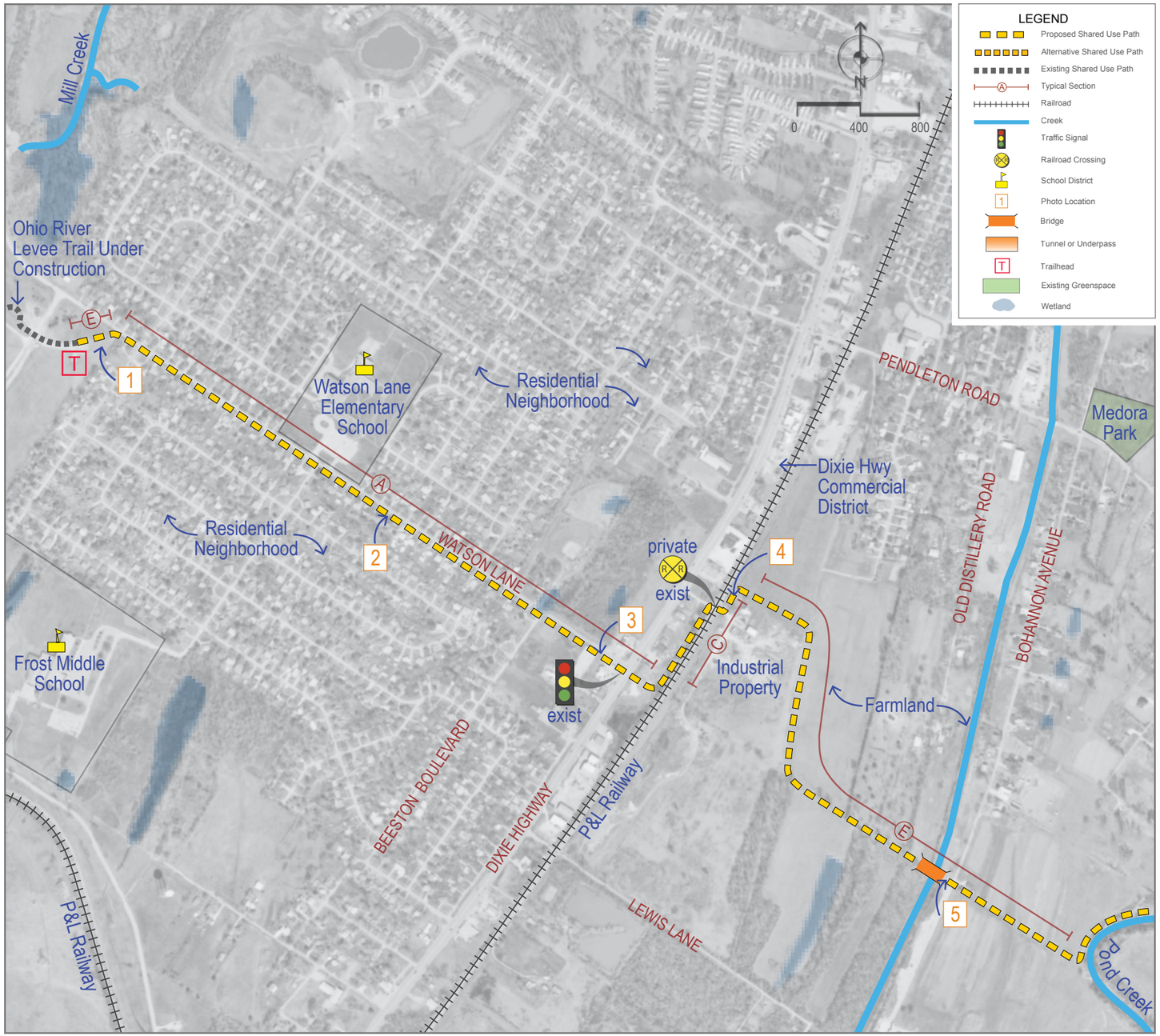
Overhead utilities are present along Watson Lane; however there is ample room to avoid these obstacles without the purchase of ROW.

TOPOGRAPHY

There is very little change in elevation along the route; path grades could be maintained at below 5% (meeting ADA guidelines) without additional grading or walls.

ENVIRONMENT

The first half of the segment would follow Watson Lane through a residential neighborhood with no significant environmentally sensitive areas. Mature street trees along Watson Ln may conflict with the routing, but impacts to the trees could be minimized with meanders in the path layout. The second half of the segment would travel through low-lying farmland.



SAFETY

The primary safety concern is the crossing of 44 driveways; these driveway crossings would create potential conflicts between path users and turning vehicles. The segment would include crossing 3 un-signalized residential roadways; safety concerns at these intersections could be mediated with proper signage. The segment would cross Dixie Hwy at Watson Lane, which is an existing signalized at-grade intersection. Although this intersection is currently signalized, it would require upgrades, such as pedestrian signal heads, signage, and potentially pedestrian refuge islands, to make a safe crossing condition for path use. A grade separated crossing at Dixie Highway may improve safety, but would not be practical due to cost, land ownership issues, and zero topographical advantages.

AVAILABLE RIGHT-OF-WAY

The wide ROW along Watson Ln would provide ample space for a 12' wide path. Once the segment crosses Dixie Hwy, land acquisition would be required. Acquisition of property from the small parcels along Dixie Hwy would pose the most significant acquisition challenge. Acquiring, even a narrow corridor along the backs of these properties, would be a large impact to these small parcels. The large parcels southeast of Dixie Highway includes undeveloped farmland which should make the acquisition of a pathway corridor easier.

EXPERIENCE

The first half of the segment, along Watson lane, would have significant safety issues and little scenic value. However, the user experience would greatly improve on the southeast side of the P&L railroad, as the pathway meanders through scenic farmland.

WATSON LN LOOKING SOUTHEAST 1


WATSON LN LOOKING SOUTHEAST 2


WATSON LN/ DIXIE HWY INTERSECTION LOOKING SOUTHEAST 3


ADJACENT TO P&L CORRIDOR LOOKING NORTHEAST 4


BOHANNON AVE LOOKING EAST 5

ALIGNMENT B, SEGMENT 2

The segment would begin on the southwest side of Pond Creek; continue northeast along Pond Creek through undeveloped properties to Pendleton Rd; turn southeast and continue on Pendleton Rd; turn north and continue on Medora Road, turn east and continue on Blevins Gap Road; turn north into the Jefferson Memorial Forest Property, and terminate on the north side of Crane Run. An alternative alignment is proposed where, in lieu of turning onto Pendleton Road and Medora Road, the path would continue along Pond Creek through the back side of large residential properties; turn east onto Blevins Gap Road; and connect back to the main alignment at the Blevins Gap Road/Medora Road intersection.

The following typical sections would be included in the segment:

- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek through farm land and floodplain forest.
- *Typical Section A: Path adjacent to road* — proposed along Pendleton Rd, Medora Road, and Blevins Gap Road. These 3 roadways are two-lane, 35 mph rural roadways that are surrounded by large, multi-acre, residential lots.

CONNECTIVITY

A short spur trail connection down Pendleton Road could provide connectivity to the surrounding neighborhood and to a potential trailhead location at Medora Park. This segment, in conjunction with the previous segment, would provide access to the Dixie Highway commercial corridor and Watson Lane Elementary School, which serves this neighborhood.

CROSSINGS

The CSX Railroad would be crossed at Blevins Gap Road; this existing crossing would require upgrades and widening to accommodate a shared-use path. The path would cross several driveways, but these are spread far apart, and do not pose the safety concern that the tightly spaced dense residential driveways do. The segment would cross two minor roadways (Pendleton Road and Blevins Gap Road) at un-signalized locations. Concerns associated with these crossings are discussed in the Safety Section below.

UTILITIES

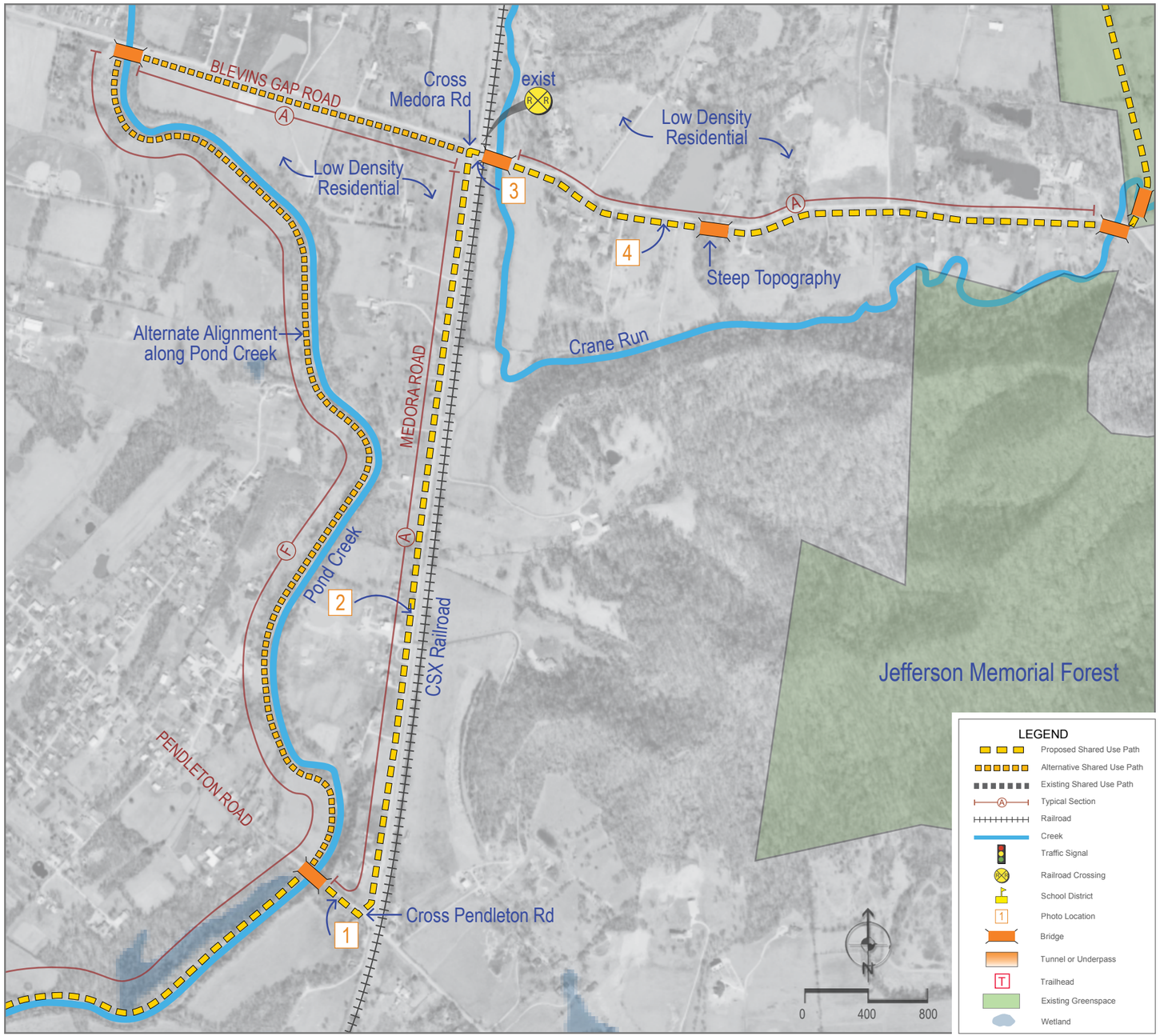
Overhead utilities are present along the north side of Pendleton Road, the west side of Medora Road, and the south side of Blevins Gap Road.

TOPOGRAPHY

Topography is relatively flat along Pond Creek, and transitions to rolling hills along Medora Road and Blevins Gap Road. A 5% path route could be constructed with a minimal amount of grading.

ENVIRONMENT

The primary route along Medora Road would have minimal environmental opportunities or constraints. The alternative route runs adjacent to Pond Creek. While a few isolated wetlands exist on the upper banks, the majority of constraints would be to the adjacent forested riparian areas. However, as this segment location is adjacent to Pond Creek, many opportunities exist for stream and ecosystem restoration along the creek corridor. In addition, a trail head at this location would provide a possible water trail access point at downstream end of Pond Creek.



SAFETY

The primary safety concern is the crossing of Pendleton Road and Blevins Gap Road at “midblock” (non- intersection) locations. These midblock crossings would require special signage, striping, and potentially flashing beacons to alert drivers of the pathway crossing. The driveway crossings are a minor safety concern; however, the long distance between driveways makes them less problematic than closely spaced driveways in more dense residential developments.

AVAILABLE RIGHT-OF-WAY

The segment would follow road right-of-way to minimize land acquisition. Unfortunately the road right-of-ways are not wide enough to totally accommodate a 12’ wide path with appropriate offsets, so some acquisition would still be required. The portions of the segment along Pond Creek (including the alternate route) would be entirely on private property and would require right-of-way acquisition. Fortunately, the parcels are large, so a small acquisition along the property line would have minimal impact to the parcel.

EXPERIENCE

The user experience along Pond Creek would be good—the creek corridor is highly scenic and there are no vehicular conflicts. The experience of the segment along the various roadways would be fair. The roadway corridors are rural in character and the surrounding landscape offers good scenery; however the user would encounter roadway noise and safety issues associated with driveway crossings.

DISCUSSION OF ALTERNATIVE ROUTE

The alternative route would follow Pond Creek in lieu of Pendleton Road and Medora Road. This route would be more scenic, safer, and would have a better user experience. The development of this route could also be combined with stream restoration projects. The most significant disadvantage of the alternate route is the issue of land acquisition. The alternate route would cross the back side of large residential properties, which could be an issue of concern for property owners. The alternate route is also a half mile longer, and would therefore be more expensive.


PENDLETON RD LOOKING SOUTHEAST 1


MEDORA RD LOOKING NORTH 2

MEDORA RD/ BLEVINS GAP RD LOOKING NORTH 3


BLEVINS GAP RD LOOKING EAST 4

ALIGNMENT B, SEGMENT 3

The segment would begin at the entrance to the Jefferson Memorial Forest on Blevins Gap Road. This area of the Forest is planned to be the Jeff Jack Resource Center. From Blevins Gap Road, the segment would cross Crane Run; follow an existing driveway through old farmland; enter the woods and meander through Forest property and adjacent private property; and terminate on the north side of Dodge Gap. Portions of the segment through the Forest would follow the routes of existing unpaved paths.

The following typical sections would be included in the segment:

- *Typical Section E: Path within field* — proposed through old farm land with rolling topography (part of Jefferson Memorial Forest)
- *Typical Section D: Path within forest* — proposed through the forested knobs of the Jefferson Memorial Forest and adjacent private property.

CONNECTIVITY

The segment provides connectivity to a newly acquired Jefferson Memorial Forest property that is planned to be the Jeff Jack Resource Center. The long range plans for this site include campground, research lab, and ecological restoration areas.

CROSSINGS

There are no significant crossings along this segment.

UTILITIES

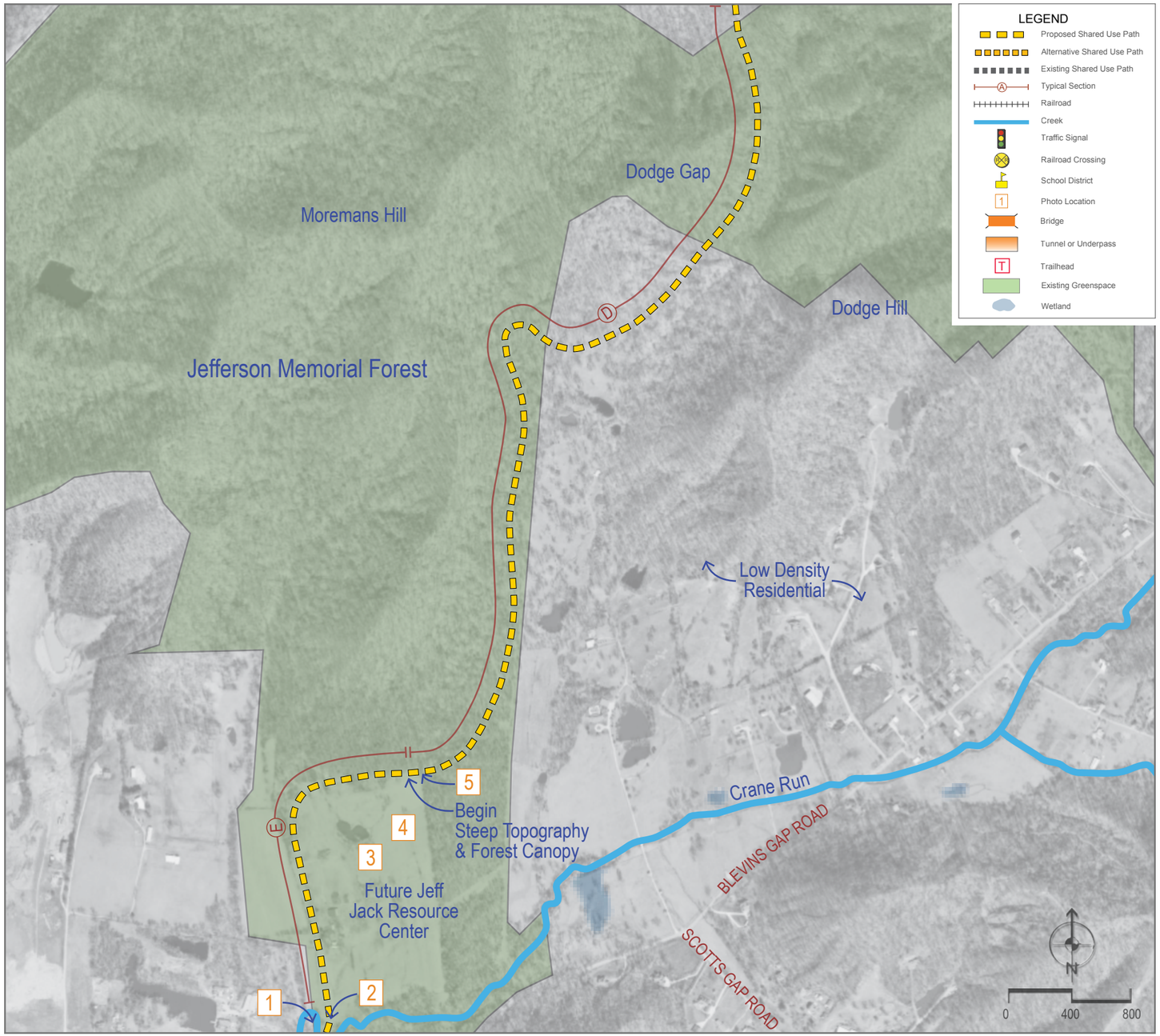
Utilities are not a significant issue for this segment.

TOPOGRAPHY

Topography is a significant issue for this alignment. Walls and/or a significant amount of grading would be required to construct a 5% path (meeting ADA guidelines) through the forest. Existing unpaved paths could be expanded to minimize disturbance.

ENVIRONMENT

The majority of the segment is within densely vegetated forest on steep slopes. Temporary disturbance to the forest would be necessary in order to install a 12' wide paved path. Disturbance could be minimized by following one of several existing unpaved paths, and by the use of retaining walls. Special attention to visual impacts to significant visual or cultural resources in the area would need to be considered. Coordination with the Jeff Jack Resource Center offers an excellent opportunity for environmental education.



SAFETY

Safety conditions are good along this segment.

AVAILABLE RIGHT-OF-WAY

This segment would require a minor amount of land acquisition; the segment would cross through the back side of a private parcel in order to maintain a 5% grade through the steeply sloping topography. The impact of the acquisition on the effected property would be relatively low- the acquisition area would be located on a steep undevelopable portion of the property, and the acquisition area would be a small percentage of the parcel as a whole.

EXPERIENCE

The user experience along this segment would be high due to the lack of safety issues and the good scenic value of the forest and open farm land.


CRANE RUN 1


JEFFERSON MEMORIAL FOREST LOOKING NORTH 2


JEFFERSON MEMORIAL FOREST LOOKING NORTH 3


JEFFERSON MEMORIAL FOREST LOOKING NORTH 4


JEFFERSON MEMORIAL FOREST LOOKING NORTH 5

ALIGNMENT B, SEGMENT 4

The segment would begin on the north side of Dodge Gap, near an existing small lake. The route would head northwest , following an existing cleared route; cross under the Gene Snyder Freeway using an existing tunnel; turn east and follow the for approx 1 mile; head northeast along Pond Creek, turn northeast and follow the CSX corridor; and end at the Stonestreet Rd/Pond Station Rd intersection.

This segment includes the following typical sections:

- *Typical Section D: Path within forest* — proposed through floodplain forests and forested knobs on either side of the freeway.
- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed along the freeway, and would pass through forested wet areas, steep forested knobs, and open pasture land.
- *Typical Section E: Path within field*— proposed along the freeway through open pasture land.
- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek within forest and wet areas.
- *Typical Section C: Path adjacent to railroad* — proposed along CSX corridor through open fields.

CONNECTIVITY

This segment would provide connectivity to the newly acquired Metro Parks property at the former Flynn Brothers sand quarry. A short spur trail could provide connectivity to the adjacent residential development on the northern side of the Gene Snyder Freeway, adjacent to Deering Road. This is a large development that includes both single family and multifamily residential units.

CROSSINGS

The Gene Snyder Highway would be crossed at an existing corrugated steel tunnel. This tunnel was originally used by trucks to access a sand quarry, so the horizontal and vertical clearances are more than adequate for a shared-use path. Minor grading improvements would be necessary to improve the drainage conditions within tunnel.

UTILITIES

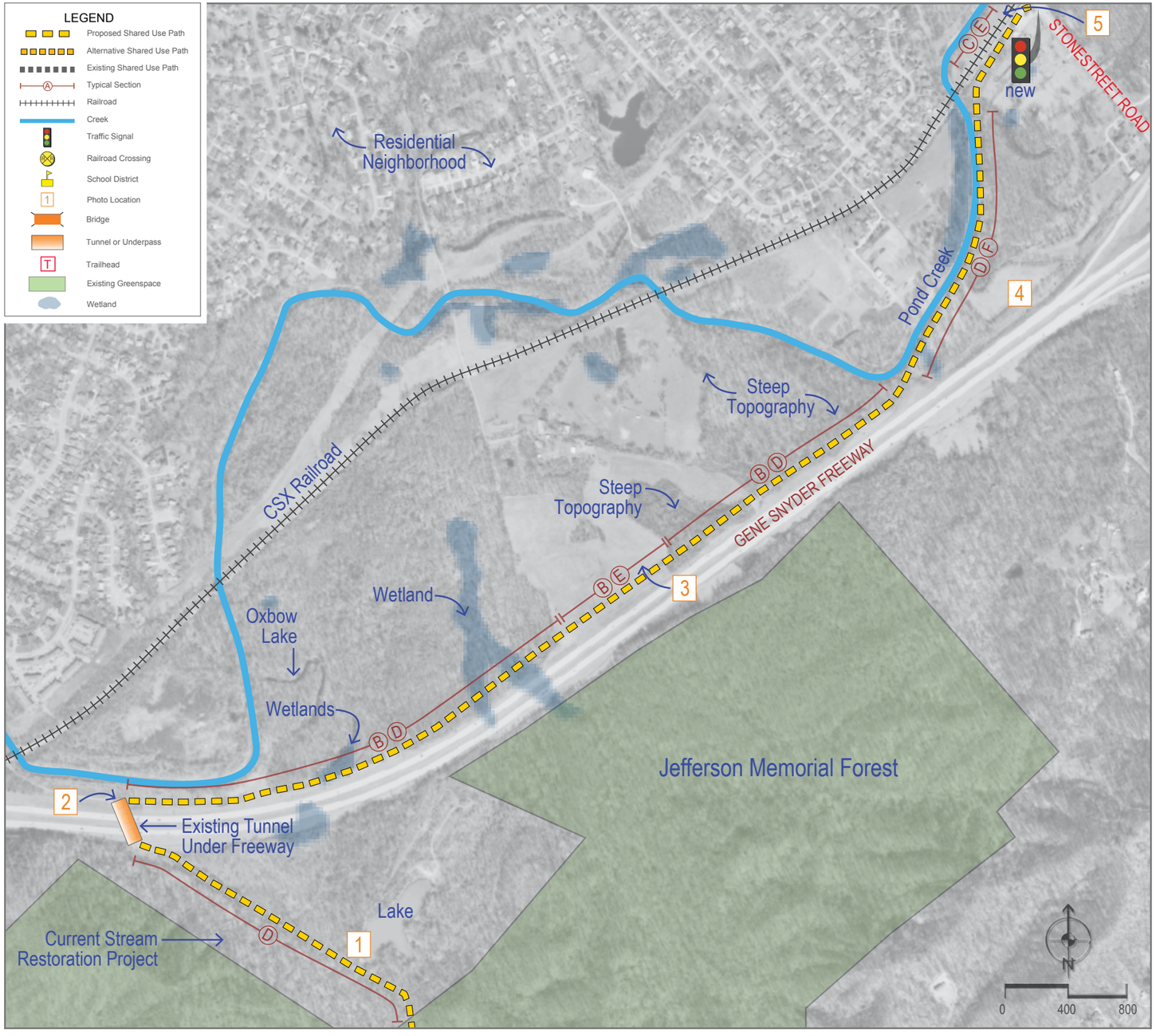
Utilities are not a significant issue for this segment.

TOPOGRAPHY

The path would cross 2 small forested knobs as it parallels the highway—significant grading and/or walls would be needed to achieve a 5% grade.

ENVIRONMENT

The segment passes next to a small stream (on the south side of the Gene Snyder Fwy) that is currently undergoing restoration work. This restoration area, and a small lake (located near the tunnel crossing) offer excellent potential for environmental interpretation Portions of the segment along the Gene Snyder Freeway would cross through wetlands. The northern portion of the alignment would be along Pond Creek, offering opportunities for stream restoration.



SAFETY

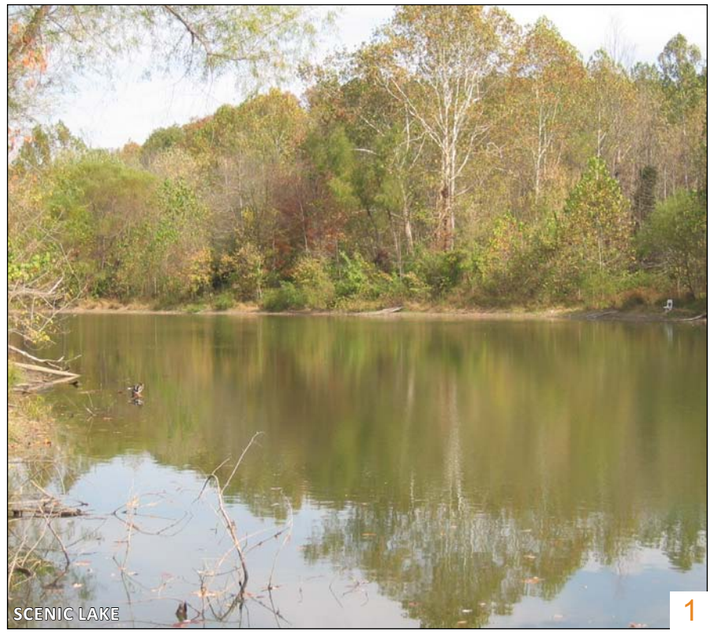
Safety conditions would be good along this segment; all major crossings would be grade separated with no vehicular conflicts.

AVAILABLE RIGHT-OF-WAY

Metro Parks owns the former sand quarry property on the north side of the Gene Snyder Freeway, and the Metropolitan Sewer District (MSD) owns another small property on the north side of the Gene Snyder Freeway. The remainder of the corridor would require land acquisition. The portion of the segment along the Gene Snyder Freeway may be placed on the highway right-of-way if the private property owners are not be willing to sell a portion of their property. Coordination with the Kentucky Transportation Cabinet (KYTC) would be necessary to use the Gene Snyder ROW.

EXPERIENCE

Path user experience along the Gene Snyder Freeway would be fair to poor depending on the buffer width between the path and the highway. The portions of path along Pond Creek would have high user experience due to good scenic value and lack of safety issues.



SCENIC LAKE 1

EXISTING TUNNEL UNDER GENE SNYDER 2

GENE SNYDER ROW LOOKING SOUTHWEST 3

PRIVATE PROPERTY ADJACENT TO GENE SNYDER LOOKING NORTH 4

CSX RAILROAD LOOKING SOUTHWEST 5

ALIGNMENT B, SEGMENT 5

The segment would begin at a proposed traffic signal at the intersection of Stonestreet Rd and Pond Station Rd. The segment would run northeast along Pond Station Rd; continue northeast along the CSX corridor; cross Pond Creek; turn southeast and continue along Pond Creek; and terminate at the existing MSD Trail along Pond Creek.

The following typical sections are included in the segment:

- *Typical Section A: Path adjacent to road* — proposed along Pond Station Road, a two-lane private industrial road that provides access to shipping warehouse and a paintball facility.
- *Typical Section C: Path adjacent to railroad* — proposed to follow CSX corridor through forested floodplain.
- *Typical Section D Path within forest* — proposed through forested floodplain, adjacent to railroad corridor.
- *Typical Section F: Path adjacent to creek* — proposed to follow Pond Creek.

CONNECTIVITY

The segment would provide a direct connection to the existing MSD Trail along Pond Creek. A spur trail from the Pond Station Road intersection, headed northwest could provide connectivity to Stonestreet Elementary School (which is approximately ½ mile away) and to the large residential developments that connect to Stonestreet Road.

CROSSINGS

Stonestreet Road (a 35 MPH minor arterial roadway with 2 travel lanes and a central turn lane) would be crossed at the Pond Station Road intersection. This crossing would require the installation of traffic signals, pedestrian signal heads, and signage. This is currently a busy intersection which would help to justify the installation of traffic signals.

UTILITIES

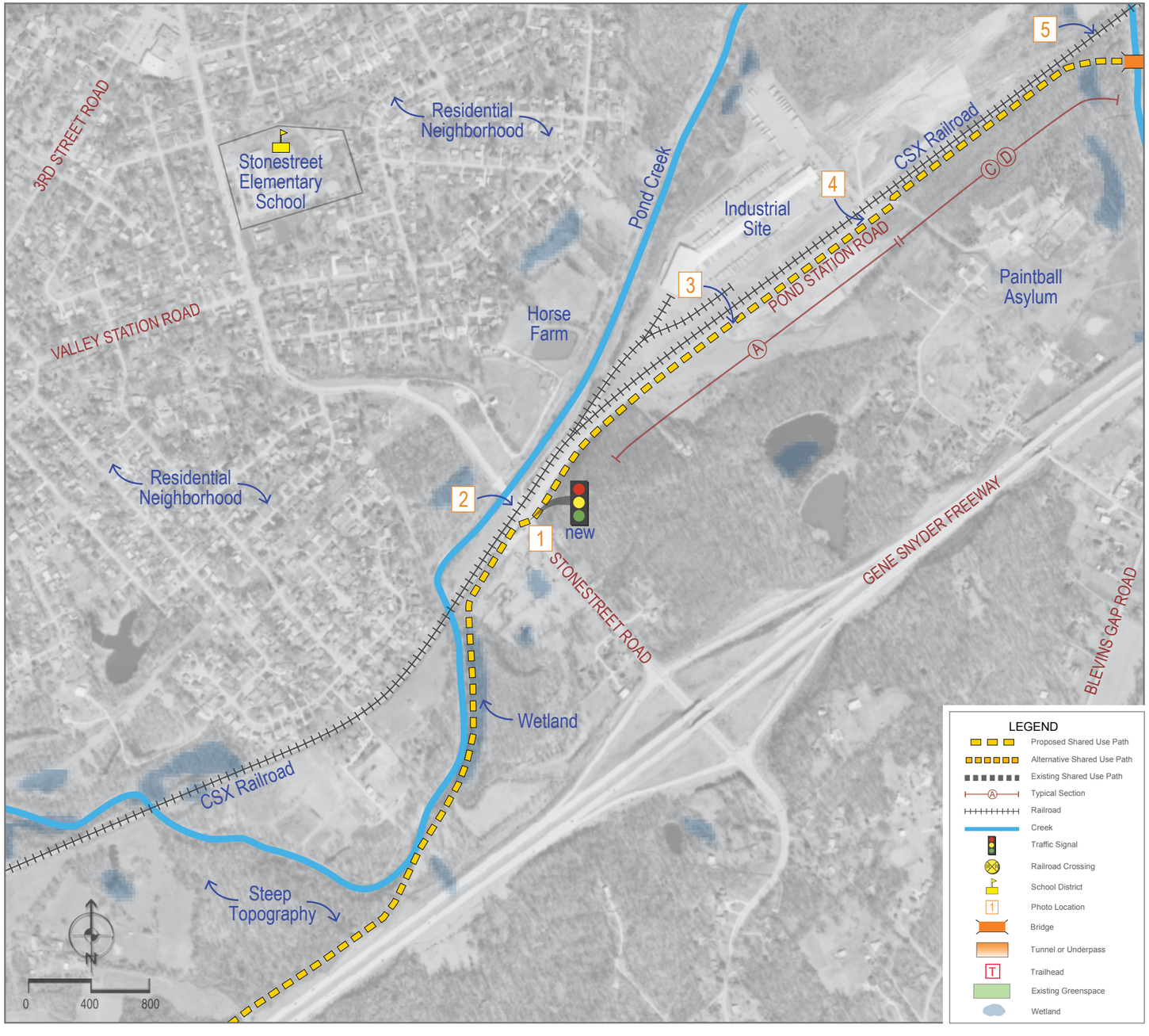
Utilities are not a significant issue for this segment.

TOPOGRAPHY

Topography is generally flat along this segment; however the crossing of Pond Creek may require a ramping system to get the bridge above floodplain elevation. The segment of path adjacent to Pond Creek has significant cross slopes which would require significant grading or walls.

ENVIRONMENT

The majority of this segment would be adjacent to the CSX rail line and Pond Station Road. The potential for environmental opportunities for this portion of the segment is limited as the eastern portion of the segment utilizes the existing MSD Trail and channel improvements that were completed in 2010. Flooding is a significant issue along Pond Creek, and care should be taken to set the bridge and path at the appropriate levels to avoid frequent flood damage.



SAFETY

Truck traffic is significant along Pond Station Road; there is a constant flow of 18 wheel trucks that access the warehouse. This high level of traffic creates a significant traffic safety issue as trucks turn left onto Stonestreet Rd at an unsignalized intersection. No driveways are currently present along the east side of Pond Station Rd; however a future planned development will change this condition.

AVAILABLE RIGHT-OF-WAY

This route would be entirely within private property, including Pond Station Rd which is a private roadway. Most of the properties are large and industrial, which could facilitate an easier acquisition process.

EXPERIENCE

The user experience along this segment would be poor along Pond Station Road due to truck traffic and poor scenery. Once the segment leaves Pond Station Rd, the user experience would improve as the path runs along the railroad (through a forested floodplain) and along Pond Creek.

STONESTREET RD CROSSING @ POND STATION RD LOOKING SOUTHWEST 1

POND STATION RD LOOKING NORTHEAST 2

POND STATION RD LOOKING NORTHEAST 3

POND STATION ROAD LOOKING NORTHEAST 4

CSX RAILROAD CORRIDOR LOOKING SOUTHWEST 5

ALIGNMENT B, SEGMENT 6

This segment would follow the existing MSD trail along the east side of Pond Creek; cross Lamborne Boulevard; turn southeast and follow the east side of Lamborne Boulevard to Greyling Drive; cross to other side of Greyling Drive; turn west and follow Greyling Drive over the Gene Snyder Freeway (on a proposed pedestrian bridge) to Lamborne Boulevard; u-turn and head north on Lamborne Boulevard to the Gene Snyder Freeway; turn northeast and continue parallel to the freeway right of way for approximately .43 miles ; turn southeast at small creek; continue southeast to Penile Road; cross to other side of Penile Road and continue northeast along Penile Road.

This segment includes the following typical sections:

- *Typical Section F: Path adjacent to creek* — would follow the existing MSD trail along Pond Creek and would follow a small creek segment north of Penile Road.
- *Typical Section A: Path adjacent to road* — proposed along Lamborne Boulevard (two-lane residential roadway), Greyling Drive (two-lane, 35 mile per hour, rural road, and Penile Road (two-lane, rural road that carries approximately 2100 vehicles per day).
- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed through open fields next to the freeway.

CONNECTIVITY

This segment would provide access to the neighborhood surrounding Lamborne Boulevard and would tie to an existing trailhead.

CROSSINGS

The Gene Snyder Freeway would require an approximate 235 foot long pedestrian bridge. Pond Creek would also be crossed, requiring either a pedestrian bridge (approximately 100 feet long), or widening of the existing Lamborne Boulevard bridge. Greyling Drive would be crossed at an unsignalized intersection. Penile Road would be crossed at a midblock location. Safety considerations associated with these crossings are discussed below.

UTILITIES

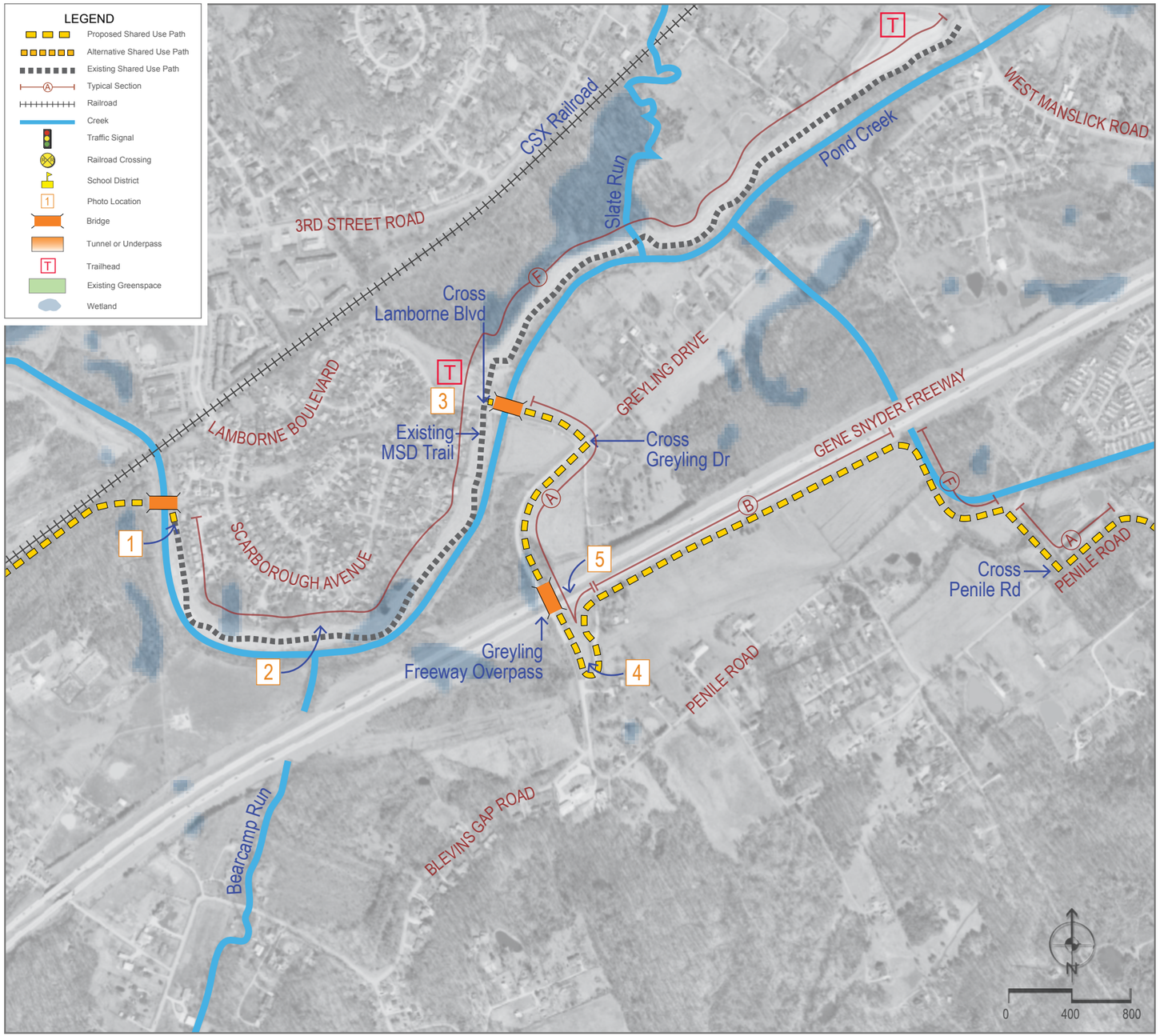
Utility poles are present along Penile Road, but these should be easily avoided.

TOPOGRAPHY

Topography would be an issue at both approaches to the bridge over the freeway. The shoulders are not currently wide and flat enough to accommodate a trail, so additional fill material and potentially walls will be required to construct the trail approach to the pedestrian bridge. Additionally, the grade of the trail up to the bridge should be 5% maximum.

ENVIRONMENT

The trail and channel improvements along Pond Creek that were completed in 2010 provide an opportunity for environmental interpretation. Flooding is a significant issue along this portion of the trail; portions of the existing path may need to be relocated to higher elevations to avoid flood damage and periodic path closures. The segment will also be within the floodplain and adjacent to a small stream between the freeway and Penile Road.



SAFETY

The primary safety concerns would be at the Greyling Drive and Penile Road crossings. Although the Greyling Drive crossing would occur at the intersection (with Lamborne Boulevard), the intersection is currently only stop controlled for Lamborne Boulevard. This intersection would require enhanced crosswalk improvements such as in-pavement signal lights or flashing beacons in addition to signage and striping. The Penile Road crossing, at a midblock location, would also require an enhanced crosswalk design.

AVAILABLE RIGHT-OF-WAY

The segment would take advantage of road right of ways along Lamborne Boulevard, Greyling Drive, and Penile Drive, all of which appear to be wide enough to install an off road route.

EXPERIENCE

The user experience along this segment is generally fair. The path user experience would be good along Penile Road (good scenery, little traffic), fair along Lamborne Boulevard and Greyling Drive (fair scenery, fair amount of traffic), and fair to poor along the freeway(good safety, fair scenery, noisy).

CSX RAILROAD TRESTLE OVER POND CREEK LOOKING SOUTHWEST 1

MSD TRAIL 2

MSD TRAILHEAD @ LAMBORNE BLVD 3

LAMBORNE BLVD LOOKING NORTHEAST 4

GENE SNYDER ROW LOOKING NORTHEAST 5

ALIGNMENT B, SEGMENT 7

This segment would begin near the Penile Road/Spirit Drive intersection. The path would head northeast along Penile Road's southeastern right of way; cross West Manslick Road, turn northwest and follow northeastern right of way of West Manslick Road; cross Salt Block Creek; turn northeast and follow Salt Block Creek to the Gene Snyder Freeway right of way; turn west and cross Salt Block Creek; continue west adjacent to the freeway right of way line; turn south on the former New Cut Road right-of-way; turn east along Old New Cut Road to New Cut Road; cross New Cut Road at a proposed signal; turn southeast and follow the east side of New Cut Road towards Fairdale.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — would follow Penile Road (two-lane, 35 m.p.h.), West Manslick Road (two-lane, 35 m.p.h.), Old New Cut Road (two-lane, 35 m.p.h.), and New Cut Road (two-lane, 35 m.p.h.).
- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed on private property adjacent to freeway through forest and open fields.
- *Typical Section E: Path within field* — would occur in several location adjacent to Gene Snyder Freeway.
- *Typical Section F: Path adjacent to creek* — proposed along a short segment of Salt Block Creek and along Big Bee Lick Creek.

CONNECTIVITY

This segment provides access to the communities along Penile Road and Old New Cut Road.

CROSSINGS

The segment includes 3 crossings of Salt Block Creek and 1 crossing of Big Bee Lick Creek. The Salt Block Creek crossings could be accomplished with either culverts or small bridges; the Big Bee Lick Creek crossing would require a small pedestrian bridge. A wetland area adjacent to the freeway would require a boardwalk crossing. The segment includes 3 roadway crossings (West Manslick Road, New Cut Road, and Pirouette Road); the New Cut Road crossing would require a new traffic signal. The segment also includes three driveway crossings that lead to hotel/industrial uses, which have heavy truck traffic during certain times of the day.

UTILITIES

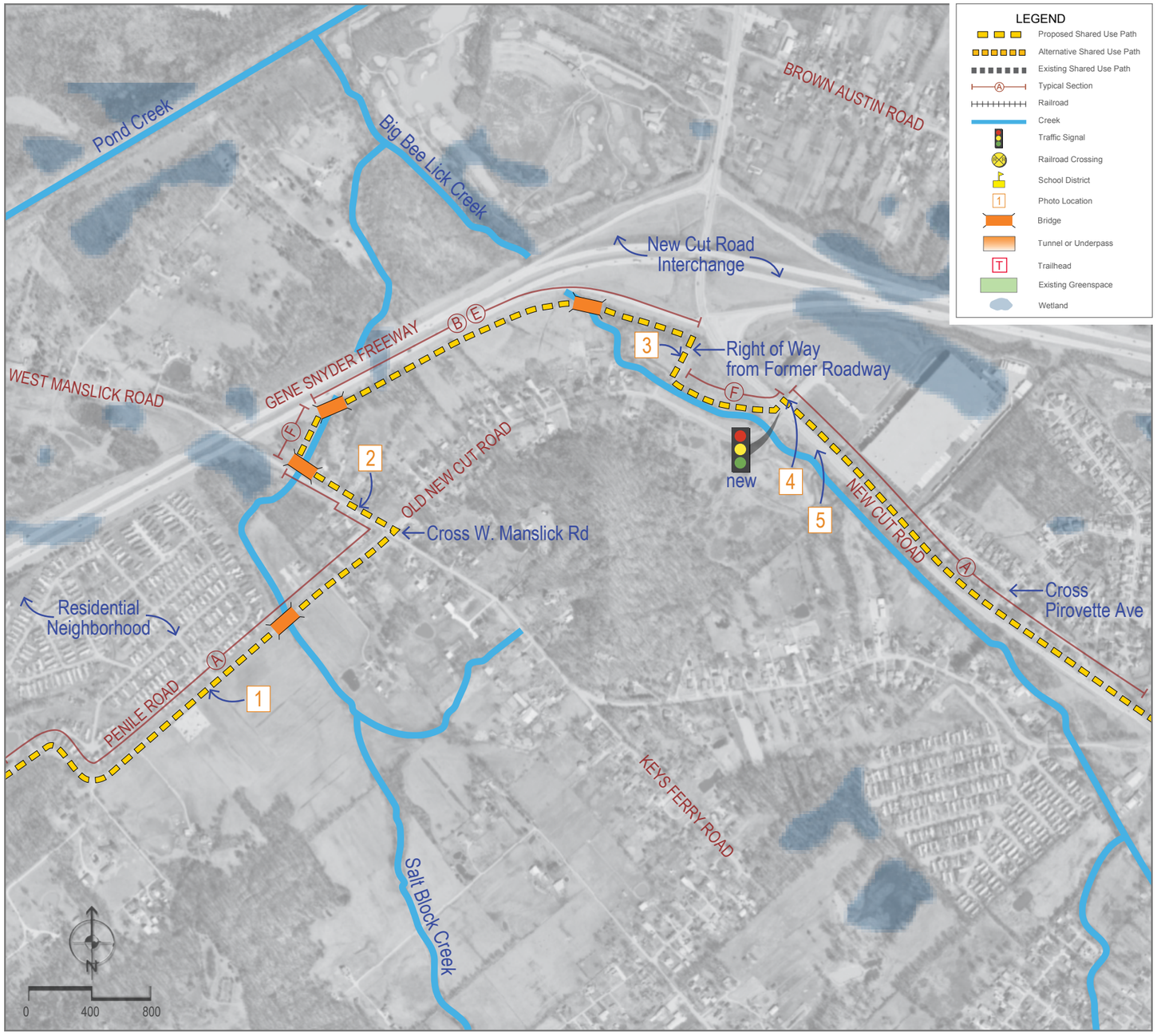
Utilities do not pose a significant obstacle for the potential development of the segment.

TOPOGRAPHY

Topography would not be an issue in this segment.

ENVIRONMENT

This segment would follow Salt Block Creek and Big Bee Lick Creek for short distances. Most of the segment would fall within land that is classified as 100-year floodplain. A small wetland would be crossed adjacent to the freeway.



SAFETY

The New Cut Road crossing is the most significant safety consideration. This crossing would require the installation of a signalized pedestrian crossing due to the width of the road (approximately 60'), traffic volume (11,400 vehicles per day), and vehicular speeds. The signal design would have to be coordinated with an adjacent signal in close proximity at the Gene Snyder off-ramp that. In addition to the crossing of New Cut Road, the hotel/industrial driveway crossings along New Cut Road would create potential conflicts for path users and turning trucks and cars.

AVAILABLE RIGHT-OF-WAY

The right of way along Penile Road appears to be an adequate width for path construction. The entire route shown between West Manslick Road and New Cut Road would be on private property and would require a linear acquisition corridor. An alternative would be to acquire the appropriate width from the Kentucky Transportation Cabinet (KYTC) as the corridor would follow the current Gene Snyder Freeway right of way. New Cut Road has a wide right of way ranging from 120 feet to over 200 feet, which would easily accommodate a shared-use pathway.

EXPERIENCE

The portion of the segment along Penile would be a good experience (it has good scenery and little traffic); however, the experience along the remainder of the segment is poor due to very little scenic value, noise issues and some safety concerns.


PENILE RD LOOKING NORTHEAST 1


W. MANSLICK RD ROW LOOKING NORTHWEST 2


FORMER NEW CUT RD LOOKING SOUTHWEST 3


NEW CUT RD/ OLD NEW CUT RD LOOKING SOUTHWEST 4


NEW CUT RD LOOKING NORTHWEST 5

ALIGNMENT B, SEGMENT 8

This segment would begin on the north side of New Cut Road near the Pirouette Road intersection. The segment would continue along the north side of New Cut Road (which turns into West Manslick Road) into the Fairdale commercial district; turn north at Fairdale Road and follow the west side of Fairdale to National Turnpike. A spur alignment would begin at the Fairdale Road/Mitchell Hill intersection and continue southwest along the west side of Mitchell Hill Road towards the Jefferson Memorial Forest Welcome Center.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — would follow New Cut Road (two-lane, 45 m.p.h), West Manslick Road (two-lane, 35 m.p.h.), Fairdale Road (two-lane, 35 m.p.h.), and the spur would follow Mitchell Hill Road (two-lane, 35 m.p.h).
- *Typical Section I/J: Path within commercial district* — proposed within the Fairdale commercial district.

CONNECTIVITY

This segment would provide good connectivity to many destinations within the study area, including: Fairdale High School, Nelson Hornbeck Park, Fairdale Elementary School, Fairdale Public Library, the Fairdale neighborhoods, and the Fairdale commercial district. The routing of the path to the commercial corridor should be an impetus for redevelopment within Fairdale.

CROSSINGS

Two creek crossings (Wilson Creek and Big Bee Lick Creek) would require pedestrian bridges. Roadway crossings would occur at Brown Austin Road, Manslick Road (at the proposed Fairdale roundabout), and Caple Avenue. Approximately 34 driveways would have to be crossed, including commercial driveways in Fairdale.

UTILITIES

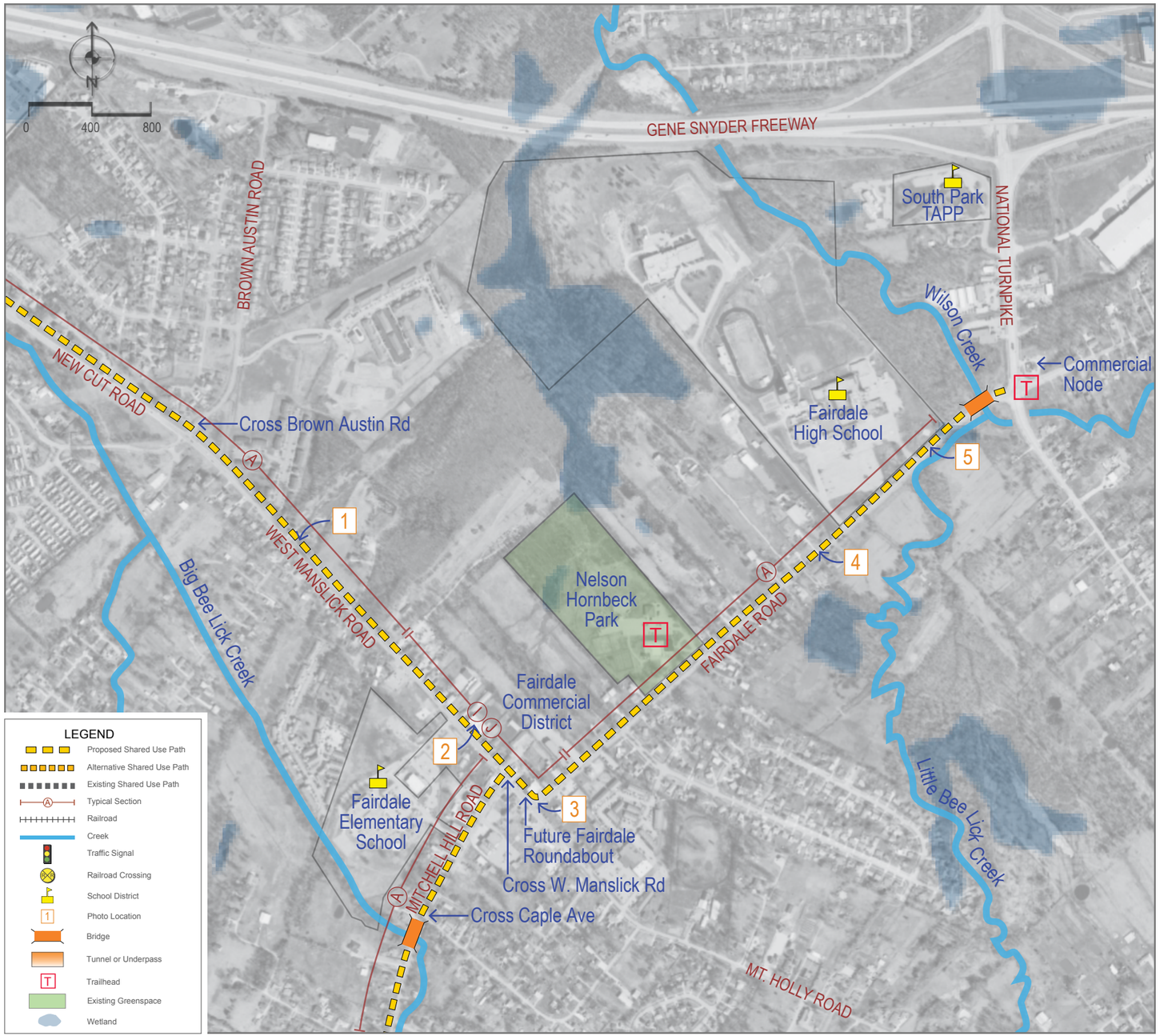
Overhead power lines and power poles exist on both sides of Fairdale Road and Mitchell Hill Road, which could become an issue in the placement of the potential pathway. Drainage structures on Fairdale Road would have to be modified.

TOPOGRAPHY

Most of the segment is fairly flat; however one area of steep topography along West Manslick Road (adjacent to a multifamily development) would have to be addressed through grading or the construction of retaining walls.

ENVIRONMENT

Wilson Creek and Big Bee Lick Creek would be crossed by this segment and offer restoration opportunities.



SAFETY

Primary safety concerns occur within the Fairdale Commercial District where there are multiple, long (almost continuous) curb cuts that access the various businesses within the district. These curb cuts would need to be condensed to reduce the number of potential conflicts. The residential driveways along Fairdale Road and Mitchell Hill Road would also create a potential conflict between turning vehicles and path users.

AVAILABLE RIGHT-OF-WAY

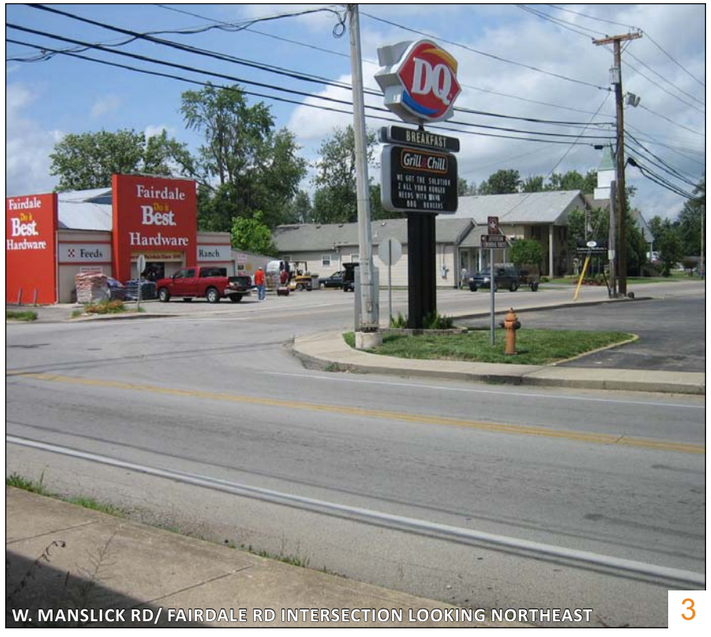
Adequate road right of way occurs along most of West Manslick and Fairdale Roads. The segment also takes advantage of publicly owned lands at Fairdale High School and Nelson Hornbeck Park. There are significant ROW challenges within the Fairdale commercial district, where parking and proximity of buildings will make trail routing difficult. Bike lanes and narrower sidewalks could be installed within the district initially, until redevelopment allows for a cycle track and wider sidewalk/pedestrian trails.

EXPERIENCE

The user experience for this segment would be fair to poor - the segment follows existing roadways the entire length, and there are safety issues associated with the 34 driveway crossings.


W. MANSLICK RD LOOKING NORTHWEST 1


W. MANSLICK RD LOOKING NORTHWEST 2



W. MANSLICK RD/ FAIRDALE RD INTERSECTION LOOKING NORTHEAST 3


FAIRDALE RD LOOKING NORTHEAST 4


FAIRDALE RD LOOKING NORTHEAST 5

ALIGNMENT B, SEGMENT 9

This segment would begin on east side of Mitchell Hill Road, just south of Chieftain Drive; continue south along Mitchell Hill Road; cross to the west side of Mitchell Hill Road at the Babe Drive intersection; continue along the west side of Mitchell Hill Road; cross back to the east side of Mitchell Hill Road at the Holsclaw Hill Road intersection (the future Jefferson Memorial Forest Welcome Center will be located at this intersection); continue south along the east side of Mitchell Hill Road to the current Jefferson Memorial Forest Welcome Center.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — proposed along Mitchell Hill Road (two-lane, 35 m.p.h.)

CONNECTIVITY

This segment would connect users to the Jefferson Memorial Forest Welcome Center (both the current location and the future location). In addition, this segment is adjacent to several residential areas that surround Mitchell Hill Road.

CROSSINGS

There would be several roadway crossings along this alignment: two Mitchell Hill Road crossings and one Keys Ferry Road crossing. Nine residential driveways would also be crossed. This segment would cross Big Bee Lick Creek which would require a pedestrian bridge.

UTILITIES

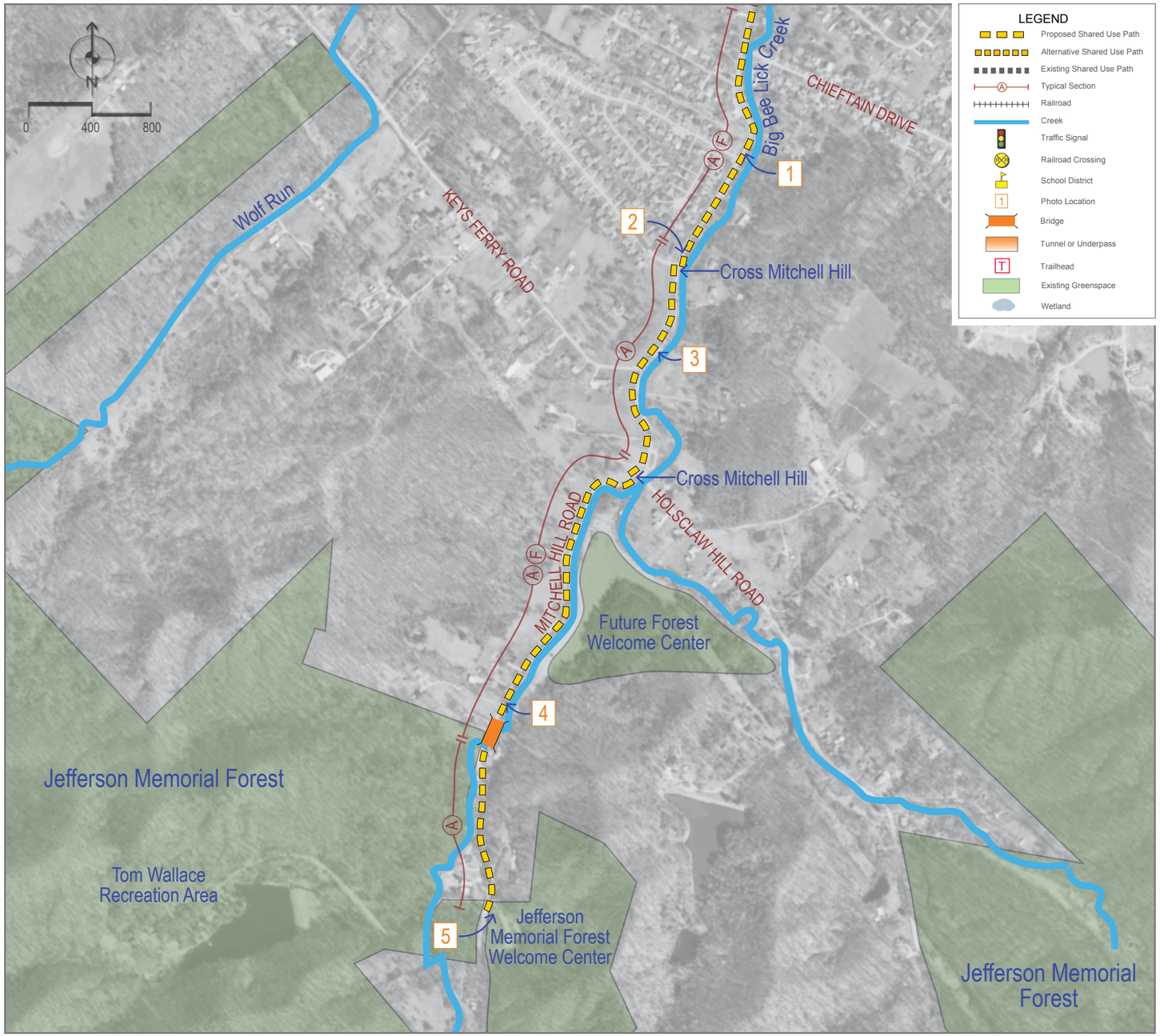
Overhead utilities exist along Mitchell Hill that could be avoided without relocation.

TOPOGRAPHY

The slope drops off significantly from the edge of the pavement along Mitchell Hill Road and would require grading or walls. These locations are primarily located in areas where the roadway parallels Big Bee Lick Creek.

ENVIRONMENT

Big Bee Lick Creek runs along the east side of Mitchell Hill Rd. and would be a scenic amenity for the path and an opportunity for stream restoration.



SAFETY

Potential vehicular conflicts would occur at the Mitchell Hill Road crossings, both of which would be at intersections that are stop controlled for the cross streets but not for Mitchell Hill Road. These crossings would require enhanced crosswalk improvements such as in pavement signal lights or flashing beacons in addition to signage and striping. The Holsclaw Hill Road intersection could potentially be turned into a four way stop condition if traffic analysis demonstrates that it is warranted after construction of the future Forest welcome center.

AVAILABLE RIGHT-OF-WAY

The route would take advantage of the parcel at the Holsclaw Hill intersection that is owned by Metro Parks for the future forest welcome center. The right of way along Mitchell Hill Road is variable; in most locations, right of way acquisition would be necessary to install the path with appropriate roadway clearance.

EXPERIENCE

The user experience for this segment would be fair. Although the path would follow a roadway for the entire length, Mitchell Hill Road is narrow and carries a low volume of traffic, so the adjacent roadway would not significantly impact the experience. The scenic value of this segment would be fairly high as there are few residential units and good views of the Jefferson Memorial Forest.


MITCHELL HILL RD/ HOLLY HILLS DR INTERSECTION LOOKING SOUTHWEST 1


MITCHELL HILL RD/ BABE DR INTERSECTION LOOKING SOUTHWEST 2


MITCHELL HILL RD/ KEYS FERRY RD INTERSECTION LOOKING SOUTHWEST 3

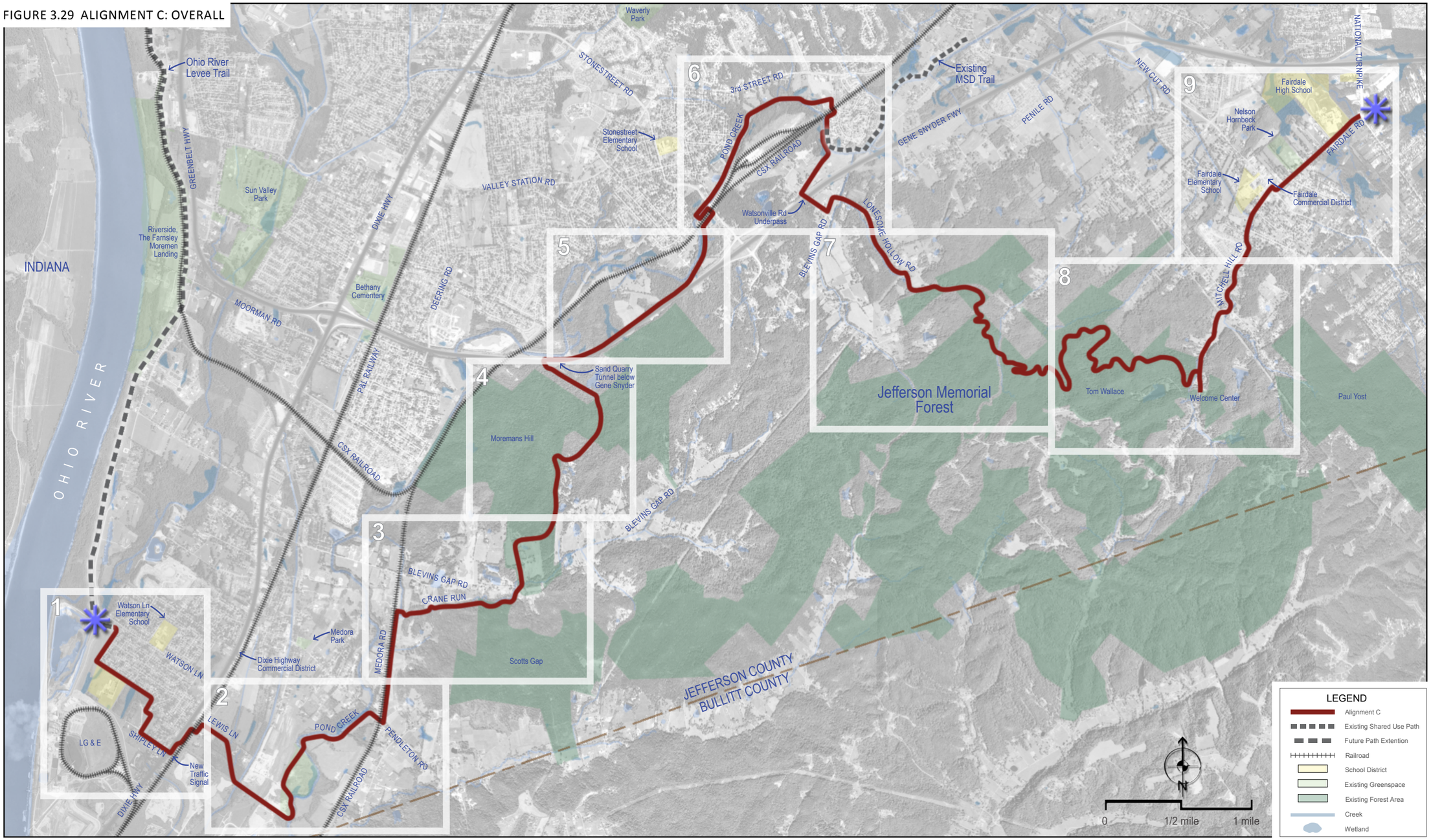

MITCHELL HILL RD LOOKING SOUTHWEST 4


JEFFERSON MEMORIAL FOREST WELCOME CENTER 5

Alignment C

Alignment C is 19.74 miles in length, and is the longest of the three alignments. This alignment (as with all three alignments) is routed through a diverse environment including residential neighborhoods, creek corridors, woodlands, and open fields. It would provide good connectivity to the surrounding neighborhoods, and to the following destinations: Watson Lane Elementary School, Frost Middle School, Fairdale High School, Fairdale Elementary School, the Fairdale Commercial District, the Dixie Hwy Commercial District, Nelson Hornbeck Park, the MSD Trail, and the Jefferson Memorial Forest. This alignment, utilizes the Jefferson Memorial Forest more than any of the other alignments which is safe, attractive, and minimizes property acquisition; however development of a trail within the steep terrain of the forest would be extremely expensive and highly destructive to the Forest. This alignment follows very few roadways. The alignment would require a new signal to cross the Dixie Highway at Shipley Lane, which may be difficult to accomplish due to KYTC permitting requirements. The Gene Snyder Highway is crossed in two locations: the western location utilizes an existing tunnel that once provided access to a sand quarry, and the eastern crossing utilizes the existing underpass at Watsonville Rd.

FIGURE 3.29 ALIGNMENT C: OVERALL



ALIGNMENT C

ALIGNMENT C, SEGMENT 1

The segment would begin at a trailhead near the entrance to the LG&E Power Plant on Watson Ln; this trailhead is currently under design as the terminus of the Ohio River Levee Trail. From the trailhead, the path would run southeast to the property line between LG&E and the private residences along Rainbow Drive; follow the property line to Frost Middle School; head southeast through the Frost Middle School property; cross back onto LG&E property; follow the property line to Shipley Lane; turn southeast and follow Shipley Lane; cross Dixie Highway at a proposed traffic signal; head northeast along the Dixie Highway; cut across an undeveloped property to the P&L railroad corridor; continue northeast along the railroad; turn southeast on Richie Lane; cross the P&L railroad; turn northeast and follow P&L railroad; and terminate at Lewis Lane.

The following typical sections are included in this segment:

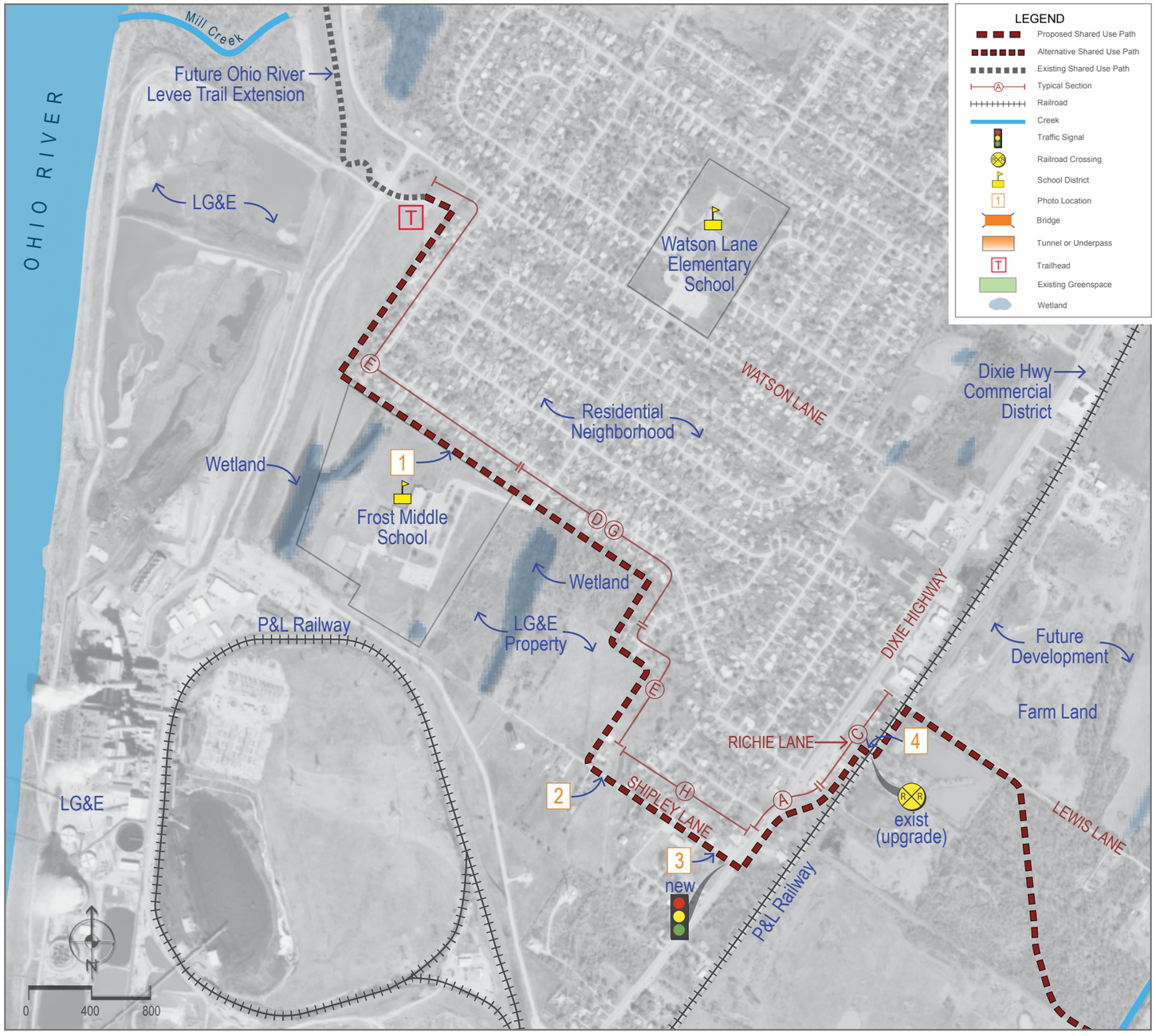
- *Typical Section E: Path within field* — proposed though LG&E and Frost Middle School properties directly adjacent to back yards of a dense single family neighborhood.
- *Typical Section D: Path within forest* — within wet forest through LG&E property.
- *Typical Section G: Path within wet area* — through wetland and wet forest on LG&E property.
- *Typical Section H: Sharrow with adjacent sidewalk* — proposed along Shipley Lane (a dead end residential roadway that serves 12 parcels)
- *Typical Section A: Path adjacent to road* — proposed along the Dixie Highway (a tenth of a mile) through residential and undeveloped property.
- *Typical Section C: Path adjacent to railroad* — proposed along P&L railroad (the path on the west side of the tracks runs behind commercial properties that face the highway and the path on the east side of the railroad runs along an existing utility access road in front of houses and farm land.

CONNECTIVITY

The segment provides connectivity to the dense single family residential neighborhood surrounding Watson Lane. The path will provide connectivity between this neighborhood and the following destinations: Frost Middle School, Watson Lane Elementary School (4 blocks from the path alignment), and the Dixie Highway Commercial District. The routing of the path to the commercial corridor should be an impetus for redevelopment along this portion of Dixie Hwy.

CROSSINGS

The path would cross Dixie Highway at Shipley Lane. Dixie Highway is a 4 lane, 50 mph state highway that creates a major barrier for pedestrian and bike flow. This intersection is not currently signalized, and would require significant coordination with KYTC to prove that a signal in this location is truly justified. Without a significant new development at the intersection of Shipley Lane, a new signal is unlikely. Dixie Highway could also be crossed with a bicycle/pedestrian bridge, which would be very expensive and require a significant amount of right of way (for bridge approach ramps). The P&L Railroad is crossed at Richie Lane; the crossing will require widening, and, potentially, signalization. Safety considerations of the various crossings are described below.



UTILITIES

Overhead utilities are located on the southwest side of Shipley Lane, both sides of Dixie Highway, and the southeast side of the P&L railroad corridor. The segment follows an exiting utility road along the southeast side of the railroad.

TOPOGRAPHY

There is very little change in elevation along the route; trail grades can be maintained below 5% (meeting ADA guidelines) without additional grading or walls.

ENVIRONMENT

As this segment is primarily in a developed area, opportunities or constraints from an environmental perspective is limited.

SAFETY

The primary safety concern is the Dixie Hwy crossing at Shipley Lane, which would be a signalized at-grade crossing. This intersection is currently unsignalized and would require upgrades, such as traffic signals, pedestrian signal heads, signage, and potentially pedestrian refuge islands, to make a safe at grade crossing condition for trail use. A pedestrian bridge crossing at Dixie Highway may improve safety, but would not be practical due to cost, land ownership issues, and zero topographical advantages. The sharrow along Shipley Lane is a minor safety concern due to mixing of bicycle and automobile traffic; however, traffic volumes are so light, that there is little potential for bicycle and automobile conflict.

AVAILABLE RIGHT-OF-WAY

This segment would utilize Frost Middle School property and Shipley Lane ROW to minimize land acquisition. A large portion of the path would be on LG&E property; LG&E has been a willing seller to Metro Parks in the past. Acquisition of property from the small parcels along Dixie Highway poses the most significant acquisition challenge. Acquiring, even a narrow corridor along the backs of these properties, would be a large impact to these small parcels.

EXPERIENCE

The segment has a fair to good user experience; very little of the segment is adjacent to roadways, it has fair scenery, and there are very few safety considerations. The only poor user experience would be along Dixie Highway and along the railroad corridor behind the parcels that face Dixie Highway.


FROST MIDDLE SCHOOL WALKWAY LOOKING NORTHWEST 1


SHIPLEY LN LOOKING SOUTHEAST 2

SHIPLEY LN/ DIXIE HWY LOOKING SOUTHEAST 3


RICHIE LN LOOKING SOUTHEAST 4

ALIGNMENT C, SEGMENT 2

The segment would follow Lewis Lane toward the southwest; turn south and follow property lines through wooded undeveloped properties; cross Weaver Run; continue to Pond Creek; turn north and follow Pond Creek through a natural area (owned by the CID); cross Pond Creek; continue along the east side of Pond Creek to Pendleton Road; turn southeast on Pendleton Road; cross Medora Road and the CSX Railroad corridor; turn and continue north adjacent to the CSX corridor.

The following typical sections would be included in the segment:

- *Typical Section A: Path adjacent to road* — proposed along Lewis Lane and Pendleton Road. Lewis Lane is a dead end roadway through sparsely populated residential/farmland area, and Pendleton Road is a two-lane, 35 mph rural roadway.
- *Typical Section D: Path within forest* — proposed in floodplain forest south of Lewis Lane
- *Typical Section G: Path within wet area* — proposed in floodplain forest and wetland areas adjacent to Pond Creek.
- *Typical Section E: Path within field* — proposed through open farmland adjacent to Pond Creek
- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek and through open farmland.
- *Typical Section C: Path adjacent to railroad* — proposed along the east side of the CSX corridor (through large residential properties).

CONNECTIVITY

A short spur trail connection down Pendleton Road could provide connectivity to the surrounding neighborhood and to a potential trailhead location at Medora Park. This segment, in conjunction with the previous segment, would provide access to the Dixie Highway commercial corridor and Watson Lane Elementary School, which serves this neighborhood.

CROSSINGS

The segment would cross Pond Creek and Weaver Run. The Pond Creek crossing would require a pedestrian bridge. Weaver Run could be crossed with either a pedestrian bridge or a culvert. The CSX Railroad would be crossed at Pendleton Road; this existing crossing would require upgrades and widening to accommodate a shared use path. The path would cross Pendleton Road (a minor roadway) at an un-signalized location. Concerns associated with this crossing are discussed in the Safety Section below.

UTILITIES

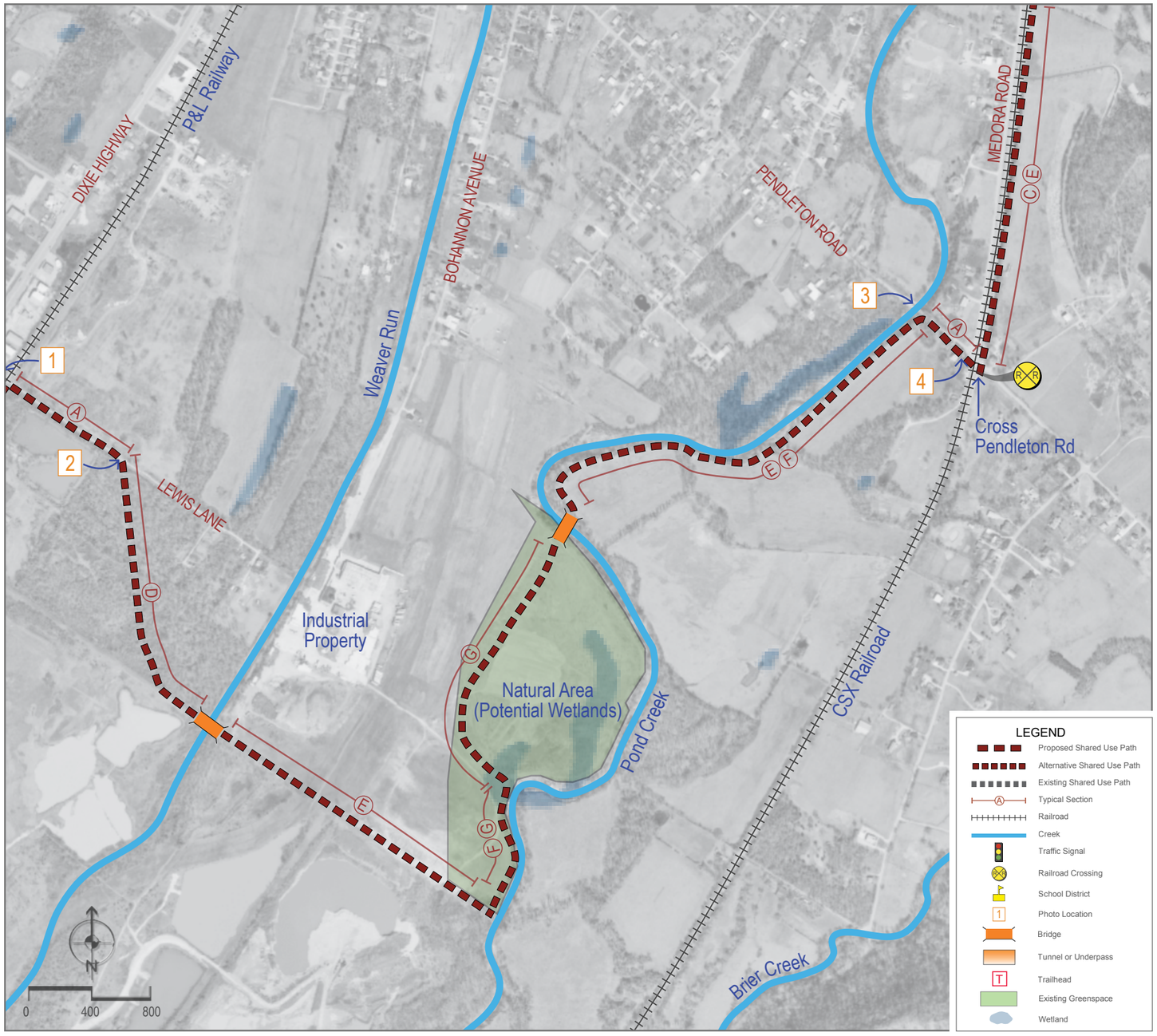
Overhead utilities are present along Pendleton Road, but the path could meander behind them.

TOPOGRAPHY

Topography is relatively flat throughout the entire segment. Cross slopes adjacent to roadways are more of an issue than running slopes parallel with the roadways.

ENVIRONMENT

While a few isolated wetlands exist on the upper banks of Pond Creek, the majority of constraints would be to the adjacent forested riparian areas. However, as this segment location is adjacent to Pond Creek, many opportunities exist for stream and ecosystem restoration along the creek corridor. In addition, a trail head at this location would provide a possible water trail access point at downstream end of Pond Creek.



SAFETY

The primary safety concern is the crossing of Pendleton Road, which would not occur at an intersection. This “midblock” crossing may require special signage, striping, and potentially flashing beacons to alert drivers of the pathway crossing.

AVAILABLE RIGHT-OF-WAY

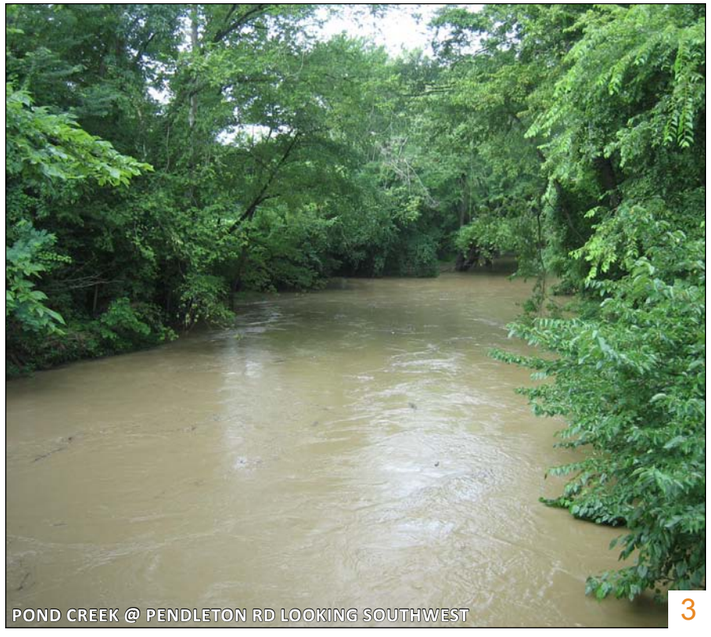
The segment would take advantage of available right of way along Lewis Lane and the CID property adjacent to pond creek. However, the majority of the segment cross private property and therefore require right of way acquisition. Fortunately, the parcels are large, so a small acquisition along the property line would have minimal impact to the parcel.

EXPERIENCE

The user experience along this segment would be good with very few vehicular conflicts and highly scenic landscapes. Scenic portions of the segment would include: the undeveloped land between Lewis Lane and Pond Creek (which is a mixture of floodplain forest and farmland); and the scenic Pond Creek corridor south of Pendleton Road. The experience of the segment along the railroad corridor would be good as well, with scenic views of the adjacent knobs and few vehicular conflicts. The crossing of Pendleton Road would be the only negative experience along the route due to the safety concerns of an unsignalized midblock road crossing.


LEWIS LN LOOKING SOUTHEAST 1


LEWIS LN LOOKING SOUTHEAST 2


POND CREEK @ PENDLETON RD LOOKING SOUTHWEST 3


PENDLETON RD LOOKING SOUTHEAST 4


CSX CORRIDOR LOOKING NORTH 5

ALIGNMENT C, SEGMENT 3

The segment would run north, parallel to the east side of the CSX corridor, turn east after passing a small farm pond, cross Crane Run, continue along the north side of Crane Run for approximately one half of a mile; cross Crane Run onto Jefferson Memorial Forest property; continue along the south and east side of Crane Run to Blevins Gap Road; cross Blevins Gap Road; cross Crane Run; continue north along an existing driveway through old farmland; enter the woods and meander through Forest property in a northwesterly direction.

The following typical sections would be included in the segment:

- *Typical Section C: Path adjacent to railroad* — proposed along the east side of the CSX corridor (through large residential properties).
- *Typical Section F: Path adjacent to creek* — proposed along Crane Run.
- *Typical Section E: Path within field* — proposed along portions of Crane Run and through old farm land with rolling topography (part of Jefferson Memorial Forest)
- *Typical Section D: Path within forest* — proposed along portions of Crane Run and through the forested knobs of the Jefferson Memorial Forest and adjacent private property.

CONNECTIVITY

The segment would provide connectivity to the recently acquired Jefferson Memorial Forest property that is planned to be the Jeff Jack Resource Center. The long range plans for this site include campground, research lab, and ecological restoration areas.

CROSSINGS

The segment would cross Crane Run in three different locations, each requiring a small pedestrian bridge. Several smaller streams could be crossed with either a pedestrian bridge or culvert. The path would cross Blevins Gap Road at an un-signalized "midblock" location. Concerns associated with this crossing are discussed in the Safety Section below.

UTILITIES

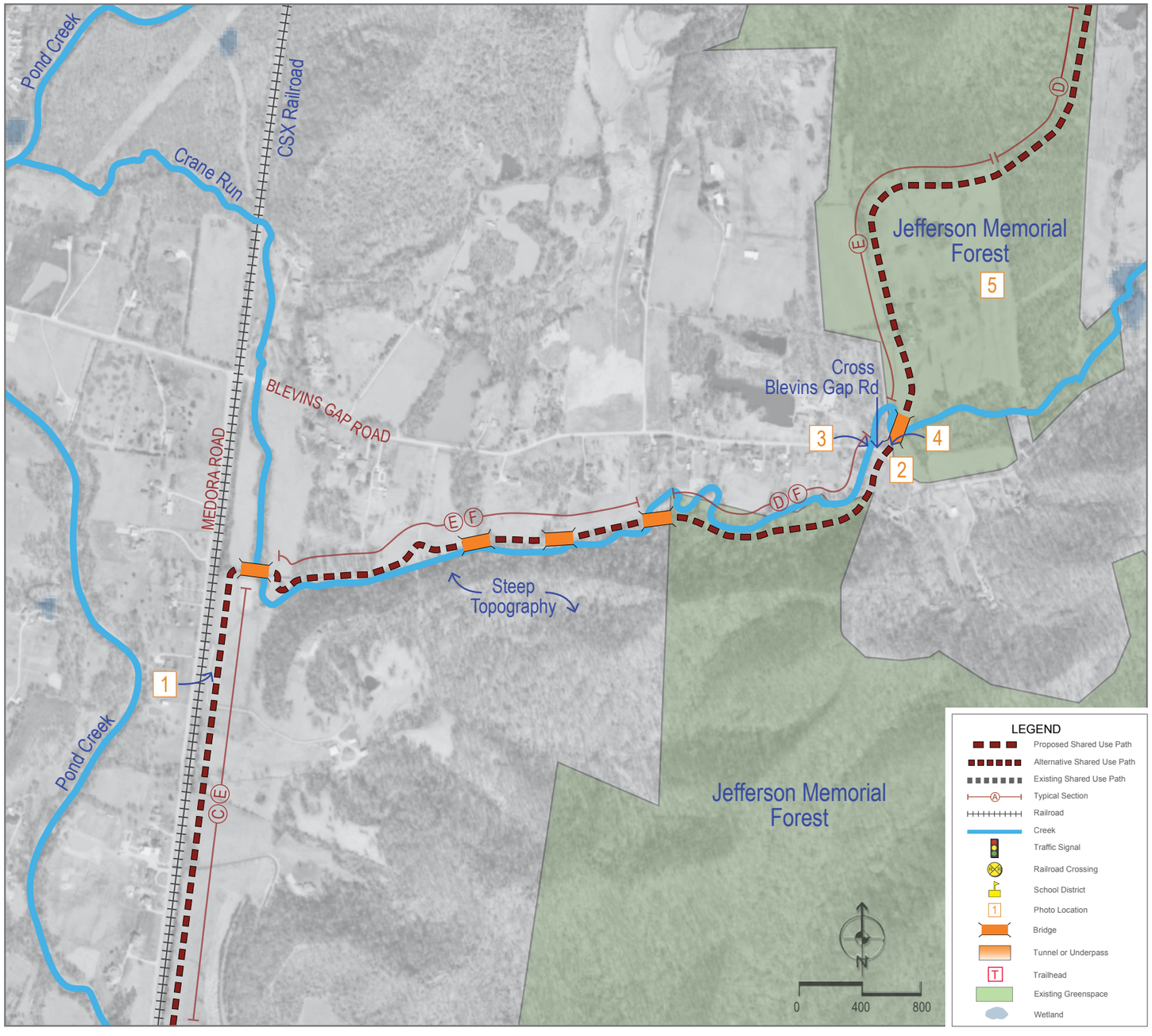
There are no utility concerns along this segment.

TOPOGRAPHY

Topography is a significant where the trail crosses the Jefferson Memorial Forest properties. Walls and/or a significant amount of grading would be required to construct a 5% path (meeting ADA guidelines) through the forest.

ENVIRONMENT

The path would be adjacent to Crane Run, a small scenic stream. There are opportunities for floodplain storage of the Crane Run watershed at Medora. Context sensitive design is important as Crane Run is currently a high quality stream. Opportunities may exist for improvements to riparian buffer vegetation composition. Coordination with the future Jeff Jack Resource Center offers an excellent opportunity for environmental education.



SAFETY

The primary safety concern is the crossing of Blevins Gap Road, which would not occur at an intersection. This “midblock” crossing may require special signage, striping, and potentially flashing beacons/in road lighting to alert drivers of the pathway crossing. The crossing location also has some site distance problems due to the curving roadway.

AVAILABLE RIGHT-OF-WAY

The segment would take advantage of available right of way in the Forest. However, approximately half of the segment would cross private property and therefore require right of way acquisition. Fortunately, the privately owned parcels are large, so acquisition of a small corridor along the property line would have minimal impact to the parcel.

EXPERIENCE

The user experience along this segment would be high due to the lack of safety issues and the good scenic value of the forest and open farm land.

PRIVATE DRIVE PARALLEL TO RAILROAD LOOKING NORTH 1

BLEVINS GAP RD LOOKING SOUTH 2

CRANE RUN LOOKING SOUTH 3

ENTRANCE TO JEFFERSON MEMORIAL FOREST LOOKING NORTH 4

JEFFERSON MEMORIAL FOREST LOOKING NORTH 5

ALIGNMENT C, SEGMENT 3

ALIGNMENT C, SEGMENT 4

The segment would begin in the Jefferson Memorial Forest on the wooded hillside north of the future Jeff Jack Resource Management Center. The segment would head generally north through Forest property, turn northeast through private property into Dodge Gap; turn northwest, following an existing cleared route; and cross under the Gene Snyder Highway using an existing tunnel.

This segment includes the following typical sections:

- *Typical Section D: Path within forest* — proposed through the forested knobs of the Jefferson Memorial Forest and adjacent private property.
- *Typical Section F: Path adjacent to creek* — proposed adjacent to small stream on south side of Gene Snyder that is currently undergoing restoration work.

CONNECTIVITY

This segment would provide connectivity to the future Jeff Jack Resource Management Center within the Jefferson Memorial Forest and to the newly acquired Metro Parks property at the former Flynn Brothers sand quarry. The segment would also enable pedestrian connectivity across the Gene Snyder Freeway, linking communities that are currently isolated by this major roadway barrier.

CROSSINGS

The Gene Snyder Freeway would be crossed at an existing corrugated steel tunnel. This tunnel was originally used by trucks to access a sand quarry, so the horizontal and vertical clearances are more than adequate for a shared-use path. Minor grading improvements would be necessary to improve the drainage conditions within tunnel.

UTILITIES

Utilities are not a significant issue for this segment.

TOPOGRAPHY

Topography is a significant issue for this alignment. Walls and/or a significant amount of grading would be required to construct a 5% path (meeting ADA guidelines) through the forest. Existing unpaved paths could be expanded to minimize disturbance.

ENVIRONMENT

The majority of the segment would be within densely vegetated forest on steep slopes. Path construction would cause a large disturbed area because of the steep topography. Path design and construction should be sensitive to the forest ecosystem- disturbance could be minimized by following one of several existing unpaved paths, and by the use of retaining walls. The lake, south of the freeway would provide an opportunity for aquatic resource enhancement and shoreline protection. A stream channel restoration project (completed in 2011) that would be directly adjacent to the segment would provide opportunities for environmental interpretation.

SAFETY

Safety conditions would be good along this segment; all major crossings would be grade separated with no vehicular conflicts.

AVAILABLE RIGHT-OF-WAY

Most of the segment would be on publicly held land in the Jefferson Memorial Forest. The parcel just south of the Gene Snyder Freeway is owned by the Flynn Brothers, who have donated adjacent properties to Metro Parks in the past. South of Dodge Gap, the segment would cross through the back side of a private parcel to avoid steeply sloping topography. The impact of the acquisition on the effected property would be relatively low- the acquisition area would be located on the back corner of the property and the acquisition area would be a small percentage of the parcel as a whole.

EXPERIENCE

The user experience on the south side of the Gene Snyder Freeway would be high due to the lack of safety issues and the good scenic value of the forest. The user experience along the freeway would be fair to poor depending on the buffer width between the path and the highway.


EXISTING FOOTPATH 1


SCENIC LAKE LOOKING NORTHEAST 2


EXISTING FOOTPATH ADJACENT TO STREAM RESTORATION PROJECT 3


EXISTING TUNNEL BELOW GENE SNYDER 4


EXISTING TUNNEL BELOW GENE SNYDER 5

ALIGNMENT C, SEGMENT 5

The segment would begin on the north side of the Gene Snyder Freeway at the existing sand quarry tunnel. The segment would head east and follow the freeway for approximately one mile; head northeast along Pond Creek, turn northeast and follow the CSX railroad corridor; and end at the Stonestreet Rd/Pond Station Rd intersection.

This segment includes the following typical sections:

- *Typical Section B: Path adjacent to Gene Snyder Freeway* — proposed on private property adjacent to freeway through forested wet areas, steep forested knobs, and open pasture land.
- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek within forest and wet areas.
- *Typical Section D: Path within forest*— proposed within wet lowland forest and steep knobs along the freeway.
- *Typical Section G: Path within wet area* — proposed within forest adjacent to the freeway.
- *Typical Section E: Path within field* — proposed within pasture land along the freeway.
- *Typical Section C: Path adjacent to railroad* — proposed along CSX corridor.

CONNECTIVITY

This segment would provide connectivity to the newly acquired Metro Parks property at the former Flynn Brothers sand quarry. A short spur trail could provide connectivity to the adjacent residential development on the northern side of the Gene Snyder Highway, adjacent to Deering Road. This is a large development that includes both single family and multifamily residential units.

CROSSINGS

The Gene Snyder Freeway would be crossed at an existing corrugated steel tunnel. This tunnel was originally used by trucks to access a sand quarry, so the horizontal and vertical clearances are more than adequate for a shared-use path. Minor grading improvements would be necessary to improve the drainage conditions within tunnel.

UTILITIES

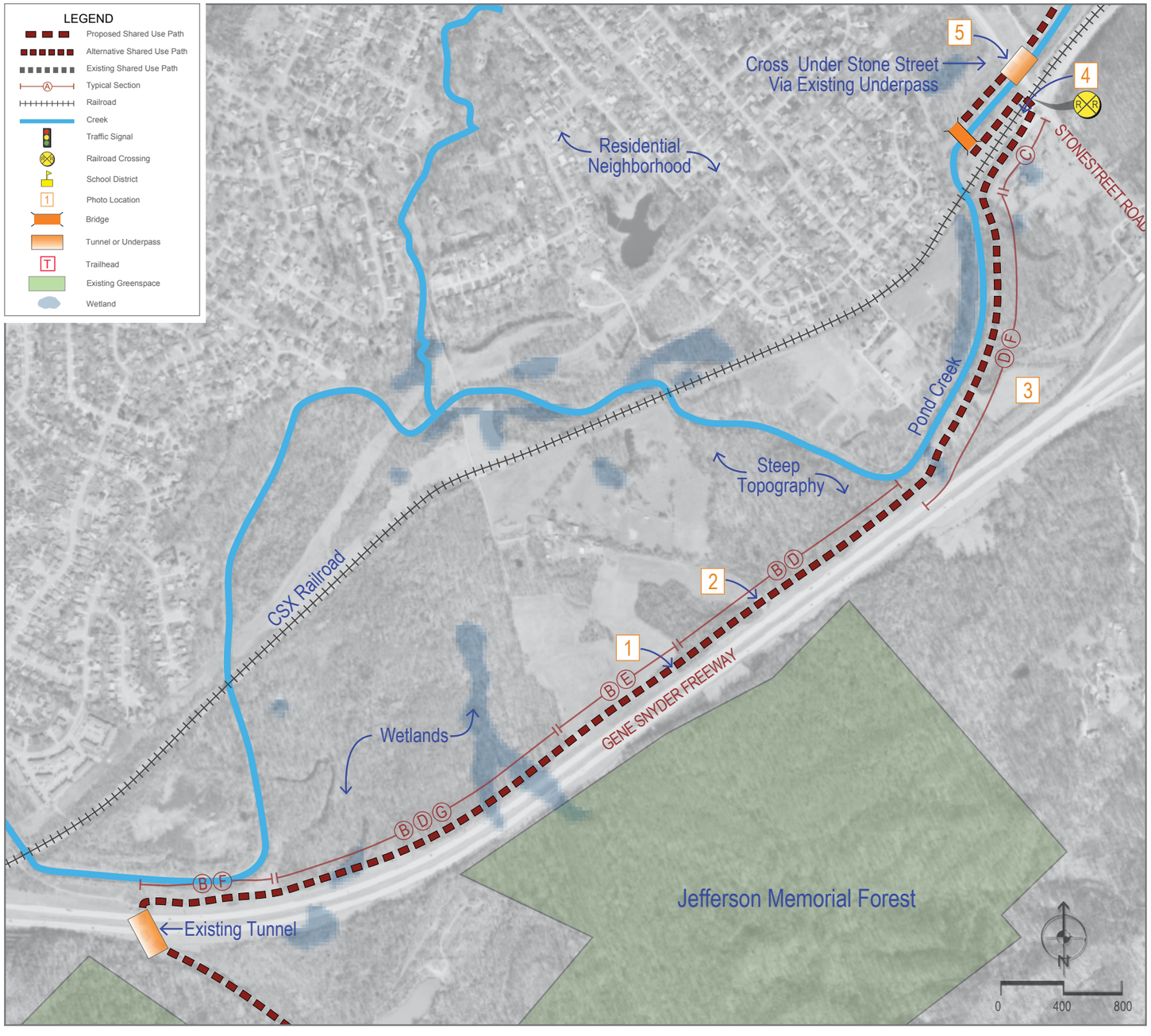
Utilities are not a significant issue for this segment.

TOPOGRAPHY

The path would cross 2 small forested knobs as it parallels the highway—significant grading and/or walls would be needed to achieve a 5% grade in those locations.

ENVIRONMENT

Portions of the segment along the Gene Snyder Freeway would cross through wetlands, offering opportunities for environmental education. The northern portion of the alignment, along Pond Creek, would offer opportunities for stream restoration.



SAFETY

Safety conditions would be good along this segment; all major crossings would be grade separated with no vehicular conflicts.

AVAILABLE RIGHT-OF-WAY

Metro Parks owns the former sand quarry property on the north side of the freeway, and the Metropolitan Sewer District (MSD) owns another small property on the north side of the freeway. The remainder of the corridor would require land acquisition. The portion of the segment along the Gene Snyder Freeway may be placed on the right-of-way if the private property owners are not be willing to sell a portion of their property. Coordination with the Kentucky Transportation Cabinet (KYTC) would be necessary to use the Gene Snyder right of way.

EXPERIENCE

Path user experience along the freeway would be fair to poor depending on the buffer width between the path and the highway. The portions of path along Pond Creek would have high user experience due to good scenic value and lack of safety issues.


GENE SNYDER ROW LOOKING NORTHEAST 1


GENE SNYDER ROW LOOKING SOUTHWEST 2


PRIVATE PROPERTY ADJACENT TO GENE SNYDER 3


CSX RAILROAD LOOKING SOUTHWEST 4


POND CREEK LOOKING SOUTH 5

ALIGNMENT C, SEGMENT 6

The segment would begin on the west side of the Stonestreet Rd/Pond Station Rd intersection. The route would head northwest along the Stonestreet right of way; cross the CSX railroad (utilizing the existing "at grade" Stonestreet Road crossing; turn southwest and descend the hill next to Pond Creek; cross to the north side of Pond Creek and follow Pond Creek northeast; cross below the Stonestreet Road bridge; continue along the north side of Pond Creek for approximately one mile; turn east through a wetland area into Valley View Church property; follow the property line around church ball field to Lamborne Boulevard; turn south and follow the west side of Lamborne Boulevard across the CSX tracks and into the neighborhood; turn east through one of the first residential properties and continue to the Pond Creek Corridor; head south along Pond Creek to the existing MSD Trail; turn west and cross to the other side of Pond Creek and follow it south for approximately .2 miles; turn southwest through fields to Watsonville Road; continue southwest along Watsonville Road; cross below the Gene Snyder Freeway utilizing the existing underpass; continue on Watsonville Road to Blevins Gap Road; turn north and follow Blevins Gap Road.

This segment includes the following typical sections:

- *Typical Section F: Path adjacent to creek* — proposed along Pond Creek within forest and wet areas.
- *Typical Section D: Path within forest* — proposed adjacent to Pond Creek and through the church property .
- *Typical Section E: Path within field* — proposed between Pond Creek and Watsonville Road and on portions of church property.
- *Typical Section A: Path adjacent to road* — proposed along Stonestreet Road (two-lane 35 m.p.h), Lamborne Boulevard (two-lane residential road), and Blevins Gap Road (two-lane 35 m.p.h).
- *Typical Section H: Sharrow with adjacent sidewalk* — proposed along Watsonville Road (a dead end, low volume, residential road).

CONNECTIVITY

This segment would provide connectivity to the existing MSD Trail and the residential neighborhoods surrounding Lamborne Boulevard and Stonestreet Road.

CROSSINGS

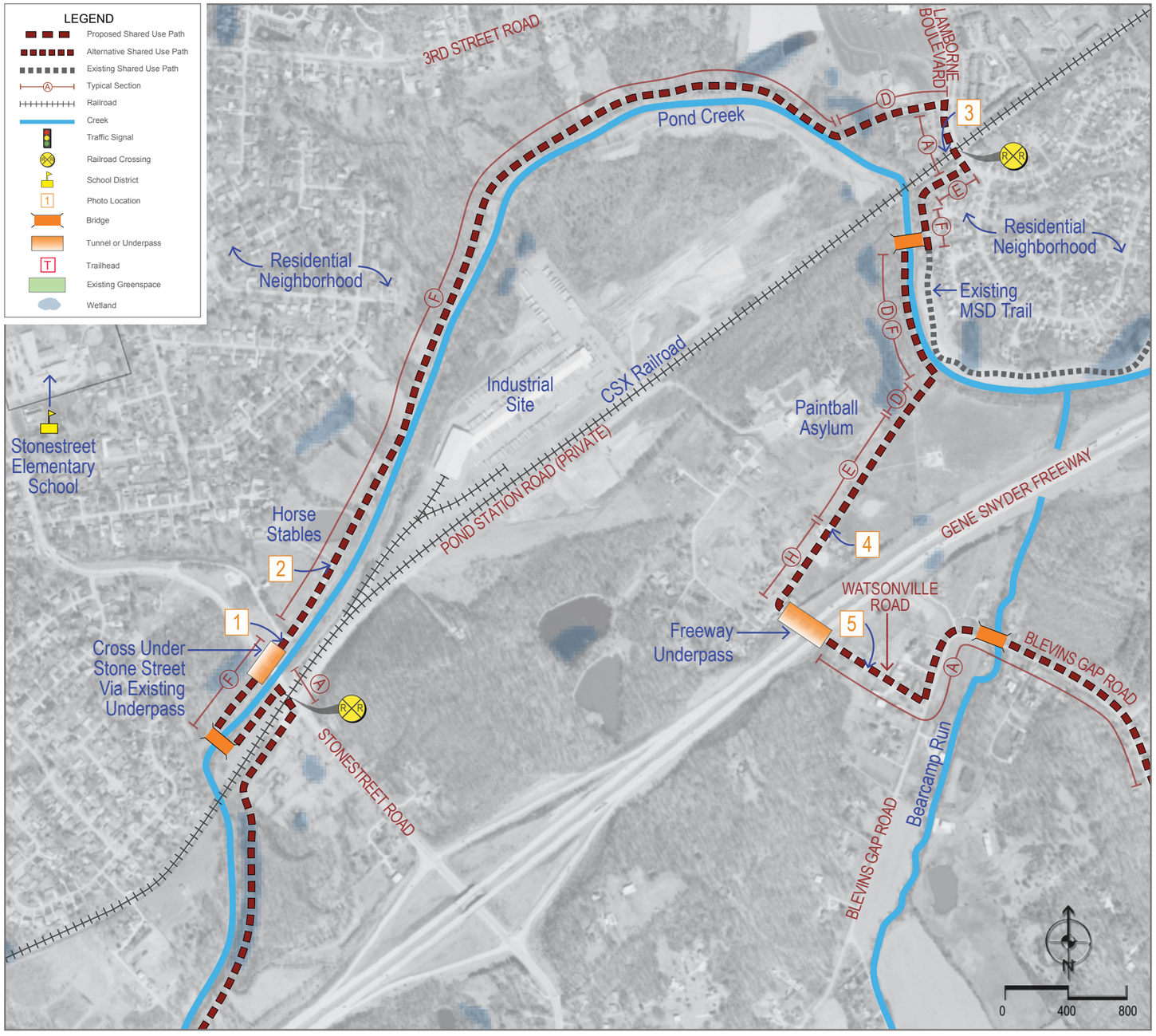
Pond Creek would be crossed twice utilizing proposed pedestrian bridges. Bearcamp Run, a small stream would be crossed with either a bridge or culvert. The CSX Railroad corridor would be crossed twice, utilizing existing roadway crossings at Stonestreet Road and Lamborne Boulevard.
The Gene Snyder Freeway would be crossed utilizing the existing Watsonville Road overpass, which provides a comfortable crossing experience. An existing Stonestreet Road Bridge over Pond Creek would provide an underpass for a grade separated crossing of the busy Stonestreet Road.

UTILITIES

Utilities poles are located on the southwest side of Watsonville Road and on the south and east side of Blevins Gap Road; conflicts with these poles would be avoidable.

TOPOGRAPHY

Generally, the topography along this segment is fairly flat. A short segment of grading or boardwalk will be required to transition from Stonestreet Road down to Pond Creek. Also the steep cross slope below the Stonestreet roadway bridge would require walls on each side of the path.



ENVIRONMENT

This route would offer an excellent opportunity to combine a significant Pond Creek restoration project with trail installation, as was recently completed upstream of this segment. This segment would fall within the 100 year floodplain- the trail design should elevate trail grade so that it is not frequently flooded. A small wetland area would be crossed on church property.

SAFETY

Safety conditions would be good along this segment. This is the only alignment option that provides a grade separated route of Stonestreet. Safety concerns occur at the two railroad crossings (that will require upgrades to accommodate the path crossing,) and along Watsonville Road, where the path would be a sharrow. However, the safety conditions along Watsonville Road are minor because it is a low volume, dead end, residential road.

AVAILABLE RIGHT-OF-WAY

The Metropolitan Sewer District (MSD) owns approximately one-third of the property on the north side of Pond Creek (between Stonestreet Road and Lamborne Drive). The segment along Watsonville Road is a sharrow and can therefore be constructed within the existing right of way. The remainder of the segment would require right of way acquisition, including the route along Blevins Gap Road and Stonestreet Road.

EXPERIENCE

Path user experience would be good for most of the segment with attractive scenery along Pond Creek and few vehicular conflicts. The portions of the segment along the roadways would have a fair experience.

STONESTREET RD BRIDGE LOOKING SOUTHWEST 1

POND CREEK CORRIDOR @ STABLES LOOKING NORTHWEST 2

LAMBORNE BLVD RAILROAD CROSSING LOOKING EAST 3

TERMINUS OF WATSONVILLE RD LOOKING NORTHEAST 4

WATSONVILLE RD UNDERPASS LOOKING NORTHWEST 5

ALIGNMENT C, SEGMENT 7

The segment would begin on the east side of Blevins Gap Road near the Lonesome Hollow Road intersection. The route would cross over Blevins Gap Road; continue southeast along Lonesome Hollow Road (as a sharrow with an adjacent sidewalk) for approximately one block, then continue for approximately 0.5 miles along west side of Lonesome Hollow Road; turn south and follow edge of a field to the historic road right of way within the Jefferson Memorial Forest; follow road right of way for 0.25 mile; turn southeast and meander through Forest; cross Jefferson Hill Road; continue to meander through the Forest towards forest welcome center.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — proposed along Blevins Gap Road (two-lane, 35 m.p.h.) and Lonesome Hollow Road (dead end residential road).
- *Typical Section H: Sharrow with adjacent sidewalk* — proposed along first block of Lonesome Hollow Road, a dead-end residential road.
- *Typical Section D: Path within forest* — proposed through steeply sloping topography with Jefferson Memorial Forest.
- *Typical Section E: Path within field* — proposed around edge of open field at end of Lonesome Hollow Road.

CONNECTIVITY

This segment would provide connectivity to and through the Jefferson Memorial Forest.

CROSSINGS

Blevins Gap Road would be crossed at the Lonesome Hollow Road intersection and Jefferson Hill Road would be crossed at a midblock location. Approximately 6 driveways would be crossed along Lonesome Hollow Road. Approximately 8 different small stream/gully crossings would be required within the forest; these crossings would require pedestrian bridges.

UTILITIES

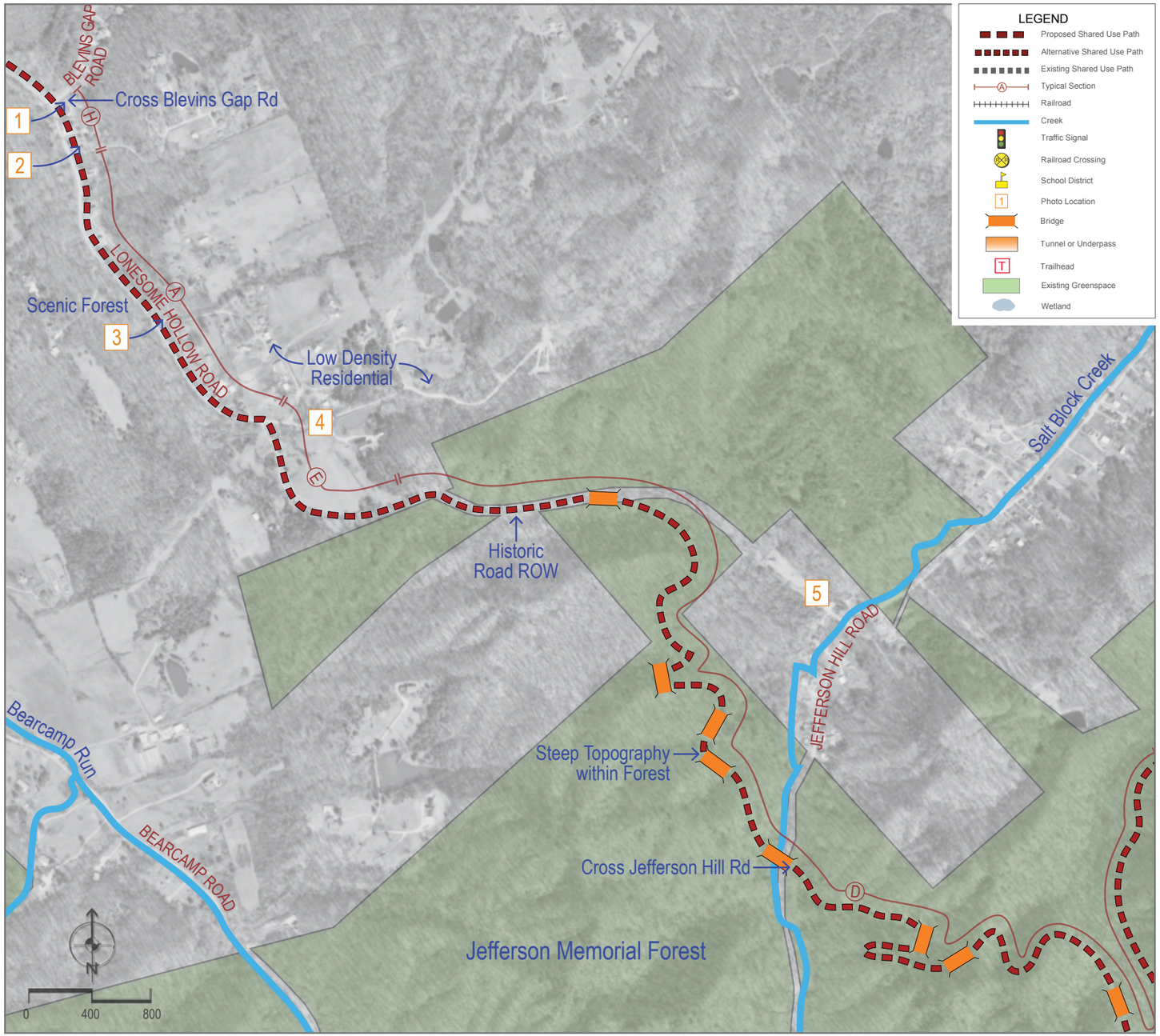
A few utility poles are located on the west side of Lonesome Hollow, these poles may require relocation, or additional right of way could be obtained to avoid conflicts.

TOPOGRAPHY

Topography is a significant concern within this segment due to extreme cross slopes and steep longitudinal slopes within the forested knobs. Significant grading and walls would be required to install a path along this segment. The path width should be reduced to 10’ along this segment to reduce grading impacts.

ENVIRONMENT

The majority of the segment would be within steeply sloping areas of the Jefferson Memorial Forest. Trail installation within such steep topography would cause a large disturbed area within the Forest. Sensitive design and construction methods, such as the use of walls, should be used to reduce the environmental impact to the forest environment.



SAFETY

Blevins Gap Road would be crossed at an intersection with poor visibility; it is recommended to install a stop controlled intersection, or an enhanced crosswalk with flashing beacons/in road lights. The midblock crossing at Jefferson Hill Road, a low volume roadway, would also require an enhanced crosswalk design.

AVAILABLE RIGHT-OF-WAY

A significant portion of this segment would be within the publicly owned lands of the Jefferson Memorial Forest. Portions of the route along Lonesome Hollow Road would require private land acquisition; otherwise the entire segment along Lonesome Hollow could become a sharrow with adjacent sidewalk.

EXPERIENCE

This segment, in combination with the following segment would offer some of the best scenery among all alignment options. Safety along the route is generally good, with the exceptions of the two roadway crossings. The only negative user experience would be the steep trail grades, which would be difficult to traverse over long distances.

LONESOME HOLLOW RD LOOKING SOUTHEAST 1


LONESOME HOLLOW RD LOOKING SOUTHEAST 2


LONESOME HOLLOW RD LOOKING EAST 3


LONESOME HOLLOW RD LOOKING SOUTHEAST 4


LONESOME HOLLOW RD LOOKING NORTHWEST 5

ALIGNMENT C, SEGMENT 8

The segment would begin within the Jefferson Memorial Forest and meander approximately 2 miles through forested knobs to Mitchell Hill Road; cross Big Bee Lick Creek; cross Mitchell Hill Road; either turn south to the existing Forest Welcome Center or turn north and follow the east side of Mitchell Hill Road to Holsclaw Hill Road (which will be the location of the future Forest Welcome Center); cross Mitchell Hill Road at the Holsclaw Hill Road intersection; continue north along the west side of Mitchell Hill Road to Babe Drive; cross back to the east side of Mitchell Hill Road and continue north towards the Fairdale commercial district.

This segment includes the following typical sections:

- *Typical Section D: Path within forest* — proposed through steeply sloping topography with the Jefferson Memorial Forest.
- *Typical Section A: Path adjacent to road* — proposed along Mitchell Hill Road (two-lane, 35 m.p.h.).
- *Typical Section F: Path adjacent to creek* — proposed parallel to Big Bee Lick Creek and Mitchell Hill Road.

CONNECTIVITY

This segment, in combination with the previous segment would connect the Fairdale commercial district to the Jefferson Memorial Forest Welcome Center and provide a scenic route through the Forest.

CROSSINGS

Approximately 9 different small stream/gully crossings would be required within the Forest, and Big Bee Lick Creek would be crossed along Mitchell Hill Road. All of the stream crossings would require pedestrian bridges. There would be several roadway crossings along this alignment, three of them crossing Mitchell Hill Road and the other one at Keys Ferry Road.

UTILITIES

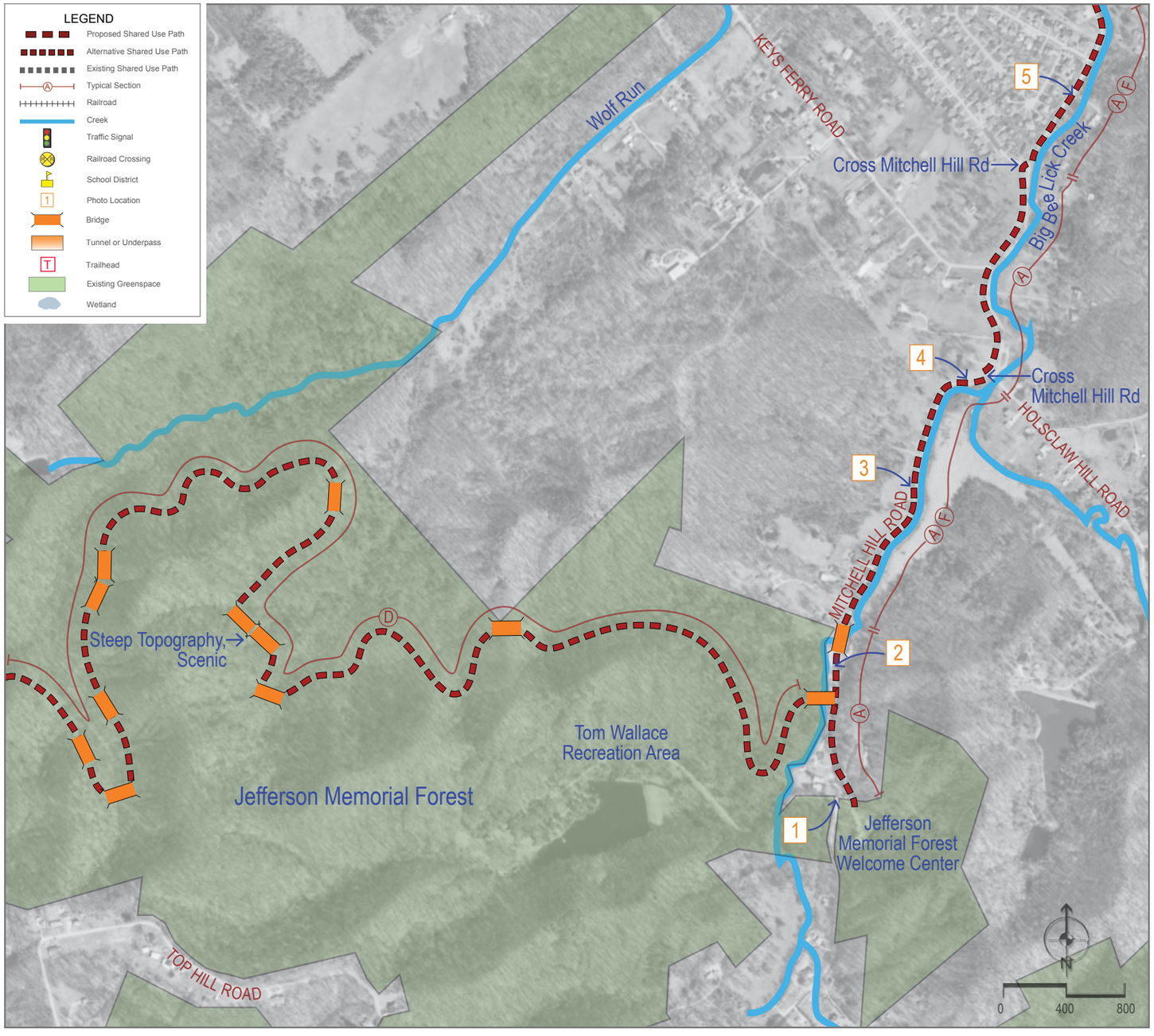
Overhead utilities exist along Mitchell Hill that could be avoided without relocation.

TOPOGRAPHY

Topography is a significant concern within this segment due to extreme cross slopes and steep longitudinal slopes within the forested knobs. Significant grading and walls will be required to install a path along this segment. The path width should be reduced to 10’ along this segment to reduce grading impacts.

ENVIRONMENT

Portions of the segment would be within steeply sloping areas of the Jefferson Memorial Forest. Trail installation within such steep topography would cause a large disturbed area within the Forest. Sensitive design and construction methods, such as the use of walls, should be used to reduce the environmental impact to the forest environment. Additionally, Big Bee Lick Creek runs along the east side of Mitchell Hill Road, which could be a scenic amenity for the path and an opportunity for stream restoration.



SAFETY

Potential vehicular conflicts exist at the three Mitchell Hill Road crossings. Two of these crossings occur at midblock locations, and the third crossing location occurs at the Holsclaw Hill Road intersection, which is only stop controlled for Holsclaw Hill Road. Therefore all three of these crossings would require enhanced crosswalk improvements such as flashing beacons or in-pavement lights, as well as signage and striping. The Holsclaw Hill Road intersection could potentially be turned into a four way stop condition if a traffic analysis demonstrates that it is warranted.

AVAILABLE RIGHT-OF-WAY

A significant portion of this route would be within the publicly owned lands of the Jefferson Memorial Forest. A parcel at the Holsclaw Hill Road intersection is owned by Metro Parks for a future Forest Welcome Center. The right of way along Mitchell Hill Road is variable; in most locations, right of way acquisition would be necessary to install the path with appropriate roadway clearance.

EXPERIENCE

The experience along this segment is fair to good. The portion of the route within the Forest has some of the best scenery among all alignment options, and there are no vehicular conflicts. The only negative user experience within the Forest would be the steep trail grades, which may be difficult to average path users. The route along Mitchell Hill Road has a fair experience; safety concerns at the three roadway crossings are balanced by the good scenery of the adjacent forest.

MITCHELL HILL RD LOOKING NORTHEAST 1


MITCHELL HILL RD LOOKING NORTHEAST 2


MITCHELL HILL RD LOOKING NORTHEAST 3


MITCHELL HILL RD LOOKING NORTHEAST 4


MITCHELL HILL RD LOOKING NORTHEAST 5

ALIGNMENT C, SEGMENT 9

The segment would begin at the intersection of Mitchell Hill Road and Babe Drive. The path would follow the east side of Mitchell Hill Road north to the Fairdale commercial center at Manslick Road; turn east and follow Manslick Road to Fairdale Road (this is the location of a future round about); turn northwest and continue on the west side of Fairdale Road to the path terminus at National Turnpike.

This segment includes the following typical sections:

- *Typical Section A: Path adjacent to road* — proposed along Mitchell Hill Road (two-lane, 35 m.p.h.), West Manslick Road (two-lane, 35 m.p.h.), and Fairdale Road (two-lane, m.p.h.)
- *Typical Section F: Path adjacent to creek* — proposed along Big Bee Lick Creek and Mitchell Hill Road.
- *Typical Section I/J: Path within commercial district* — proposed within the Fairdale commercial district.

CONNECTIVITY

This segment would provide good connectivity to many destinations within the study area, including: Fairdale High School, Nelson Hornbeck Park, Fairdale Elementary School, Fairdale Public Library, the Fairdale neighborhoods, and the Fairdale commercial district. The routing of the path to the commercial corridor should be an impetus for redevelopment within Fairdale.

CROSSINGS

Two creek crossings (Wilson Creek and Big Bee Lick Creek) would both require pedestrian bridges. Roadway crossings would occur at Chieftain Road, Caple Avenue, and Manslick Road(at the proposed Fairdale roundabout). Approximately 34 driveway crossings would have to be traversed, including residential and commercial driveways.

UTILITIES

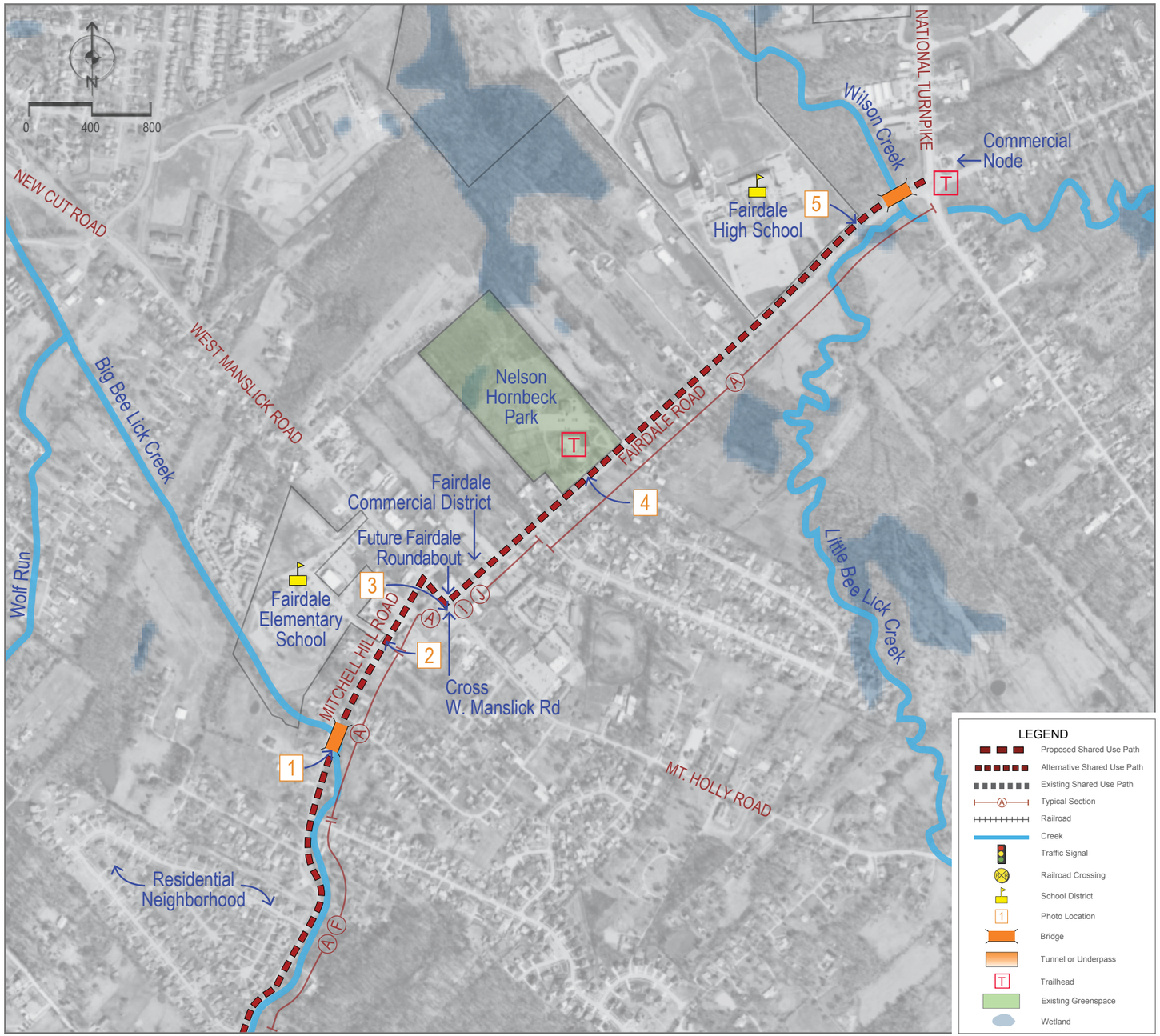
Overhead power lines and power poles exist on both sides of Fairdale Road and Mitchell Hill Road which could become an issue in the placement of the potential pathway. Drainage structures on Fairdale Road would have to be modified.

TOPOGRAPHY

Topography is flat and conducive to a path alignment.

ENVIRONMENT

Big Bee Lick Creek runs along the east side of Mitchell Hill Rd. and would be a scenic amenity for the path and an opportunity for stream restoration.



SAFETY

The primary safety concern occurs within the Fairdale Commercial District where there are multiple, long (almost continuous) curb cuts that access the various businesses within the district. These curb cuts would need to be condensed to reduce the number of potential conflicts. The driveway crossings along Fairdale Road and Mitchell Hill Road are also a concern.

AVAILABLE RIGHT-OF-WAY

Available right of way includes property associated with Fairdale High School and Nelson Hornbeck Park. The segment takes advantage of the right of way along Mitchell Hill Road and Fairdale Road; however existing right of ways are not adequate for a 12' wide path with appropriate roadway clearance and shoulder widths, so additional right of way acquisition would be necessary. There are right of way challenges within Fairdale, where parking and proximity of buildings will make trail routing difficult. Bike lanes and narrower sidewalks could be installed within the district initially, until redevelopment allows for a cycle track and wider sidewalk/pedestrian trails.

EXPERIENCE

Experience along this segment is fair to poor; scenery is fair, but the pathway would be adjacent to the roadway and the large number of driveway crossings pose safety concerns.

MITCHELL HILL RD L@ CAPLE AVE LOOKING NORTHEAST 1

MITCHELL HILL RD LOOKING NORTHEAST 2

W. MANSLICK RD/ FAIRDALE RD INTERSECTION LOOKING NORTH 3

FAIRDALE RD LOOKING NORTHEAST 4

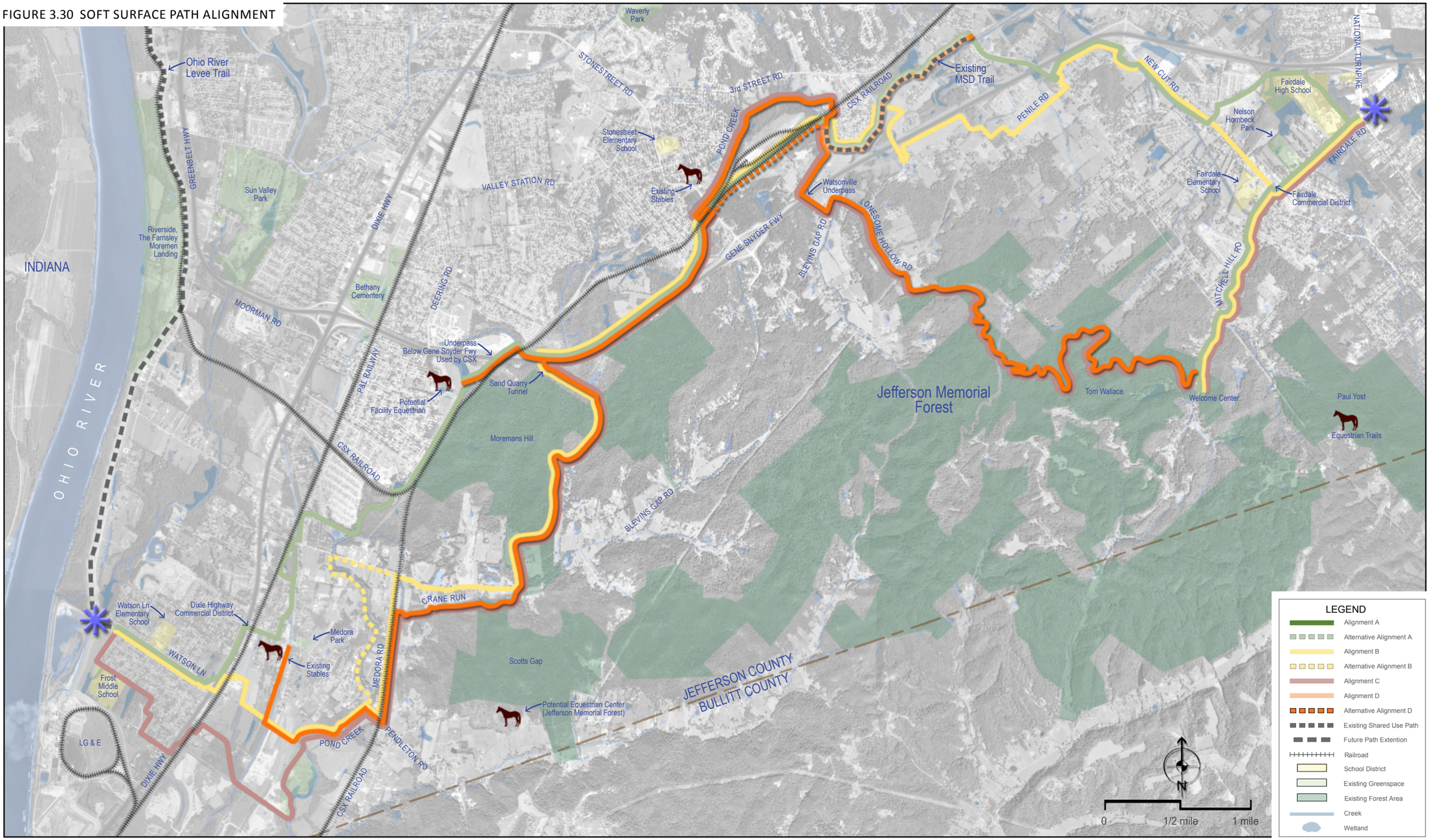
FAIRDALE RD LOOKING NORTHEAST 5

Soft Surface Path Alignment

The Louisville Loop will include a soft surface path network, in addition to the primary shared-use path. The Louisville Loop Design Standards state: “Soft surface trails are a complimentary component of the Louisville Loop and serve as both additional pedestrian connectors and as recreational facilities for hiking, trail runners, mountain biking, and equestrian use, where appropriate.” The design standards also include the following guidance for soft surface paths:
Trail width — 52-72 inches for equestrian only trails, and 6 feet minimum for shared use trails
Trail slope — 8% max for equestrian trails and 15% maximum for hiking trails
Materials — bare soil (typical), and crushed stone (heavy use areas)
Clearances — 10 to 12 feet vertical clearance, and 3 feet horizontal clear zones

The soft surface alignment developed in the Pond Creek Corridor Shared-use path and Ecological Restoration Plan is focused on equestrian use. This trail system is intended to tie into the equestrian facilities within the Jefferson Memorial Forest, and to private horse stables in the surrounding area. The equestrian focus does not restrict other uses; however, it was the guiding factor in determining alignment.
The soft surface alignment would begin at an existing horse stables on Old Distillery Road. From the stables, the route would head south along Weaver Run; turn southeast and continue to Pond Creek. At this point the soft surface path would follow the same route as Alignment C to the Jefferson Memorial Forest Welcome Center. As such, the alignment would continue along Pond Creek, turn southeast onto Pendleton Road and cross the CSX railroad tracks. On the east side of the railroad, the path would turn north and follow the CSX railroad corridor, cross over Crane Run ,and continue east along Crane Run. The path would then turn north into the Jefferson Memorial Forest (future Jeff Jack Resource Center), and continue through the Forest to the Gene Snyder Freeway. The path would utilize the former sand quarry tunnel to cross Gene Snyder Freeway, and would then turn and head northeast along the freeway. After following the freeway for one mile, the path would turn north and follow Pond Creek to Stonestreet Road. At Stonestreet Road, the path would use the road right of way to cross over the railroad. The alignment would then descend into the stream corridor, cross to the north side of Pond Creek, and follow the creek under the Stonestreet Bridge. The path would then follow along the north side of Pond Creek to the existing MSD trail. The alignment would then cross Pond Creek (at the MSD trail terminus) and continue to Watsonville Road. The path would cross under the Gene Snyder Freeway utilizing the Watsonville Road underpass, and continue to Lonesome Hollow Road. The alignment would parallel Lonesome Hollow Road,head into the Jefferson Memorial Forest, and eventually terminate at the Welcome Center. See Figure 3.30 for a map of the proposed soft surface path alignment.
One alternate alignment for the soft surface path would be located between Stonestreet Road and the existing MSD Trail. This alignment would follow Pond Station Road and the CSX Corridor rather than the primary route along the north side of Pond Creek. One advantage of this alternate route would be that it could parallel the shared-use path , should Alignment B be selected as the preferred shared-use path alignment. Other advantages would include less parcels affected by land acquisition, and less expense associated with construction. However, this alternate would not provide direct access to the horse stables on the north side of the creek, it would be less scenic, and it would require an at grade crossing of Stonestreet Road.
A few of the major destinations for equestrian users include: the existing horse stables on Old Distillery Road, the existing stables at Stonestreet Road, a future equestrian center at the Jefferson Memorial Forest (location not yet finalized), and horse trails at Paul Yost (access to Paul Yost would require a spur trail). One large parcel on the southwest side of the Gene Snyder Freeway, at Pond Creek, currently has horses on it, and may have the potential to become an equestrian facility. In addition to equestrian destinations, the soft surface alignment would also provide access to the mountain bike trails at Moremans Hill. A potential spur trail connection between Moremans Hill and bike trails at nearby Waverly Park could greatly expand mountain biking opportunities in the area.
The soft surface alignment could be a stand alone path, or could run parallel to primary shared-use path alignment. Should Alignment A, or B be chosen as the primary shared use alignment, then segments of the soft surface path would be stand alone; however, should Alignment C be preferred, then the soft surface path could be built parallel. Typical Section K in section 3.3 shows a typical soft surface path section.

FIGURE 3.30 SOFT SURFACE PATH ALIGNMENT



ALIGNMENT D

Alignment Summary

Each of the three alignments presented in the previous section accomplishes the primary goal of maximizing path usership by connecting the corridor's population centers to key destinations, such as schools, parks, and commercial districts. Each alignment is distinctive in its balance of cost, land acquisition, environmental sensitivity, and user experience. For example, Alignment "C" balances the negatives of high price and a high level of environmental disturbance with the positive of a high level of user experience. The next step in the planning process will be to determine which balance of criteria is most appropriate. Is cost more important than user experience? Is user experience more important than limiting disturbance to the environment? In order to reach a decision on these questions, it is important to look at the three alignments together to see how they approach these balances. The following matrix includes quantitative data such as length, cost, and acquisition areas, as well as qualitative analysis such as user experience and connectivity. The intent of the comparison is to provide information necessary to eventually determine one final preferred alignment. This preferred alignment may not necessarily be any of the three alignments presented here but may be a combination of the three.

FIGURE 3.31 ALIGNMENT SUMMARY MAP

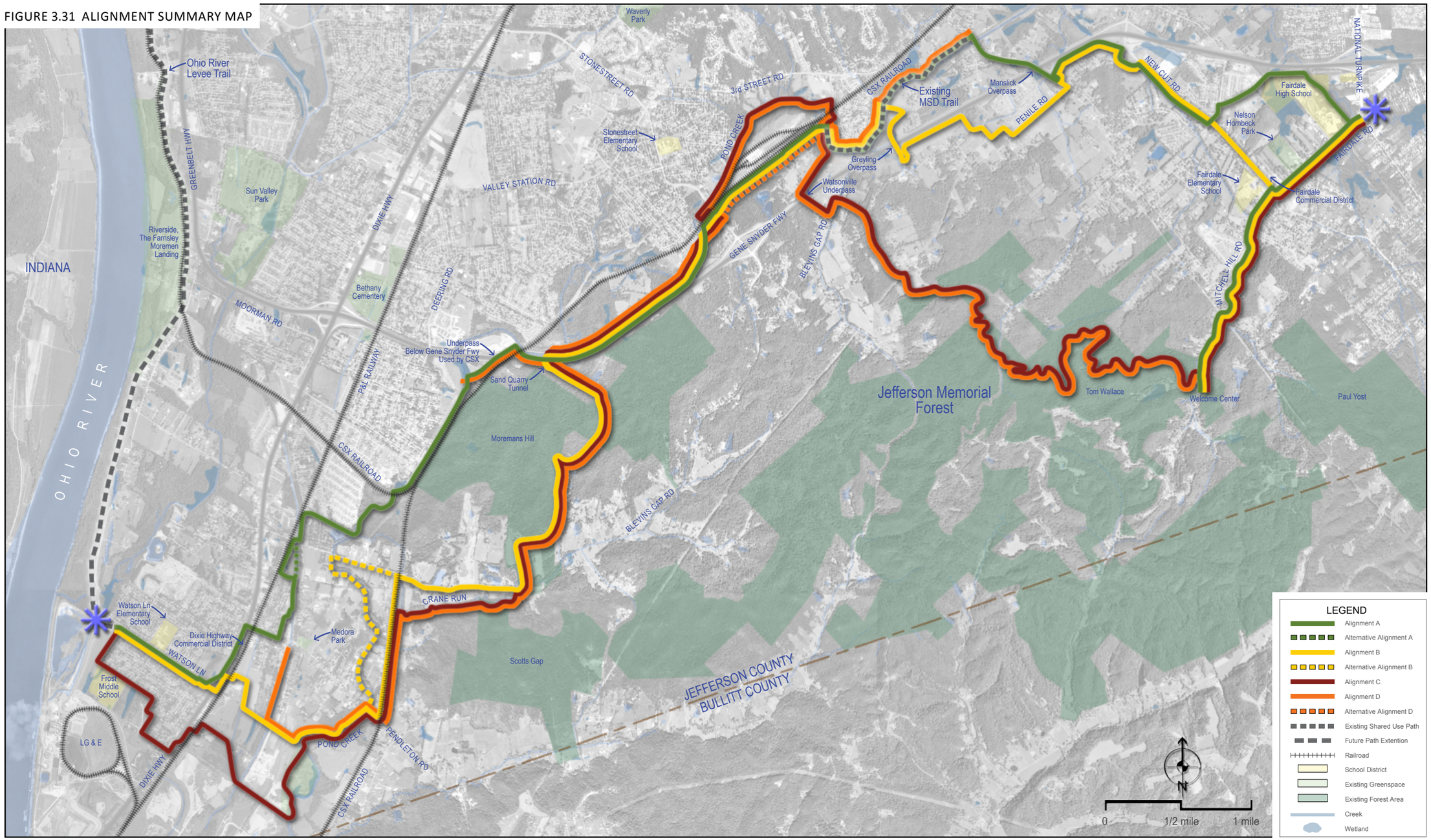


FIGURE 3.32 ALIGNMENT SUMMARY TABLE

	ALIGNMENT A (GREEN)	ALIGNMENT B (YELLOW)	ALIGNMENT C (RED)
LENGTH	13.36 miles	15.62 miles	19.74 miles
COST	$18,047,336	$20,391,080	$24,699,708
BRIDGES (SHORT SPANS)	9	14	31
BRIDGES (POND CREEK)	4	3	3
BRIDGES (GENE SNYDER)	1	1	0
ROW (PARCELS) (AREA)	59 parcels affected, 24.43 acres	45 parcels affected, 24.55 acres	76 parcels affected, 32.47 acres
DRIVEWAY CROSSINGS	115	173	68
GENE SNYDER HWY CROSSING LOCATIONS	• Underpass used by CSX Railroad • Overpass at Manslick Rd	• Tunnel at former sand quarry • Overpass at Greyling Dr	• Underpass at Watsonville Rd • Tunnel at former sand quarry • Underpass used by CSX Railroad (Spur Trail)
DIXIE HWY CROSSING LOCATIONS	• Existing traffic signal at Pendleton Rd	• Existing traffic signal at Watson Ln	• Proposed traffic signal at Shipley Ln
AT-GRADE RAILROAD CROSSING LOCATIONS	• P&L Railroad at Pendleton Rd	• P&L Railroad at private driveway crossing north of Watson Ln • CSX Railroad at Blevins Gap Rd	• P&L Railroad at Richie Ln (private drive) • CSX Railroad at Pendleton Rd • CSX Railroad at Stonestreet Rd • CSX Railroad at Lamborne Blvd
CONNECTIVITY	• Only alignment to provide connection to Autumn Lakes Mobile Home Estates and the large residential neighborhood southwest of Gene Snyder Fwy, adjacent to Deering Rd. • Connections to Fairdale High School, Nelson Hornbeck Park, Fairdale Commercial District, Fairdale Elementary School, the Fairdale Library, and the Jefferson Memorial Forest Welcome Center and Tom Wallace Recreation Area are made via spur alignment, not the main alignment. • There would be no connection to the proposed Jeff Jack Resource Management Center area of Jefferson Memorial Forest.	• Main alignment runs directly through Fairdale Commercial District and the Jefferson Memorial Forest property that is planned to be the Jeff Jack Resource Center. Also connected would be Fairdale High School, Nelson Hornbeck Park, and Frost Middle School. • A spur alignment provides connectivity to Fairdale Elementary School, the Fairdale Library, and the Jefferson Memorial Forest Welcome Center and Tom Wallace Recreation Area.	• Provides most connectivity to and through Jefferson Memorial Forest (including Forest Welcome Center, Tom Wallace, and the planned Jeff Jack Resource Center). • Alignment would also connect to Frost Middle School, Fairdale Elementary, Fairdale High School, and the Fairdale Library • Although long segments run through the Forest, the alignment still connects to the key commercial districts, and residential areas.

	ALIGNMENT A (GREEN)	ALIGNMENT B (YELLOW)	ALIGNMENT C (RED)
USER EXPERIENCE	• Lowest ranking of the 3 alignments- it follows roadways through dense residential developments, and connects to the fewest scenic areas. • Segments with the highest user experience include: pathways adjacent Weaver Run and Pond Creek, and segment that goes behind Fairdale High School. • Segments with lowest user experience include: pathways adjacent to Watson Ln, Pendleton Rd, New Cut Rd, and Mitchell Hill Rd; the Gene Snyder Fwy crossing at Manslick Rd; and the pathway through Autumn Lakes Mobile Home Estates (trail is very close to homes)	• Middle ranking of the 3 alignments- it follows quite a few roadways; however most of the roadways are rural in character and are preferable to roadways through dense residential neighborhoods. The alignment also includes long segments through scenic landscapes. • Segments with the highest user experience include: pathways through the scenic farmland south of Dixie Hwy, pathways through the Forest, and pathways adjacent to Pond Creek. • Segments with lowest user experience include: pathways adjacent to Watson Ln, New Cut Rd, West Manslick Rd, and Mitchell Hill Rd; the Gene Snyder Fwy crossing at Greyling Rd.	• Highest ranking of the 3 alignments- it includes the most pathway within the Forest, and includes segments through several other scenic areas. This is the only alignment that has the main route (rather than a spur route) going directly through the Forest. This alignment also minimizes routes adjacent to roadways. • Segments with the highest user experience include: pathways through the scenic farmland south of Dixie Hwy, pathways through the Forest, and pathways adjacent to Pond Creek and Crane Run. • Segments with lowest user experience include: pathways adjacent to Watsonville Rd and Mitchell Hill Rd.
SIGNIFICANT ADVANTAGES	• Shortest Route • Least expensive • Avoids difficult driveway conditions in Fairdale Commercial District • Only alignment to include the scenic portion of Pond Creek behind Autumn Lake Mobile Home Community. • Least impact to environment	• Takes advantage of existing road ROW to reduce amount required right of way • Alignment runs through scenic Riverport land on south side of Dixie Hwy, which is a safer, more attractive, and affects fewer property owners than Pendleton Rd alternative. • Use of former sand quarry tunnel requires few upgrades to make it suitable for shared-use path	• Provides best connectivity to scenic Forest property • Highest user experience • Alignment runs through Frost Middle School property and Riverport land on south side of Dixie Hwy, which is safer, more scenic, and affects fewer property owners than the Watson Ln/ Pendleton Rd alternative. • Use of former sand quarry tunnel and Watsonville Rd underpass requires few upgrades to make them suitable for shared-use path • Excellent potential as soft surface route that includes a potential connection to stables at Stonestreet Rd. • Easiest crossing of the Gene Snyder Fwy as it would not require the constructION OF A PEDESTRIAN BRIDGE OVER THE FREEWAY.
SIGNIFICANT DISADVANTAGES	• Lowest user experience • Gene Snyder Fwy crossing at CSX underpass requires significant upgrades and potential cost and delays associated with CSX oversight. • Several segments pass through residential areas that will require acquisitions from a large number of parcels (Pendleton Rd, neighborhood southwest of Gene Snyder Fwy, adjacent to Deering Rd) • Upgrading the Manslick Rd overpass to include shared use path would require a costly bridge to be constructed over the Gene Snyder Fwy. • The main path does not take advantage of Jefferson Memorial Forest, although a spur alignment does provide access.	• Upgrading the Greyling Rd overpass to include a shared use path would require the construction of a costly bridge over the Gene Snyder Fwy. • Permission to cross P&L Railroad at private driveway may be difficult to obtain from the company.	• Significant disturbance to Forest in order to construct 12’ wide pathway within steep terrain • Most expensive alignment due to route length and significant costs associated with trail construction in steep forest terrain • New traffic signal at Dixie Hwy/Shipley Ln may not be feasible.

This page intensionally left blank.

4.0 Ecological Restoration Plan for the Pond Creek Corridor

4.1 BACKGROUND

The Pond Creek basin drains an approximate area of 126 square miles and is largely located in Jefferson County, Kentucky (Figure 4.1, Basin Overview Map). Portions of the Pond Creek basin lie within the historic Scottsburg Lowland (known as the "Wet Woods" in Kentucky). This flat area is underlain by New Albany shale, a black, fissile, carbonaceous shale that is highly impervious and erodible (Jones, 1978). Therefore, this area has poor infiltration rates, increased runoff of precipitation, and drainage and flooding problems.

As Louisville and the surrounding areas expanded, many of the aquatic resources (wetlands and streams) within the Wet Woods were drained into ditches and were filled (prime examples of this are the Northern and Southern Ditches). This development has caused increased storm runoff, and the existing channels lack sufficient capacity to handle some storm events; consequently, flooding has become an issue for the Pond Creek watershed. Many properties, the majority of which are residential, are vulnerable to flood damages during a 100-year storm event.

Floodplain information studies were conducted in the 1960s and 1970s, and the Jefferson County Flood Insurance Study (FIS) was completed in 1978. Some flood protection projects completed in Southwestern Jefferson County provided protection to the lower part of the Pond Creek Basin from backwater flooding from the Ohio River. The U.S. Army Corps of Engineers (USACE) performed a reconnaissance study in 1990 with updated hydrologic models (USACE, 1990). The reconnaissance study recommended that a feasibility study be performed to evaluate the flood control capacity of Pond Creek.

As a result, the U.S. Army Corps of Engineers (USACE), together with the Louisville and Jefferson County Metropolitan Sewer District (MSD), evaluated several options for flood protection. In March of 1994, USACE prepared a report titled Interim Feasibility Report for Pond Creek Flood Protection Project (USACE, 1994). The purpose this report was to look at alternative flood control methods to reduce flooding of Pond Creek. The report recommended a plan that included the construction of two detention basins and channel enlargement (Figure 4.2, Recommended Plan). A portion of the channel enlargement was planned for Pond Creek (miles 13.4 to 15.8).

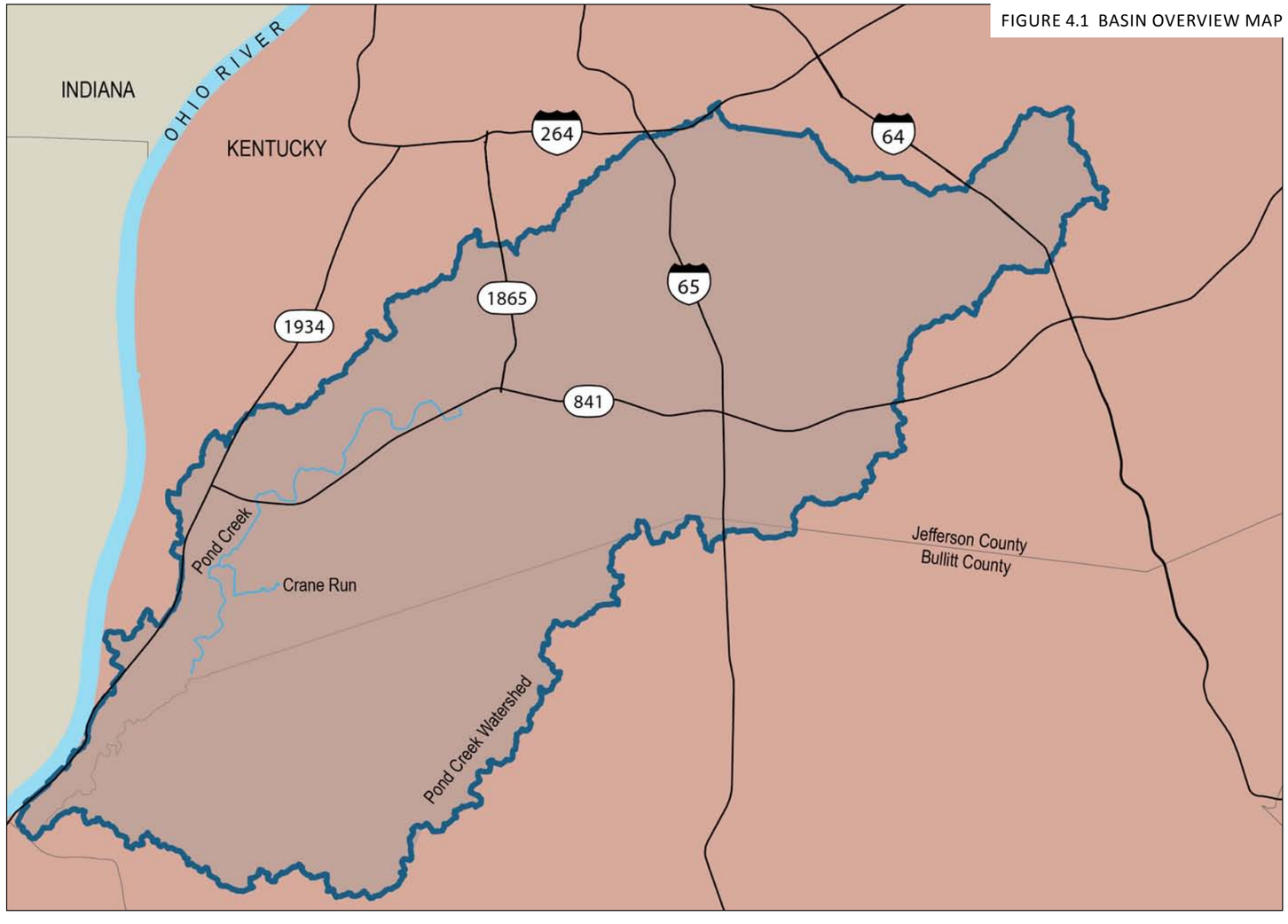


FIGURE 4.1 BASIN OVERVIEW MAP

In 1997, Pond Creek experienced the most severe flooding in 50 years, causing an estimated $185 million in flood losses. Following this, the Louisville and Jefferson County Metropolitan Sewer District (MSD) initiated the Pond Creek Watershed Restoration Conceptual Plan to evaluate options to minimize flood risk (MSD, _2000). The plan envisioned a combination of projects such as storm water basins, establishment of greenways, voluntary buyouts of unprotectable areas, acquisition of available property, construction of linear basins adjacent to the Northern and Southern Ditch, habitat/stream restoration, and wetland restoration/protection.

Elements of the 1994 Interim Feasibility Report and the Pond Creek Watershed Restoration Concept Plan, such as the Vulcan Quarry Basin, restoration of Okolona Treatment Plant lagoons, Melco Basin, and Pond and Northern Ditch channel improvements, have been completed. Even with these efforts, flooding remains an issue.

In 2008, as part of the Pond and Mill Creek Recreational Concept Plan Report, some ecological restoration concepts were reviewed (Stantec, 2008). The report focused primarily on locations for a shared-use path and, in particular, evaluated the development of the Southern Pond Lake concept at the Southern Pond Creek Pump Station. Several options were considered. To date, no formal plans are being considered to implement this project.

4.2 GOALS AND OBJECTIVES

The overall goal of the Ecological Restoration Plan is to evaluate the opportunities for and the benefits of ecological restoration of Pond Creek and/or its tributaries. By evaluating ecological needs and opportunities to incorporate stream restoration activities into community plans, the Plan can enable Pond Creek to serve as an asset to the community as well as the natural resources of the area. The following objectives were established to guide the planning and implementation efforts of the Ecological Restoration Plan:

- Ecology and habitat – conserve, enhance, and maintain the natural functioning of ecological systems associated with and supported by Pond Creek.
- Water quality – improve water quality through wetland and stream corridor preservation and restoration.
- Recreation – provide unique, multiple-use recreation opportunities for all ages.

As part of meeting the above objectives, the ability to provide flood risk management was also considered.

4.3 EXISTING CONDITIONS

Existing conditions were evaluated for both the physical characteristics of Pond Creek and the functions of the creek and its associated riparian corridor. The following discusses the Pond Creek Study Area, methodology, and results of the evaluation of existing conditions.

POND CREEK STUDY AREA

The Pond Creek Study Area for the stream assessment was created along the length of the Pond Creek corridor from south of Pendleton Road northward and eastward to West Manslick Road. The Study Area follows the creek contours with a 100-foot buffer on either side (Figure 4.3).

FIGURE 4.2 RECOMMENDED PLAN

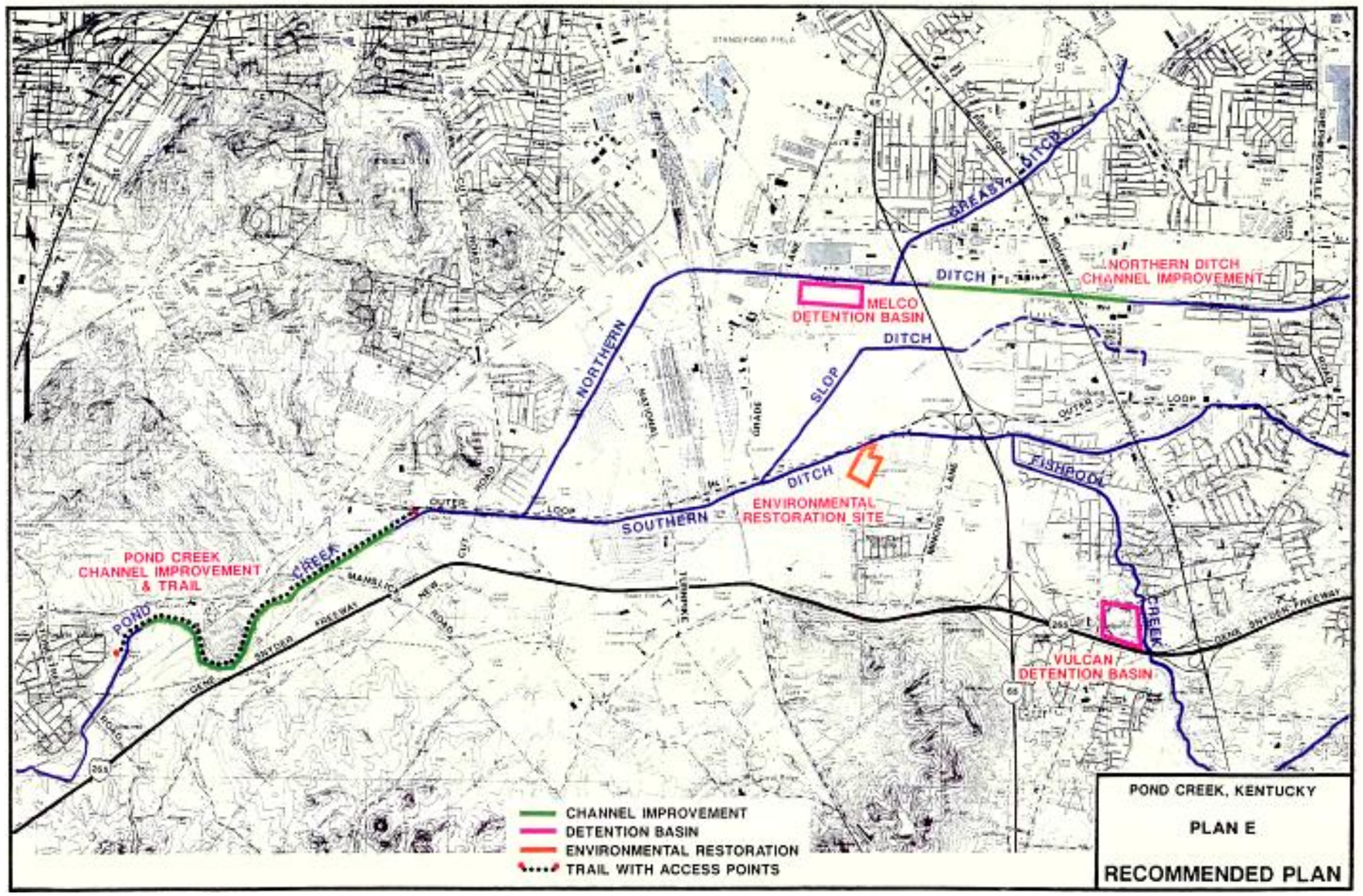
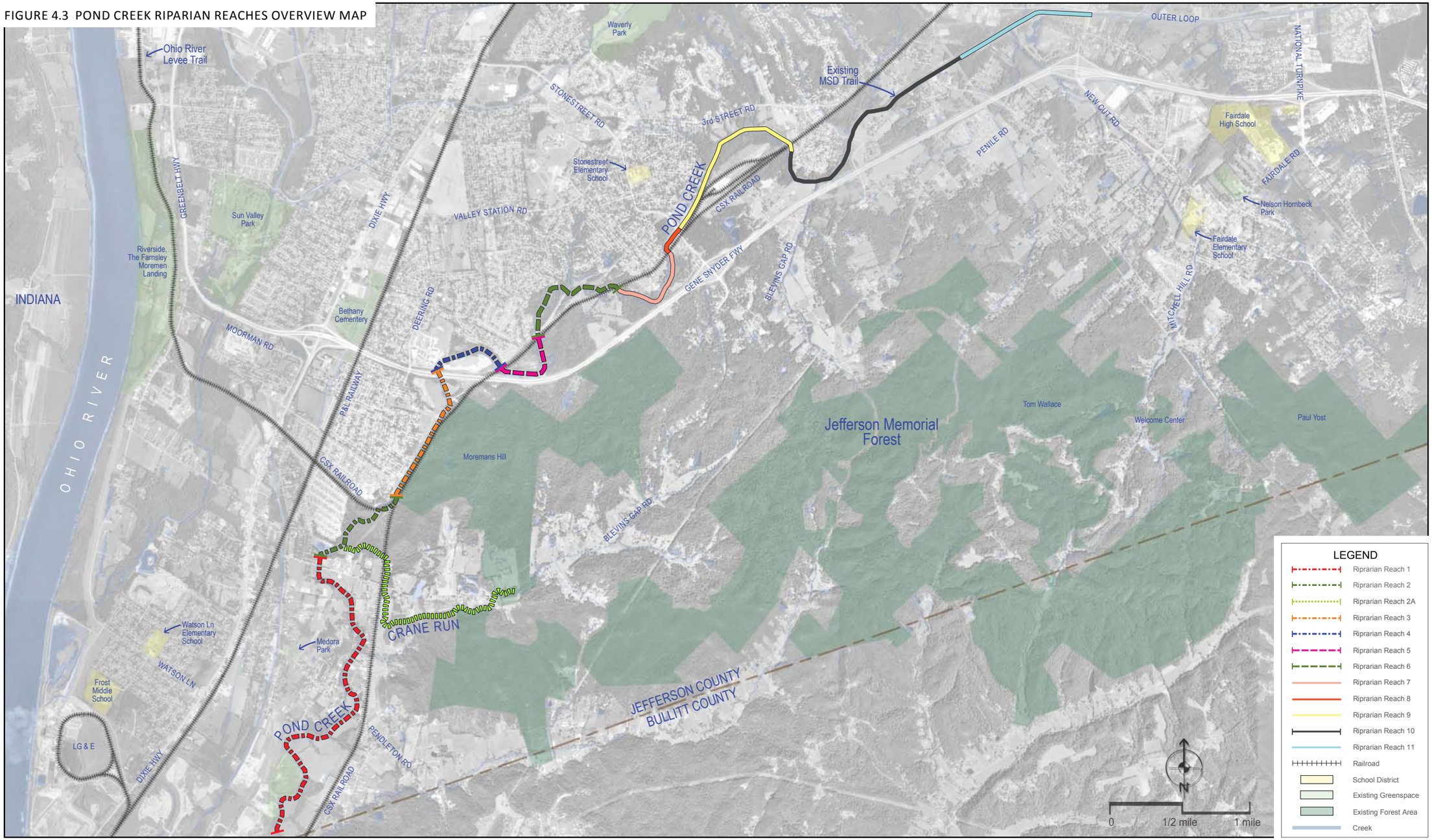


FIGURE 4.3 POND CREEK RIPARIAN REACHES OVERVIEW MAP



The Pond Creek Study Area was divided into riparian reaches (RRs). For purposes of the stream assessment methodology, an RR includes the bank-full stream channel and the active floodplain. An RR is defined laterally as a segment of a main stem bank-full stream channel and adjacent riparian ecosystem that is relatively homogenous in terms of its geomorphology, hydrology, channel morphology, vegetation, and cultural alteration characteristics. The RRs were determined based on constriction points, such as roadway and rail road bridges), tributary confluences, other significant features that would create a human-induced barrier, or by other ecological/geomorphological separation from one reach to the next. Crane Run, a tributary to Pond Creek, was also investigated and characterized for potential restoration activities that could benefit flood risk management and the water quality of Pond Creek.

A general description of the 11 RRs and the Crane Run tributary follows (see Figure 4.3 for locations). The elements of the general setting may contribute to the physical and functional elements of each reach and may ultimately influence the recommendations for ecological restoration within each reach.

RR 1 (13,980 FEET), SOUTH OF PENDLETON ROAD TO BLEVINS GAP ROAD

Located at the lower end of the Pond Creek Study Area and at the lower end of the watershed, RR1 is in a rural setting with limited development. Some forested wetlands are present on the banks near the lower end of the reach. The CSX rail line parallels this reach to the east (Figure 4.4).


1

FIGURE 4.4 RIPARIAN REACH 1

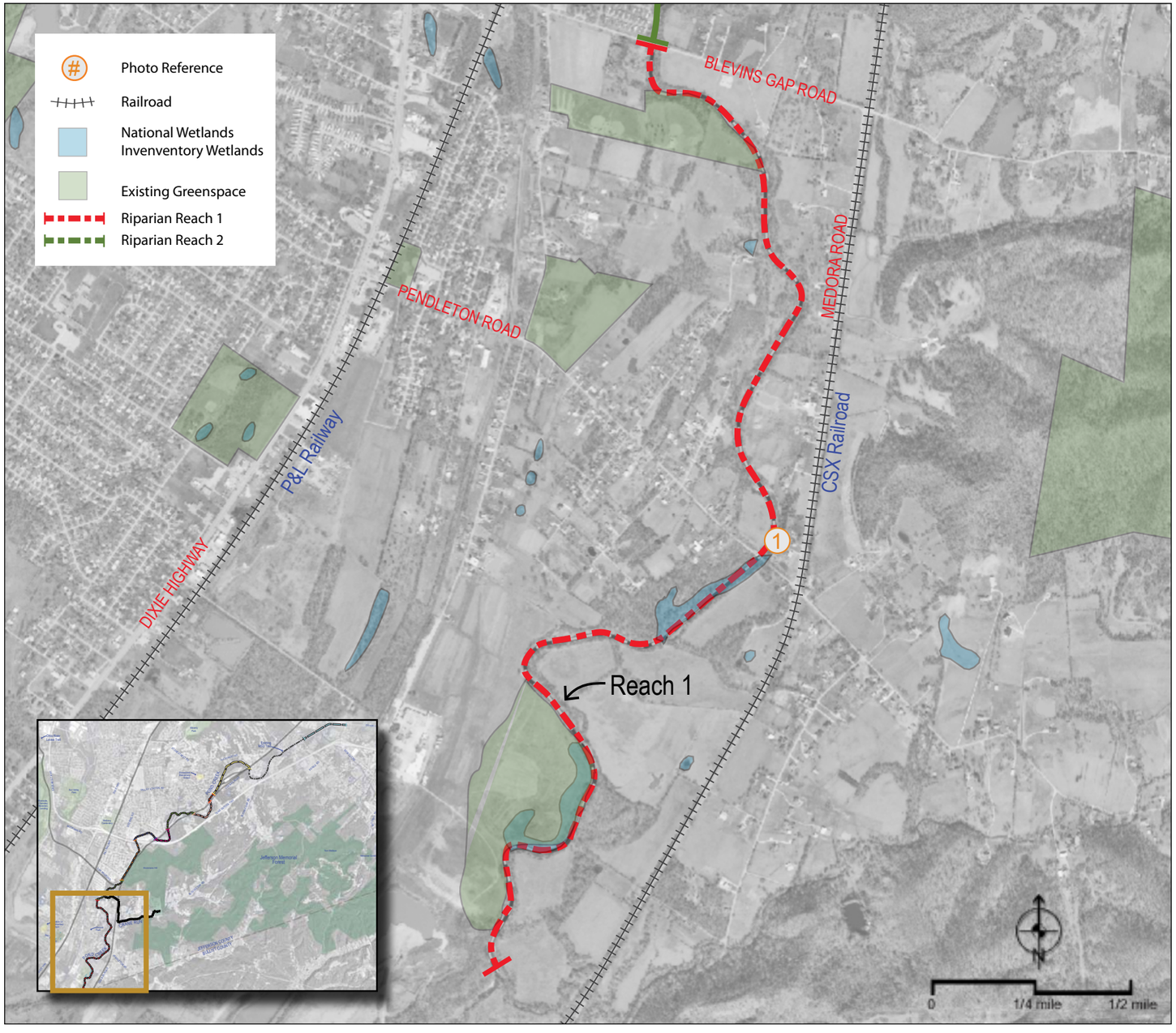
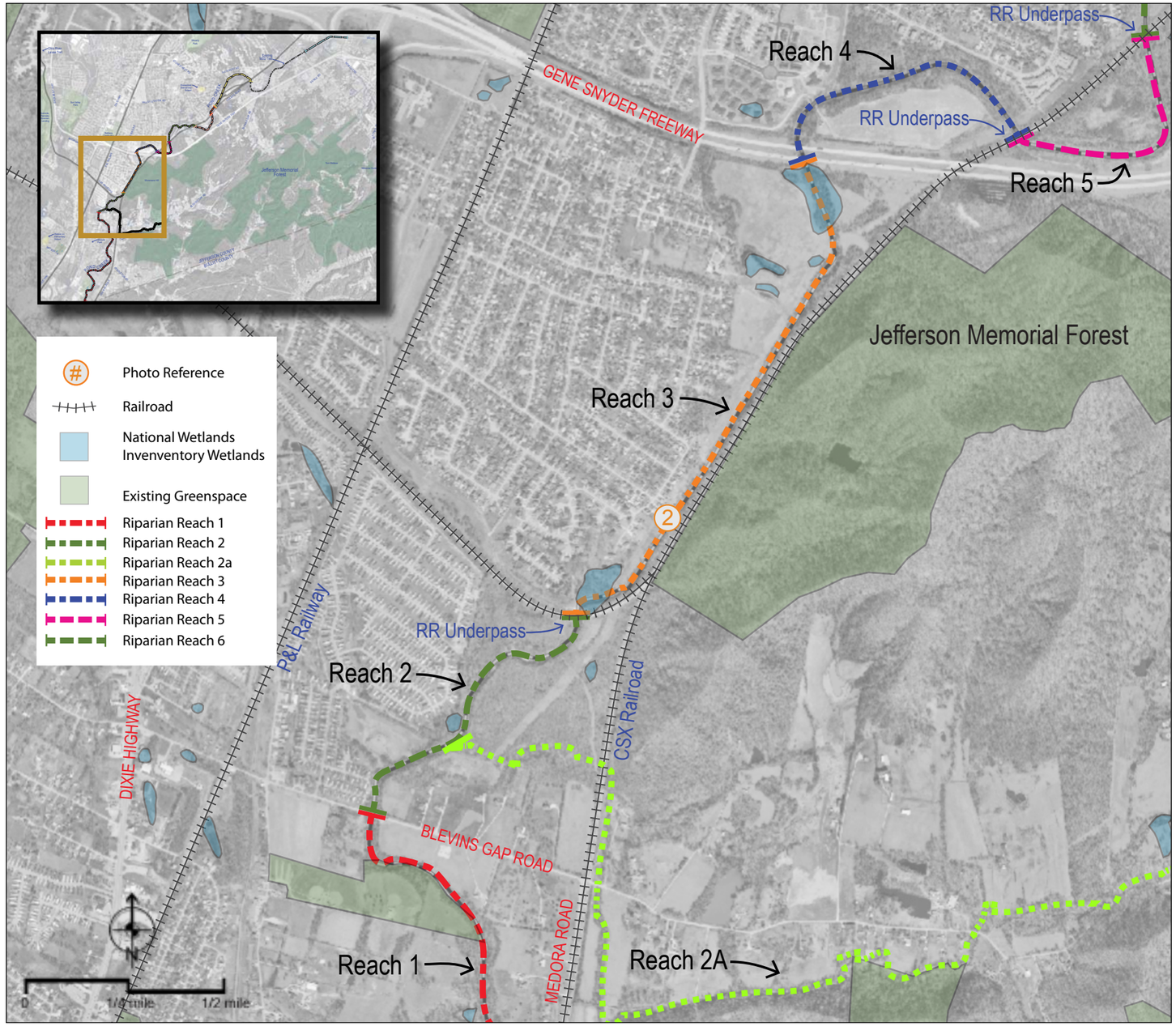


FIGURE 4.5 RIPARIAN REACHES 2, 2A, AND 3



RR 2 (6,690 FEET), BLEVINS GAP ROAD TO SUMMER CREEK DRIVE

The localized drainage area of RR 2 contains medium- to high-density single-family residential units; however, most of Pond Creek is in a forested environment. Crane Run empties into Pond Creek in the middle of this reach.

RR 2A (10,670 FEET), CRANE RUN FROM NORTH OF BLEVINS GAP ROAD TO THE CONFLUENCE WITH POND CREEK

This tributary to Pond Creek, flows primarily at the base of the Knobs (bluffs) of Jefferson Memorial Forest. The setting, adjacent to horse farms and agricultural land, is rural.

RR 3 (5,990 FEET), SUMMER CREEK DRIVE TO GENE SNYDER FREEWAY

Most of RR 3 has been channelized. RR 3 is predominately bounded by CSX railroad on the left bank by and single-family residential units on the right bank. However, the upper end of the reach is open space and contains remnant forested wetlands (Figure 4.5).

RR 4 (3,280 FEET), GENE SNYDER FREEWAY TO RAIL LINE BRIDGE

RR 4 is a short reach located on a continual bend. The inner bend is on land owned by Metro Park and contains the abandoned aggregate pit excavation, filled with fly ash and capped.

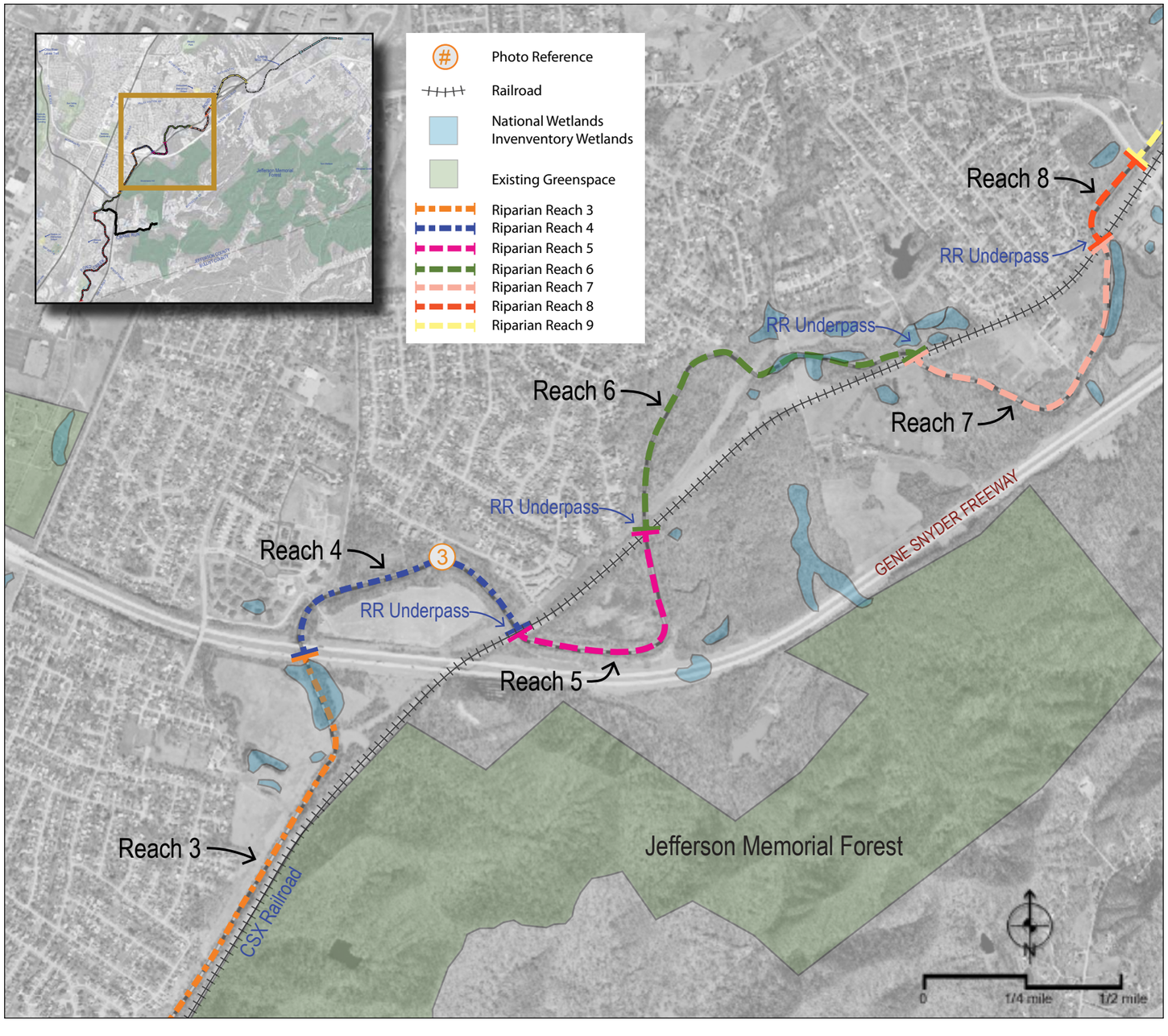
RR 5 (2,815 FEET), BEND IN THE CHANNEL FROM RAIL LINE BRIDGE TO RAIL LINE BRIDGE

This short reach is located between two CSX bridges and also parallels the Gene Snyder Expressway. There is currently a proposed project to restore a disconnected oxbow in the vicinity of this reach.

RR 6 (4,580 FEET), RAIL LINE BRIDGE TO RAIL LINE BRIDGE

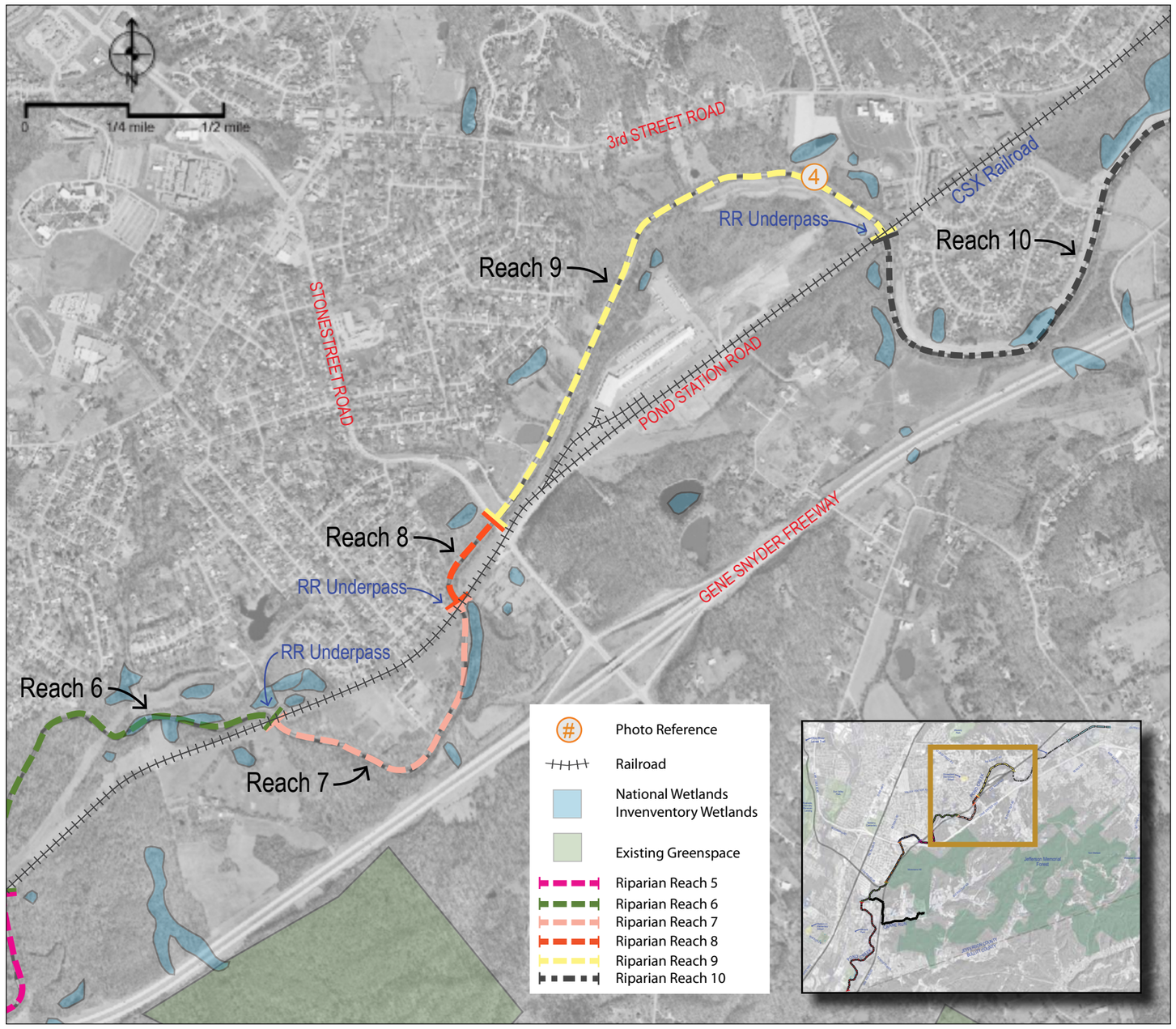
This reach is predominately through rural environment with remnant forested wetland areas (Figure 4.6).

FIGURE 4.6 RIPARIAN REACHES 4, 5, AND 6



3

FIGURE 4.7 RIPARIAN REACHES 7, 8, AND 9



RR 7 (3,646 FEET), RAIL LINE BRIDGE TO RAIL LINE BRIDGE

This reach is similar to RR 6 and has remnant forested wetlands present on the upper end.

RR 8 (1,070 FEET), RAIL LINE BRIDGE TO STONESTREET ROAD

This short reach is bounded by the CSX rail on the left bank and by some residential lots on the right bank on the downstream end.

RR 9 (6,533 FEET), STONESTREET ROAD TO THE RAIL LINE BRIDGE NEAR LAMBORNE BOULEVARD

The lower portion of RR 9 is constrained by the CSX rail line on the left bank and by a residential road on the right bank. The upper portion appears to have been cleared of forested vegetation (Figure 4.7).

RR 10 (8,430 FEET), RAIL LINE BRIDGE TO W. MANSLICK ROAD

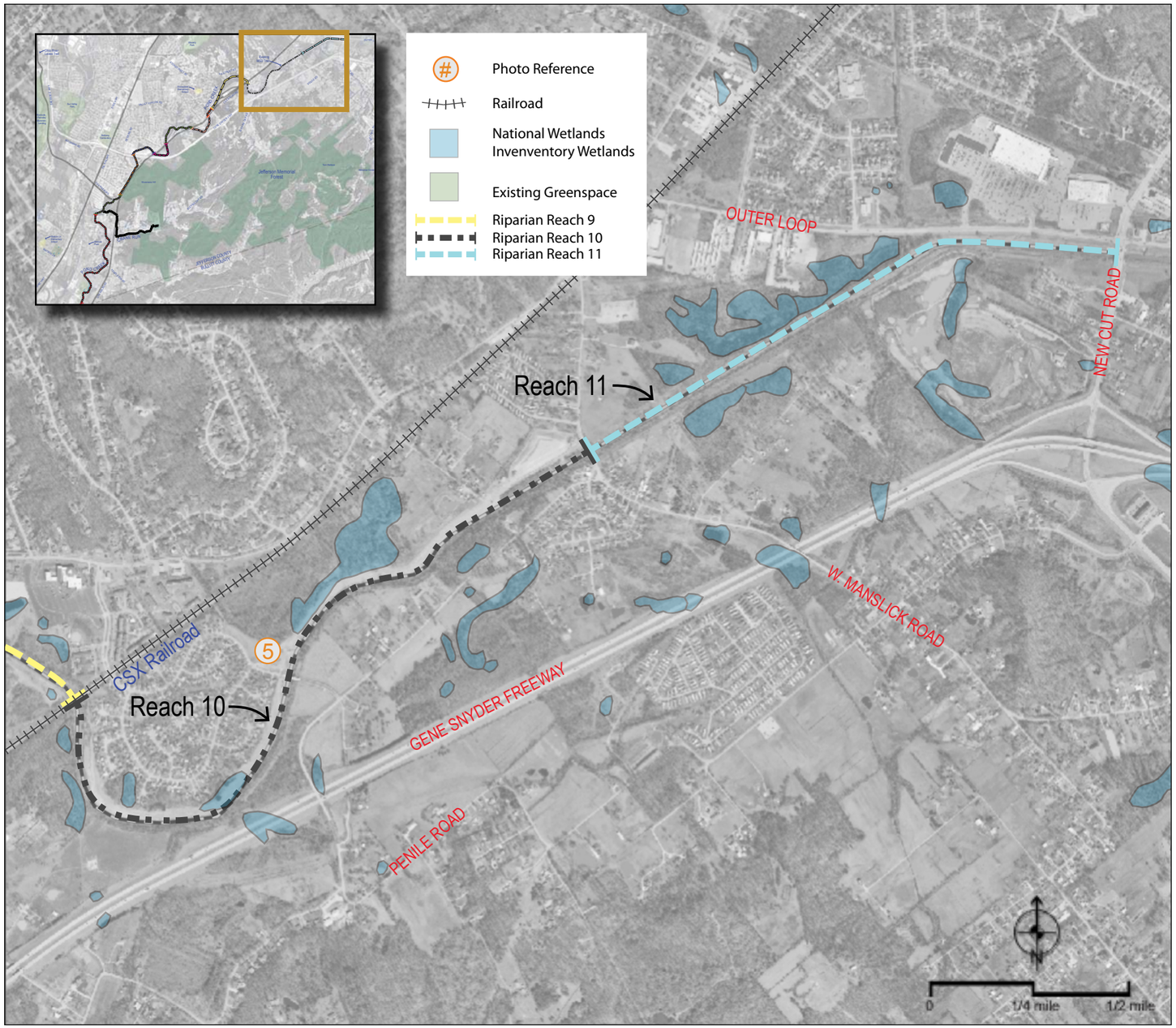
This reach is along the MSD trail project. Channel benching and in-stream habitat features have been added.

RR 11 (6,290 FEET), WEST MANSLICK ROAD TO NEW CUT ROAD

RR 11 is possibly the most manipulated (channelized) portion of the creek within the Pond Creek Study Area, specifically in the lower portion. The entire channel has been modified to a trapezoidal channel with high bank design for flood flow conveyance. The North Ditch enters Pond Creek in this reach (Figure 4.8).

5

FIGURE 4.8 RIPARIAN REACHES 10 AND 11



METHODOLOGY

In October 2010, a qualified environmental scientist and a stream restoration engineer performed a visual assessment of the Pond Creek RRs to document the existing physical and associated functional conditions of Pond Creek. The assessment provided reconnaissance-level characterization of the RRs to document baseline information and to determine a general level of stream function. This information will be used to identify actions intended to improve the overall function of the RRs. The data collected for this analysis were typically obtained from one observation point within each RR, with visual verification of that point at other locations within the reach, as possible.

The physical conditions evaluated were channel width and depth, channel bank height, and bank slope (Figure 4.9). Observations of specific stream characteristics included identifying indications of stream degradation such as bank erosion, headcutting , debris, effects from tributaries, and trash.

FIGURE 4.9 CHANNEL PHYSICAL CONDITIONS

In addition to the physical assessment described above, an adapted version of the USACE Nebraska Field Office Draft Nebraska Stream Capability Assessment Procedure was used. This procedure has the ability to provide for rapid data collection to assess various elements of stream function. The procedure was developed specifically to assess elements of stream function in an ecosystem setting, considering the riparian corridor and the adjacent land use.

This draft stream assessment procedure uses thematic variables for the major physical, ecological, and anthropogenic (human) factors that can strongly influence the stream and adjacent riparian system. The thematic variables characterized for each RR of Pond Creek and associated tributaries are as follows:

- Hydraulic conveyance and sediment dynamics
- In-stream habitat/available cover (Figure 4.10)
- Floodplain interaction – connectivity (Figure 4.11)
- Buffer continuity and width (Figure 4.12)
- Land use adjacent to active floodplain zone

FIGURE 4.10

FIGURE 4.11

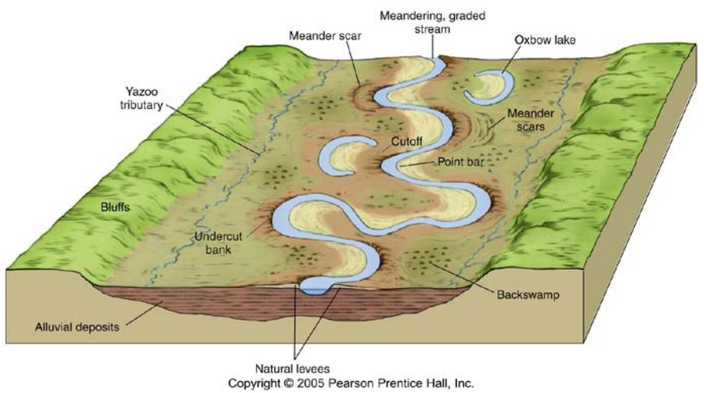


FIGURE 4.12

For the purposes of this assessment, each thematic variable received a qualitative "condition index rating" from low to high based on conditions observed in the Pond Creek Study Area. The most disturbed conditions (usually resulting from human sources) were assigned a "low" rating. The least altered condition was assigned a "high" rating. Intermediate assignments between "low" and "high" represent the range of variation between most disturbed and least disturbed conditions.

In most cases, the physical characteristic, such as bank height, slope, channel width, and ultimately the stream morphology (the form and structure of a stream), is a result of human influences on the stream system. Increases in storm water runoff because of increased impervious surfaces (such as pavement and roof tops), stream channel modifications (channelization), and alterations to the historic floodplain (levees) all affect these physical conditions. Consequently, these physical conditions, in addition to other factors, relate to the functions that the stream provides to the ecosystem.

An example of this relationship is the bank height of a stream. An exaggerated bank height due to stream bed erosion and headcutting over time would reduce the ability of the stream to connect to the historic floodplain. Another example is the effect of accumulated debris. Debris at the upstream face of bridge piers would affect hydraulic conveyance capacity, increase scour at piers and sediment dynamics. Additionally, bank erosion can potentially diminish the riparian corridor and affect the vegetative composition, with more adaptive but often less desirable species occurring in areas of disturbance.

For this reason, the physical conditions were assessed and the related physical issues were characterized for each RR. Then, the overall functioning of the RR was characterized. Concepts to improve these physical conditions would therefore benefit the overall stream function in direct and indirect ways (an in-stream structure could help with bank erosion as well as provide in-stream habitat).

RESULTS

Each RR has similar and differentiating characteristics when compared with the other RRs. The following describes the physical characteristics generally observed for each RR:

- Bank height decreases from upstream to downstream (40 to 15 feet).
- Top of bank decreases from upstream to downstream (150 to 80 feet).
- Channel width increases from upstream to downstream (25 to 50 feet).
- Side slopes of the banks are less steep on the uppermost reaches (2:1 – 4:1) and are consistently steep for the all other reaches (1:1).

Additionally, the following issues were identified for Pond Creek. These issues relate to the condition of the creek, its location within the watershed, and the opportunities ultimately present for ecological restoration.

- Bank erosion – Channel side slopes are steep and unstable, with exposed tree roots. Significant erosion was noted at the outer bends of channel curves and at locations of tributary confluences. Loss of native vegetation due to bank sloughing and erosion was also identified. (Figure 4.13)
- Debris – Tree trunks, branches, and other debris have accumulated at the upstream face of bridge piers, decreasing the flow area available through the bridge openings and potentially leading to significant scour at the piers. Debris that has also accumulated in the confluences of tributaries increases the likelihood of eddies forming, leading to bank erosion and channel bed scour. Figure 4.14)
- Headcutting – When headcutting occurs near bridges, it can lead to structural problems with the piers of the bridge.
- Tributaries – Tributaries entering Pond Creek and draining high ground on the east overbank have the potential to experience high velocities during high flow events as a result of the steep channel gradient. Channel degradation and bank erosion are observed at these confluences. (Figure 4.15)
- Trash – Significant amounts of trash accumulation were observed on the banks of the channel. This decreases the value of in-stream habitat, increases the potential for poor water quality, and decreases the aesthetic value of the channel. (Figure 4.16)
- Degraded wetlands – The degradation leads to decreased functionality for preserving water quality in the creek.

FIGURE 4.13

FIGURE 4.14

FIGURE 4.15

FIGURE 4.16

Table 4.1 summarizes the issues identified for each RR:

TABLE 4.1 OBSERVED PHYSICAL ISSUES FOR POND CREEK, BY RIPARIAN REACH

Riparian Reach	Bank Erosion	Debris	Headcutting	Tributaries	Trash	Degraded Wetlands
RR 1	X	X	X	X		
RR 2	X	X		X		
RR 3	X			X		
RR 4	X			X	X	
RR 5	X			X	X	
RR 6	X			X	X	X
RR 7	X			X		X
RR 8	X			X		
RR 9				X		
RR 10	X			X		
RR 11				X		

The stream functionality assessment was also conducted during the October site visit. Table 4.2 lists the condition index ratings for each of the variables assessed, by RR.

TABLE 4.2 POND CREEK STREAM ASSESSMENT CONDITION INDEX RATING

Riparian Reach	Hydraulic Conveyance and Sediment Dynamics	In-Stream Habitat/ Available Cover	Floodplain Interaction – Connectivity	Buffer Continuity and Width	Land Use Adjacent to Active Floodplain Zone
RR 1	medium-high	medium	medium-low	medium-high	medium-high
RR 2	medium-high	medium	medium	high	high
RR 2a (Crane Run)	high	medium	medium-high	high	medium-high
RR 3	medium-high	medium-low	low	medium-low	medium-low
RR 4	medium-high	medium-low	medium-high	high	medium-high
RR 5	medium-high	medium-low	medium-high	high	high
RR 6	medium-high	medium-high	medium-high	medium-high	medium-high
RR 7	medium-high	medium-high	medium-high	medium-high	high
RR 8	medium-high	medium-low	medium-high	medium-low	medium-high
RR 9	medium-high	medium-low	medium-high	medium-low	medium
RR 10	medium-high	medium-low	High	medium-low	medium
RR 11	medium-high	medium-low	medium-low	medium-low	medium-high

SUMMARY

Based on the observations of both the physical and functional conditions of the creek within the Pond Creek Study Area, bank erosion is present in most RRs (see Table 4.1). The extent varies from one RR to another. The following are observations of physical and functional conditions:

PHYSICAL CONDITIONS

- Stream width and depth are fairly consistent and increase gradually in the downstream direction.
- Bank height is fairly tall, meaning that the channel bed is deeply incised.
- Evidence of bank erosion was observed in nearly all creek segments.
- Tributaries enter the creek within each reach.

FUNCTIONAL CONDITIONS

- The ability to convey water downstream is effective.
- In-stream habitat and available cover vary from segment to segment.
- Floodplain interaction and connectivity are relatively unrestrained by barriers, except for limitations caused by channel incision.
- The buffer width and continuity vary between the reaches, which is typical for a study area of this length
- Land use is predominantly undeveloped for all RRs.

4.4 ECOLOGICAL RESTORATION

CONCEPTS

As stated above, the overall goal of the Ecological Restoration Plan for the Pond Creek Corridor is to evaluate the opportunities for and benefits of ecological restoration of Pond Creek and/or its tributaries. To meet this goal, this Plan primarily focused on directed improvements to Pond Creek. The MSD developed the groundwork for restoring Pond Creek through the development of the Pond Creek Conceptual Restoration Plan (MSD, 2000). That plan approached restoration of Pond Creek through long-range planning efforts that included local stakeholder input. The concepts listed in Table Y and described below should be considered preliminary in nature and only a piece of the overall approach to meet the ultimate goals of the Pond Creek Conceptual Restoration Plan (preservation and restoration of habitat, flood protection for people and property, and promotion of sustained economic development). As indicated in the Pond Creek Conceptual Restoration Plan, public education and community involvement are separate, ongoing tasks that provide community understanding and ownership of a program. These elements, combined with concepts aimed to address water quality issues on a watershed basis, such as best management practices (BMPs) in upstream tributaries, are elements that should continue to be considered and implemented.

Degraded portions of each RR of Pond Creek can be restored to a stable channel through a mix of traditional hard engineering stabilization methods (such as rock armoring) and bioengineering stabilization methods (such as vegetation). The restoration benefits are focused on improving downstream water quality, providing a channel with a stable grade, enhancing flood attenuation, and restoring aquatic and riparian habitat by the following means:

- Re-establishing stream stability and capacity to transport watershed flows and sediment load by restoring stable channel morphology, and grade/bank stabilization structures. These types of structures can also provide additional in-stream habitat
- Reducing non-point source sedimentation and nutrient inputs into the RRs by minimizing accelerated bank erosion and establishing of native bank vegetation

Table 4.3 lists concepts (restoration management measures and functions) that could be utilized to meet the restoration goals for Pond Creek. A description of each concept follows.

FIGURE 4.17

GRADE CONTROL STRUCTURES

A grade control structure is built in an existing natural channel to arrest the potential upstream progression of channel incision. Both the approach channel upstream and the channel downstream of the bridge are straight sections, resulting in relatively uniform hydraulic conditions through the structure at all times. A grade control structure may consist of sheet piles and rock. The channel bottom and a portion of the banks would be armored using rock riprap both upstream and downstream of the grade control structure (Figure 4.17).

- Hydraulic design features – The intent of grade control measures is to hold the bed in place and to reduce velocities and erosive energy. In-stream grade control structures establish fixed elevations in the streambed. This assists in long-term stability and development of the anticipated stream equilibrium slope and limits the maximum potential degradation. The design concept is to install structures that would produce cumulative rises in the streambed greater than the documented degradation. Fifty-year peak flow for the channel is generally used along with other channel characteristics, including channel slope, sediment characteristics, and roughness, to determine the design features of the proposed grade control structure.
- Vertical embedment – It is critical to ensure that the embedment of the steel sheet pile extends below the maximum potential scour depth and provides adequate depth for structural stability. One of the important parameters in determining the embedment depth of the grade control structure is the determination of the anticipated drop (net drop) at the structure. “Net drop” is defined as the difference in elevation between the natural streambed slope and the predicted long-term stable channel slope (final equilibrium slope).
- Lateral embedment – Using USACE guidelines (EM 1110-2-1601) lateral embedment of the grade control structures on either side of the stream banks should be calculated at the proposed location.

TABLE 4.3 RESTORATION MANAGEMENT MEASURES AND FUNCTIONS

Concept	Grade Control	Bank Protection	Flood Attenuation	Flow Redirection	In-Channel Habitat Improvement	Riparian Habitat Improvement	Water Quality Enhancements
Grade control structures	X						
Rock riprap Armoring		X					
Cross-vane	X	X		X	X		
J-hook vane	X	X		X	X		
Newbury structure	X	X		X	X		X
Rootwads		X		X	X	X	
Locked logs		X			X		
Lunker logs		X			X		
Boulder clusters				X	X		
Vegetated geogrid		X	X		X	X	X
Brush mattress		X	X		X	X	X
Riparian area Enhancement		X	X			X	X
Stormwater BMPs			X			X	X
Floodplain Bench		X	X			X	

ROCK RIPRAP ARMORING

A method of protecting channel banks from erosion is to provide rock riprap armoring. To provide greater efficiency in placing operations, a single riprap size can be used wherever possible. In addition to riprap armoring, erosion control blankets can be used on upper slopes in select locations. The locations would be determined during the design phase. The sizes of the riprap can be calculated using the riprap computer program “Channel Pro,” used for open-channel flow (Figure 4.18).

CROSS-VANES

Rock cross-vanes direct the flow away from the stream banks and into the middle of the channel. The structure creates a scour pool below which a habitat feature is provided, while maintaining the grade for the upstream reach. The structure also provides a stable drop in the stream profile. Boulders are used to build the cross vanes, and filter fabric and smaller rock further strengthen them by solidifying gaps between the boulders (Figures 4.19 and 4.20).

FIGURE 4.18

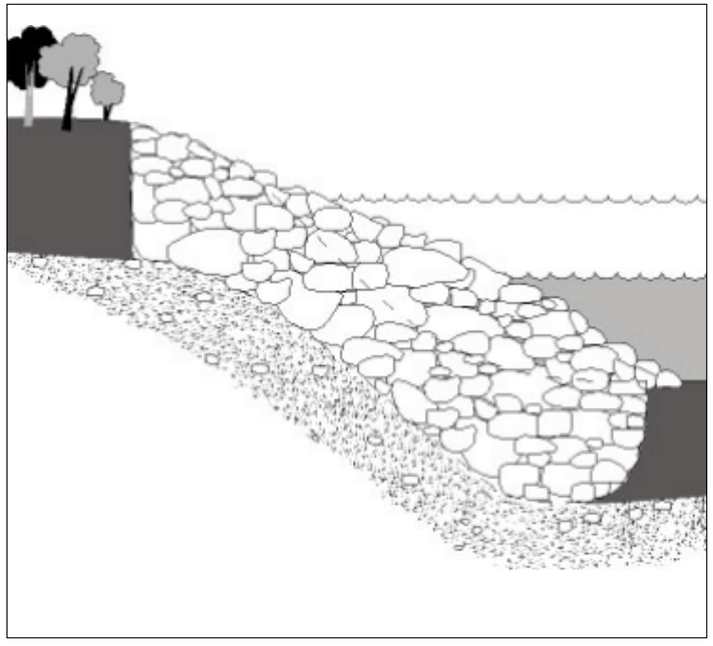


FIGURE 4.19

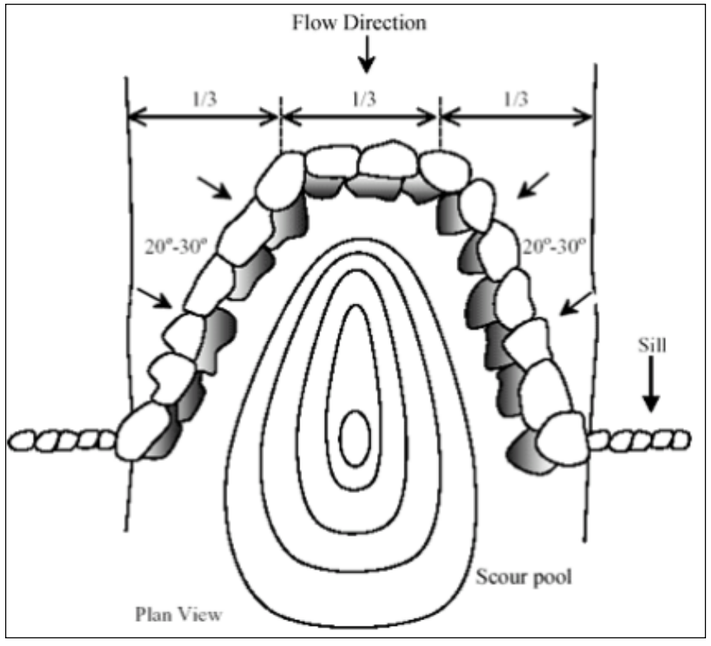


FIGURE 4.20

J-HOOK VANES

J-Hook Vanes are built with boulders and placed in the stream to direct flow away from the stream banks. The structure has the appearance of a "J" because it consists of one rock vane with boulders placed in the center of the channel, curving back around to form a hook. In addition to the vane's scour pool, the openings between the extra boulders create a variety of flow patterns. Fish often hold in the calm water behind the boulders to catch food from the flow patterns around the boulders (Figure 4.21).

NEWBURY STRUCTURES

Newbury structures or riffles (engineered rock riffles) are cross-stream rock structures that create upstream and downstream pooling of water in the channel (Derrick, 2008). The function of the structure is to direct water toward the center of the channel, aerate water, and serve as grade-control. Newbury structures enhance habitat variability through four basic mechanisms: aeration of the normal flow as it passes over the sloping rock surface; variations in normal flow velocities; creation of variable interstitial spaces within the riprap structure; and variation in slower water pool depth created upstream of the structure (Figure 4.22).

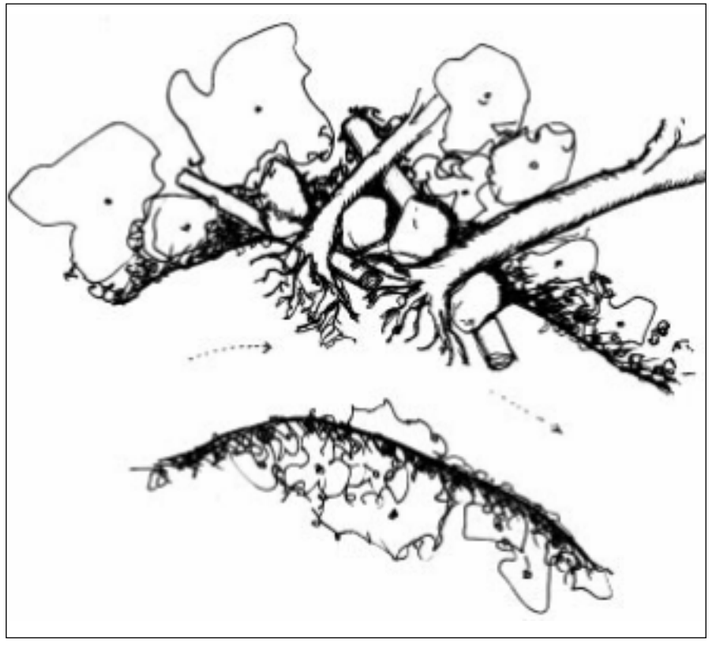
ROOTWADS

Rootwads can be placed along the sides of the channel to provide habitat diversity and cover in the near bank areas of the channel. Rootwads consist of tree trunks with the roots still attached (Sylte and Fischenich, 2000, and Derrick, 2008). The tree trunks should be anchored into the bank by rock riprap and backfill, and then placed at approximately 45-degree angles pointing into the flow. A key criterion is the vertical placement of the structure so that at least one-third the depth of the rootball is submerged into normal base flow conditions. Rootwads provide a variable flow habitat, which may be used for the hatching and rearing of young fish populations, for organic debris accumulation, and for resting and feeding areas for other aquatic life. The partially submerged rootwads also provide a surface break in the stream, which in turn provides a more oxygenated environment, as well as shade for the surrounding environment (Figure 4.23).

FIGURE 4.21

FIGURE 4.22

FIGURE 4.23



LUNKER LOGS

Lunker logs can be placed parallel to flow along the channel edges near the interface of the lower side slope and the channel bottom. Lunker logs consist of 6 to 18-inch-diameter logs with the tree crown or roots still intact. The logs are inserted into a reinforced concrete pipe (RCP). The crown or root is intended to have about 1.5 times the diameter of the RCP diameter. The purpose of the lunker log is to provide fish cover, while the RCP anchors the lunker log in the channel and provides cover.

LOCKED LOGS

Locked log structures can be placed on the outsides of bends on the low channel slope. The structure would consist of logs anchored into the bank by rock riprap and backfill. The logs would be placed together in a side-by-side manner, inserted at an approximately 45-degree angle in the direction of flow approximately 1 to 2 feet above the channel bottom (Derrick, 2008) (Figure 4.24).

BOULDER CLUSTERS

Boulder clusters consist of three large rocks placed together in the channel bottom. (Fischenich and Seal, 1999) and (Doll, B.A. et al., 2003). The boulder clusters would be placed within the middle two quarters of the channel, and spacing between rocks would be a minimum of 2 feet. The rocks would be placed in a triangular cluster, with one lead rock upstream and two downstream rocks. These structures would restrict and divide flow, forming scour pools and eddies around the edges of the boulders and promoting aquatic habitat diversity and shelter within the center of the channel (Figure 4.25).

VEGETATED GEOGRID

A vegetated geogrid consists of layers of live branch cuttings placed between layers of compacted soil with geotextiles (natural or synthetic) wrapped around each soil layer. The geotextile fabric is generally secured by tucking it into the slope. The root structures that the live branch cuttings develop penetrate the soil grids and bind the soil within the geotextile fabrics. The geogrid protects and rebuilds the stream bank and provides a condition for native vegetation to grow on the channel banks.

The channel bank protection functionality of vegetated geogrid increases over time as vegetation becomes permanently established. Vegetated geogrids can tolerate initial higher flow velocities and are helpful in restoring mid- to higher bank slopes in the outer bends of channels. The toe of the channel banks, where vegetated geogrids are installed, are generally stabilized by layers of rock on top of the same geotextile fabric. Conveyance capacity of the channel also increases when steep eroded banks are regraded to a gentler and stable slope and protected with vegetated geogrid (Figure 4.26).

FIGURE 4.24

FIGURE 4.25

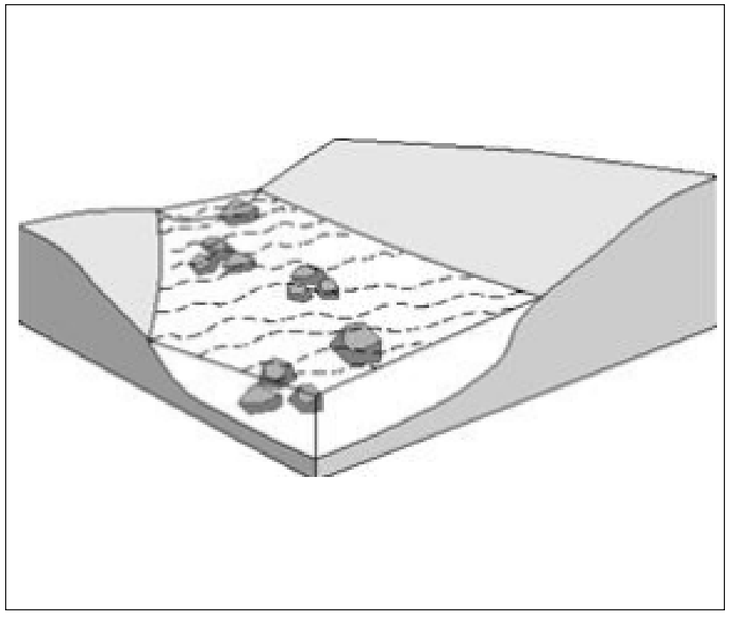
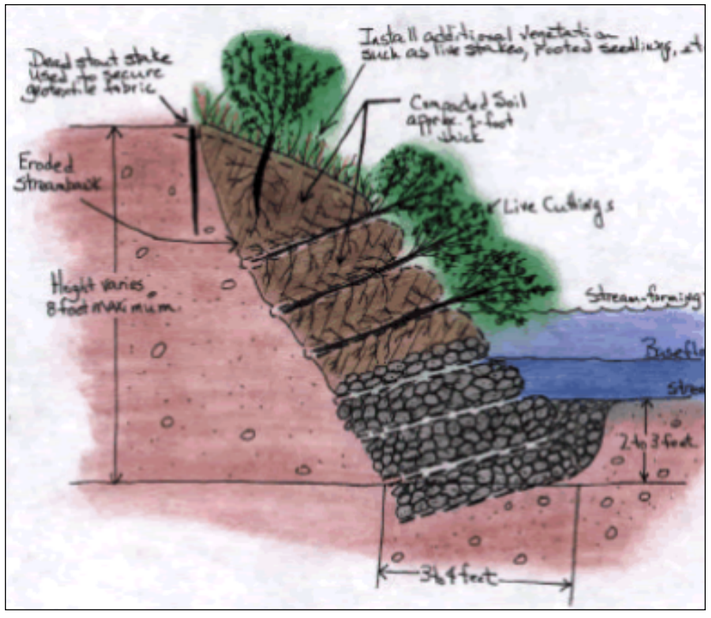


FIGURE 4.26



BRUSH MATTRESS

A brush mattress is a layer of live branches or live fascines placed on a bank face, often with a rock at the base or toe of the bank. The mattress is generally held in place with wire or ropes, live stakes, and dead stout stakes. It creates a structural stream bank protection that is designed to eventually root and provide vegetative bank stabilization. A brush mattress, with rock riprap protection at the toe of the stream bank, can be used on an eroding bank and has the potential to immediately slow channel flow velocities along the bank and accumulate sediment. The sprouting plant vegetation generally develops a strong network of interlocking roots and plant stems and provides structural strength to the channel bank. In addition to protecting the channel bank from erosion, the brush mattress provides habitat for animals and shade to the channel near the banks that can lower the water temperature and generally improve fish habitat. The brush mattress can also intercept sediment from sheet flow runoff on stream banks, providing for better water quality in the channel. Grading of steep banks to gentler slopes to lay the brush mattress layer also increases the conveyance capacity of the channel (Figures 4.27 and 4.28).

RIPARIAN AREA ENHANCEMENT

Enhancement of the riparian corridor would provide for the creation of terrestrial habitats and would provide water quality benefits. This could be accomplished through several planting types within an RR, as applicable. Planting would consist of hydrophytic vegetation, trees, shrubs, plugs, grasses, and forbs (wildflowers). Species adapted to regional conditions should be selected. The use of riprap should be minimized to the extent practical in vegetated areas. Native herbaceous hydrophytic and upland grasslands/forbs should be the primary vegetation community used on the slopes and benches of the channel and overbank areas. Herbaceous vegetation does not restrict the flow conveyance of the design. These areas can be created by seeding.

Post-construction hydraulic modeling should account for such vegetated conditions and should analyze backwater effects. However, design flow conveyance capacity most likely can be maintained while allowing vegetation on the channel banks, thereby providing much needed shading and wooded riparian habitat along the river margin that is critical to the riverine ecosystem function.

- Hydrophytic plantings – Hydrophytic plants are grasses, rushes, sedges, and forbs adapted to periodic wet and dry conditions (USACE, 2008). Hydrophytic plantings can be installed on the lower channel slopes, which are more susceptible to frequent high flow event inundation. These slopes should be seeded to hydrophytic-adapted native grasses and forbs.
- Upland plantings – Native upland-adapted grasses and forbs should be planted on dryer upper slope areas. Native grasses and forbs should be planted on the upper slopes of the channel.
- Native vegetation swale and wetland plantings – The native vegetation swale BMP areas would be planted with a selection of both hydrophytic and upland grass and forb species to allow for varied hydrologic conditions. Tree and shrub plantings would be used with various native tree and shrub species along with upland plantings specifically selected for their importance to birds and aesthetic presence.

FIGURE 4.27

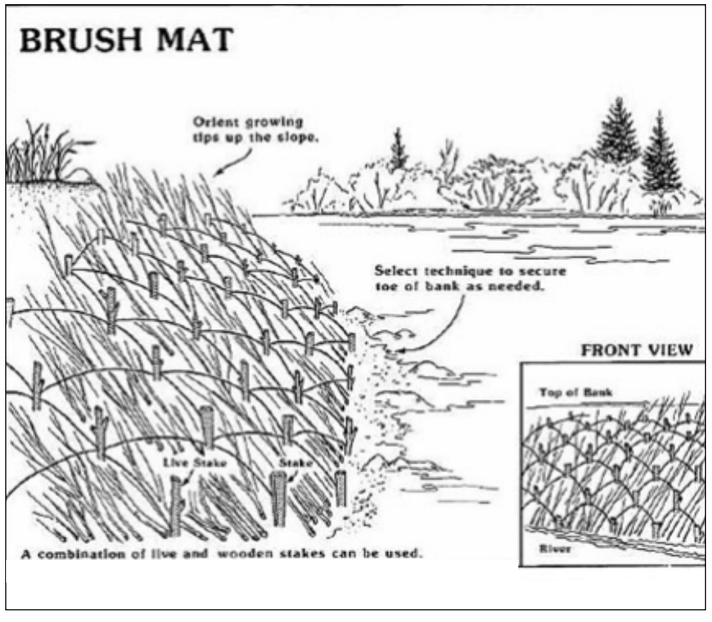


FIGURE 4.28

STORMWATER BMPS

Stormwater BMPs are proposed as enhancement features to provide water quality benefits, aesthetic values, and habitat and species diversity. Each BMP can be evaluated during the design phase based on water quality value and reduction of runoff volume, temperature, and oils and floatables. BMPs that are ultimately selected for use may include a wetland swale and three native vegetation swales (Figure 4.29).

- Wetland swales – These are defined as "broad, shallow, natural, or constructed channels with a dense stand of native vegetation covering the side slopes and emergent vegetation covering the channel bottom." Wetland swales improve water quality, reduce runoff volume and the potential for erosion, and increase habitat diversity, while providing an aesthetically pleasing BMP feature along the river bank. These swales are highly effective at removing sediment, oil and grease, and organics.
- Native vegetation swales – These are defined as "broad, shallow, natural, or constructed channels with a dense native grass stand covering the side slopes and channel bottom." Native vegetation swales also improve water quality and reduce runoff volume and potential for erosion. These swales are most effective at removing sediment and should collect runoff from a drainage area no larger than 5 acres.

FLOODPLAIN BENCH

At locations of extreme bank erosion and channel incision the natural floodplain of the channel may get disconnected from the channel. This may lead to increased channel instability, degraded riparian habitat and decrease in water quality. Floodplain benching can reconnect the channel back to the floodplain, restore overbank flows and result in enhanced hydraulic and ecological interaction. Floodplain benching can be accomplished by excavating a bench along the bank of the channel creating a two stage channel and the resulting bench can also be vegetated with native vegetation thereby enhancing riparian habitat above the low flow channel. Floodplain benching generally increases the flow area of the channel thereby increasing channel flow capacity and lowering channel flow velocities at flood events.

The in-channel structures that could be used for the restoration techniques generally neither enhances nor detracts from channel hydrology. The in channel structures are designed to create variability in water depth, velocity, and channel bed features, all of which enhance aquatic habitat. Newbury structures would provide variations in water velocity, depth, current, and would re-direct stream flows toward the centerline of the channel. Boulder clusters would cause variations in stream flow and promote localized scour and deposition. The use of hydrophytic and upland vegetation would result in minimal resistance to water flow and encourage water filtration and sediment deposition. Wetland and native vegetation swales would slow overland flow from storm events, improve water quality, and reduce stream siltation.

Proposed native plantings would anchor soil, increase filtration, and reduce erosion and stream siltation while providing an opportunity to enhance soil conservation. Native plantings capitalize on a more eco-friendly use of land and water resources within the design constraints of a flood control channel. The intent of the restoration activities will be to maximize the amount of green space available, while limiting gray infrastructure (such as concrete and riprap) to the minimum amount necessary to provide for channel slope and grade stability (Figure 4.30).

RIPARIAN REACH RECOMMENDATIONS AND ANALYSIS

Based on this initial assessment of the existing physical and functional conditions of the RRs, and the general setting of each RR, conceptual recommendations can be made as to the type and magnitude of ecological restoration within each reach. The potential range of benefits of the conceptual restoration efforts can be evaluated to provide decision makers with an idea of value and priority for initiating additional studies (see Section E, Next Steps) to determine future restoration activities.

Table 4.4 outlines the restoration techniques that could be applied to each RR to remedy or enhance the existing conditions associated with the RR.

FIGURE 4.29

FIGURE 4.30

TABLE 4.4 POND CREEK STREAM ASSESSMENT CONDITION INDEX RATING

Riparian Reach	Bank Protection[1]	Protection at Curves[2]	Protection at Confluences[3]	Grade Control[4]	In-Channel Habitat[5]	Stormwater BMP Areas[6]
1	X	X	X	X		
2	X	X	X			X
2a						X
3	X				X	X
4	X	X			X	
5	X	X				
6	X	X				X
7	X	X				X
8	X	X				
9	X	X			X	

Notes:
[1] Bank protection measures include the potential to incorporate various types of in-channel structures (cross-vanes, J-hook vanes, etc.) as well as floodplain benching and bank protections such as vegetative geogrids, rock riprap armoring, brush mattress and vegetative plantings.
[2] Protection at curves includes the use of rootwads, J-hook vanes and locked logs.
[3] Protection at confluences involves the use of bank protection on the opposite bank from the inflow from the tributary and/or a structure, like rock cross-vane, to provide grade control for the tributary.
[4] Grade control measures are in-channel structures such as a Newbury structures that controls the down cutting of the stream channel bed.
[5] In-channel habitat refers to measures such as boulder clusters and lunker logs that provide aquatic habitat above or below the implemented measure.
[6] Stormwater BMP areas include the implementation of vegetative swales or wetland swales adjacent to a stream channel or within channel overbank areas.

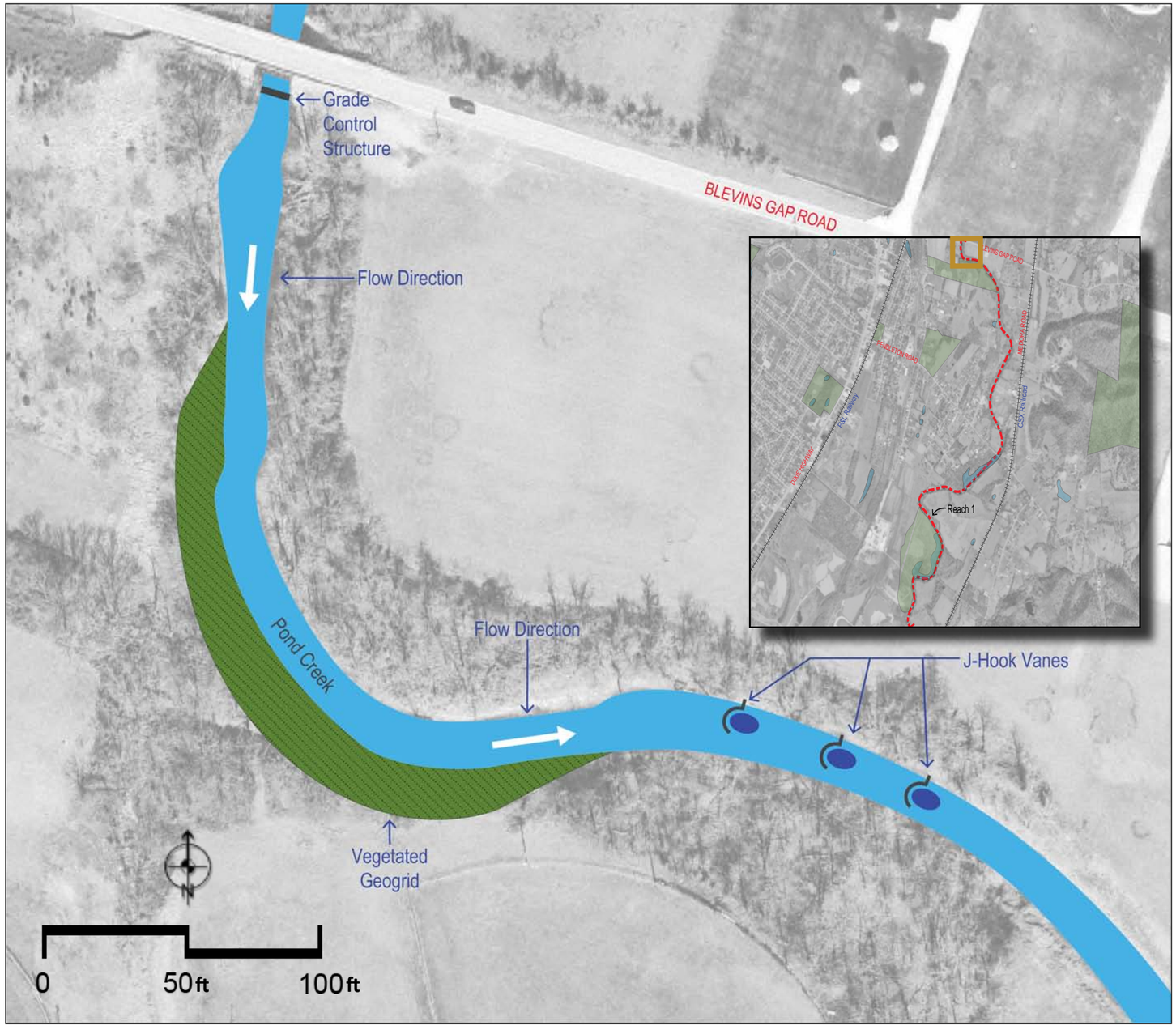
The following is a discussion of the benefits of restoration efforts for each RR, considerations of these restoration activities, and a review of other factors that affect the benefits of restoration activities. Figures 4.31-4.37 provide a conceptual sample of what could be performed in an RR.

RIPARIAN REACH 1

This reach is in a rural area at the lower end of the Pond Creek Study Area and near the lower end of the Pond Creek watershed. There is physical room for bank benching and other riparian corridor work. Though flood attenuation would be improved, the overall effect would be lessened because of the position of this RR in the watershed (the higher in the watershed the flood attenuation measures are implemented, the more benefits to downstream resources). There are existing wetlands in the corridor that, through the potential for increased interaction, would benefit these habitats.

Benefit summary – The most notable benefit would be from the connecting floodplain habitats (existing wetlands) to the creek. As shown in Figure 4.31, the grade control structure just downstream of the Blevins Gap Road Bridge will stabilize the channel grade at the bridge and potentially protect the bridge piers from excessive local scour. The left bank protection using vegetated geogrid at the curve downstream of the bridge will reduce bank erosion and provide for native vegetation growth in the channel banks. The placement of J-Hook vanes in the channel will lead to improvement to inchannel habitat. Bank benching and grading of steep banks to gentler slopes for vegetated geogrid placements may also provide moderate flood attenuation. Potential recreation opportunities exist as Shared-Use Path Alternative C is proposed to parallel Pond Creek in the lower portion of this RR, providing a connection to the creek at locations for potential recreation opportunities.

FIGURE 4.31



RIPARIAN REACH 2

The area adjacent to RR 2 allows for consideration of measures such as floodplain benching and protection of the banks. This would benefit the Crane Run tributary inflow. To accomplish benching, however, a high amount of tree removal would be required, as this area is predominately forested. Shared-Use Path Alternative A is proposed to parallel portions of this RR and would utilize an existing trail along Autumn Lake Drive.

Benefit summary – RR 2 currently serves the functions that were evaluated at a fairly high level. The most notable improvements would be to in-stream habitat and floodplain connectivity. As shown in Figure 4.32, the placing Rootwads along the bank toe in the channel provide habitat diversity and also shade and cover for fish and other invertebrates in channel near the banks. The outside bank of the curve near the confluence with Crane Run Tributary will be protected with Brush Mattress. Preventing bank erosion at the confluence in addition to the in-channel structure and bank protection measures in Crane Run Tributary will create a more stable confluence and decrease in bank erosion will enhance water quality in Pond Creek. Flood attenuation would still be moderate; because this segment is higher in the watershed, however, more downstream benefits would be realized than in RR 1.

FIGURE 4.32

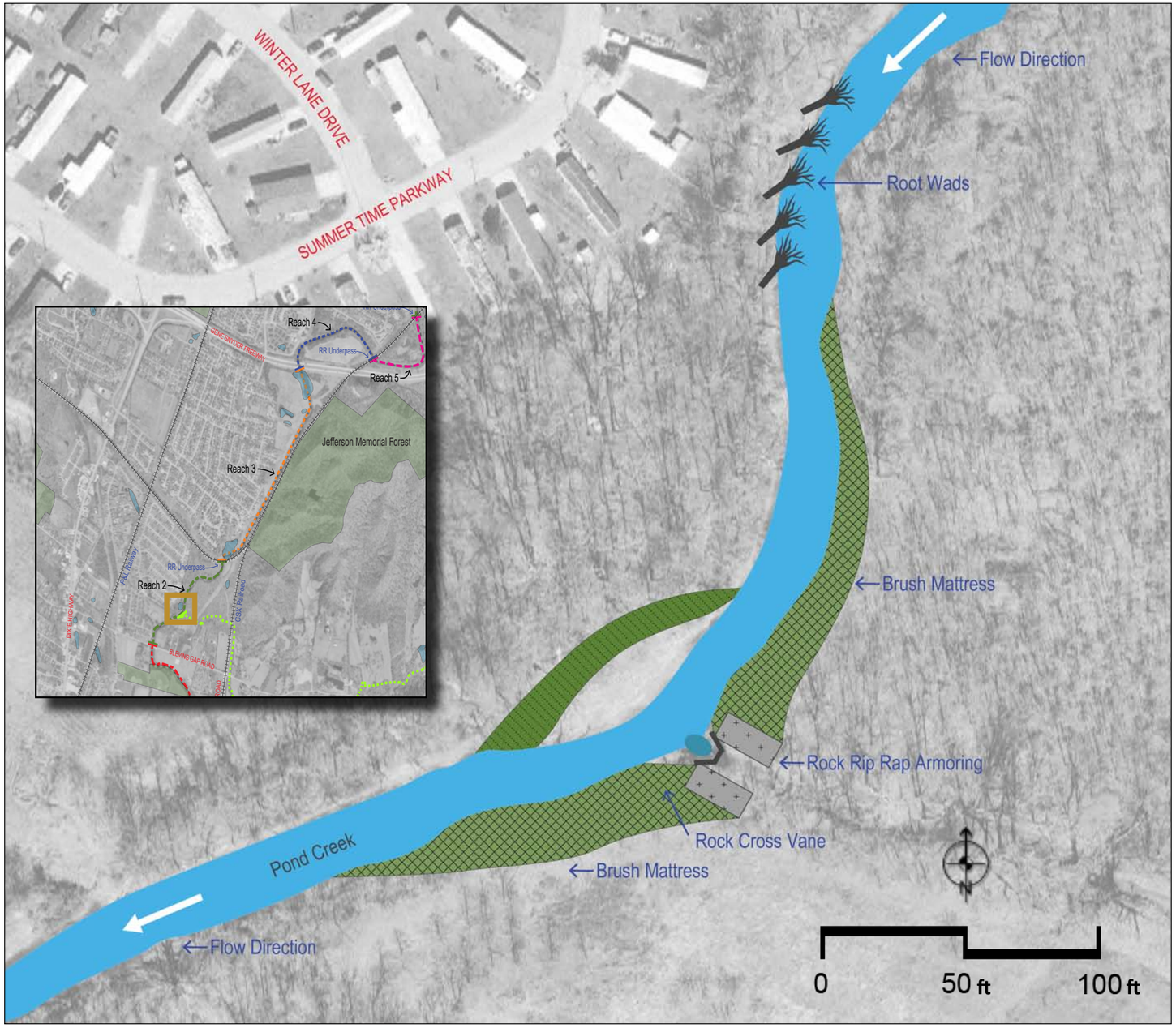
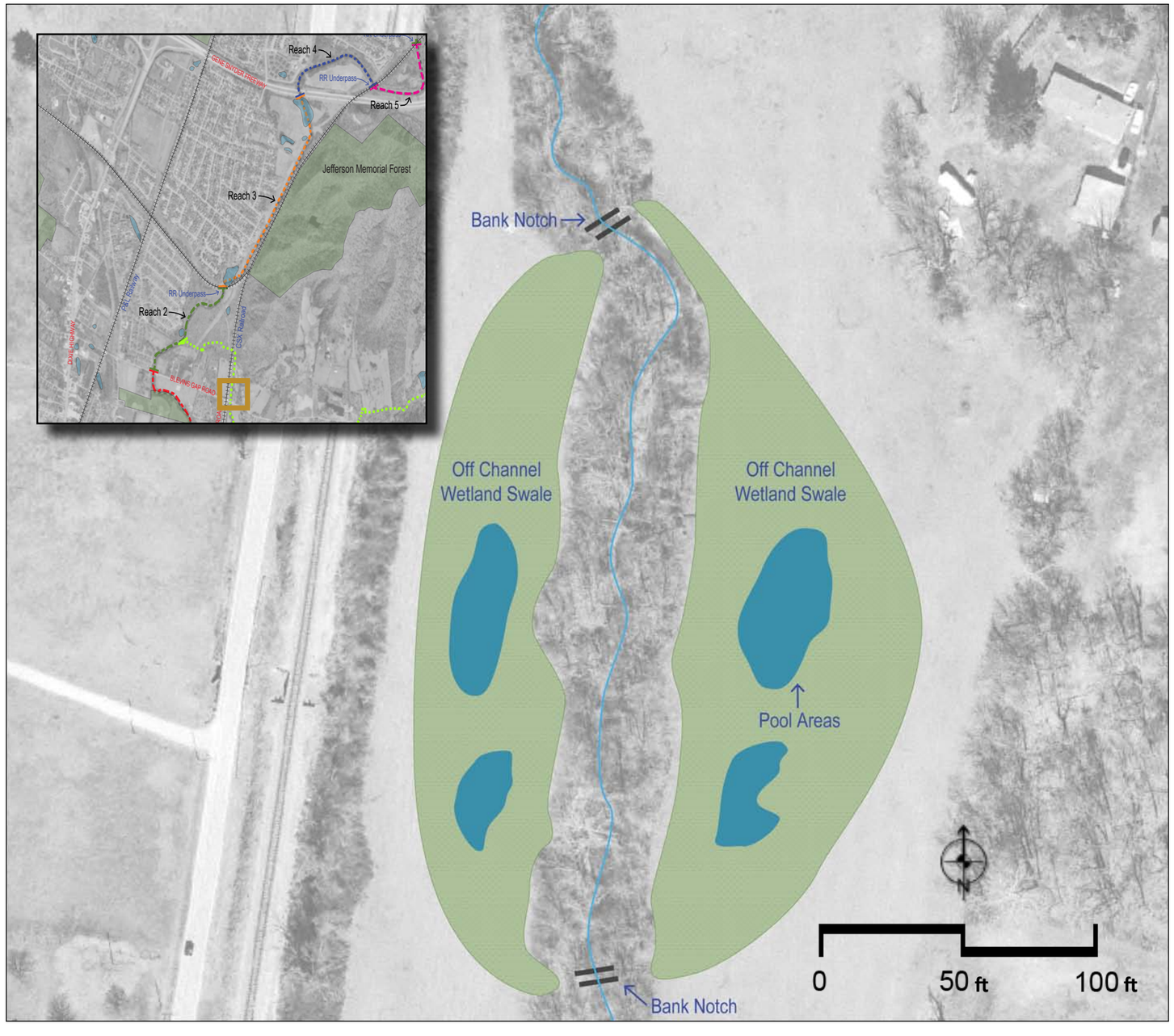


FIGURE 4.33



RIPARIAN REACH 2A (CRANE RUN TRIBUTARY)

Crane Run is a highly functioning tributary to Pond Creek. The largest benefits in ecological function would be implementation of stormwater BMPs and habitat creation through the creation of off-channel wetland depressions upstream of the crossing under the CSX rail line. At the confluence of Crane Run with Pond Creek, an in-stream structure in Crane Run would provide multiple benefits.

Benefit summary – Construction of off-channel wetland areas would result in water quality benefits for Crane Run and Pond Creek and provide flood attenuation of this tributary. The wetland areas would provide a habitat niche of a resource once prevalent in this region.

As shown in Figure 4.33, the placement of a rock cross-vane across Crane Run Tributary just upstream of it confluence with Pond Creek stabilize and maintain the grade for Crane Run tributary and also arrest headcutting from propagating upstream. The scour pool that is created downstream of the rock cross-vane provides for enhanced in-stream habitat. Protecting the banks of Crane Run Tributary just upstream of the confluence with rock riprap will prevent bank erosion and will result in water quality enhancement in Pond Creek downstream of the confluence.

RIPARIAN REACH 3

This reach is a relatively channelized portion of Pond Creek. The upper portion of RR 3 would benefit from floodplain benching to allow for increased floodplain interaction with existing wetlands. Increased in-channel habitat would also provide aquatic habitats that are diminished in this reach. Shared-Use Path Alternative A is proposed to parallel most of this reach.

Benefit summary – As shown in Figure 4.34, constructing a stormwater BMP area on the west bank of Pond Creek will lead to habitat diversity, increased floodplain interaction and enhanced water quality of stormwater runoff flowing into Pond Creek. Planting of native vegetation along the west bank of the channel will connect the existing vegetation on the west bank further upstream and downstream. Placing lunker logs along the channel bank toe will provide for fish cover and enhance in-stream habitat diversity. Protecting the east bank at the curve with vegetated geogird will prevent excessive outer bank erosion during high flood events. Building a rock cross-vane in the tributary just upstream of its confluence with Pond Creek will prevent headcutting from the confluence propagating upstream into the tributary and thereby stabilizing the grade of the tributary channel. Increased floodplain interaction would have the highest net functional gain for RR 3. Concepts for in-stream habitat would also provide a moderate functional lift. Flood attenuation continues to be more beneficial in this reach than in RRs 1 or 2 because this reach is higher in the watershed. Recreation and educational opportunities would exist if Alternative A is utilized for a shared-use path at some point.

FIGURE 4.34

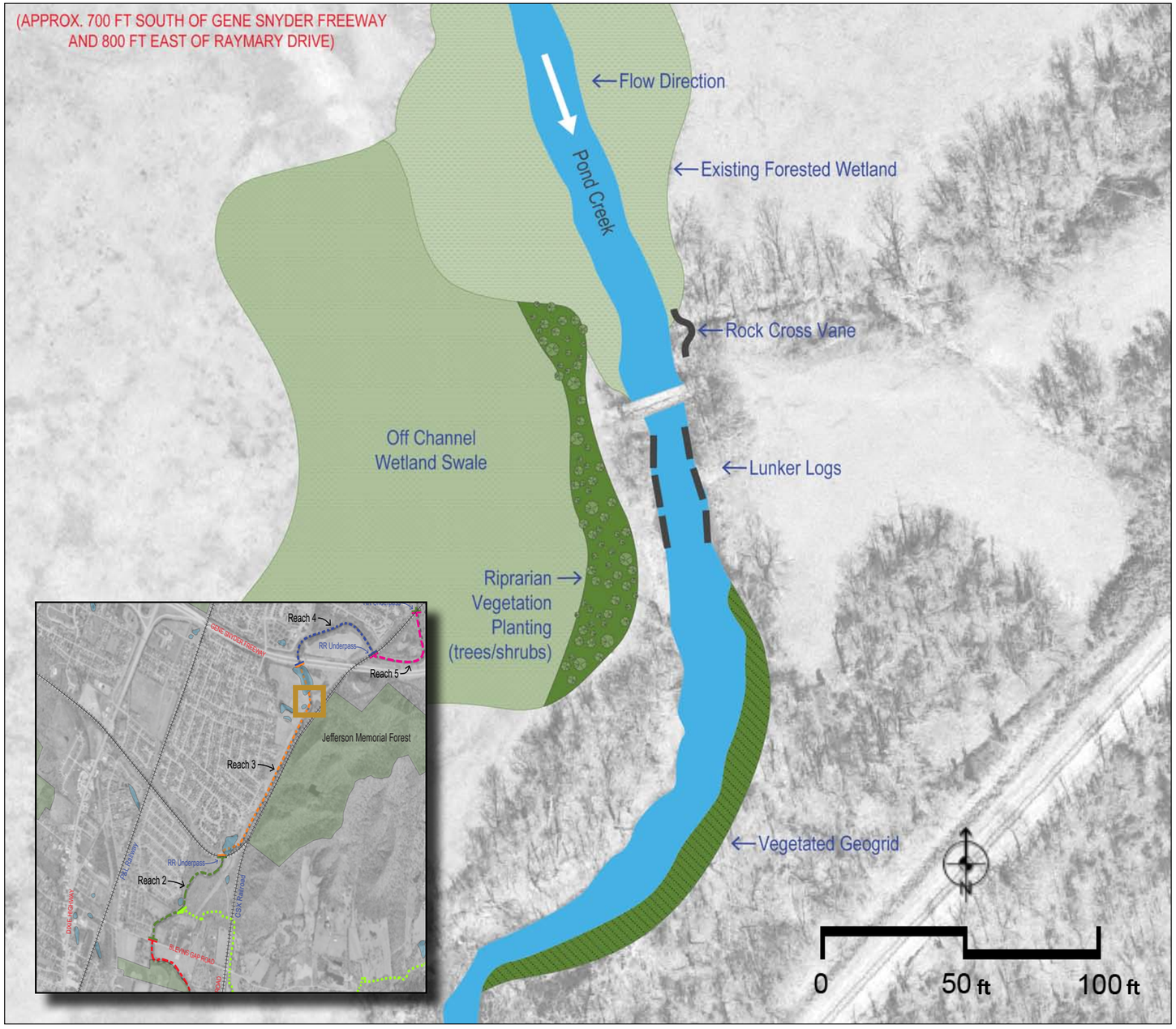
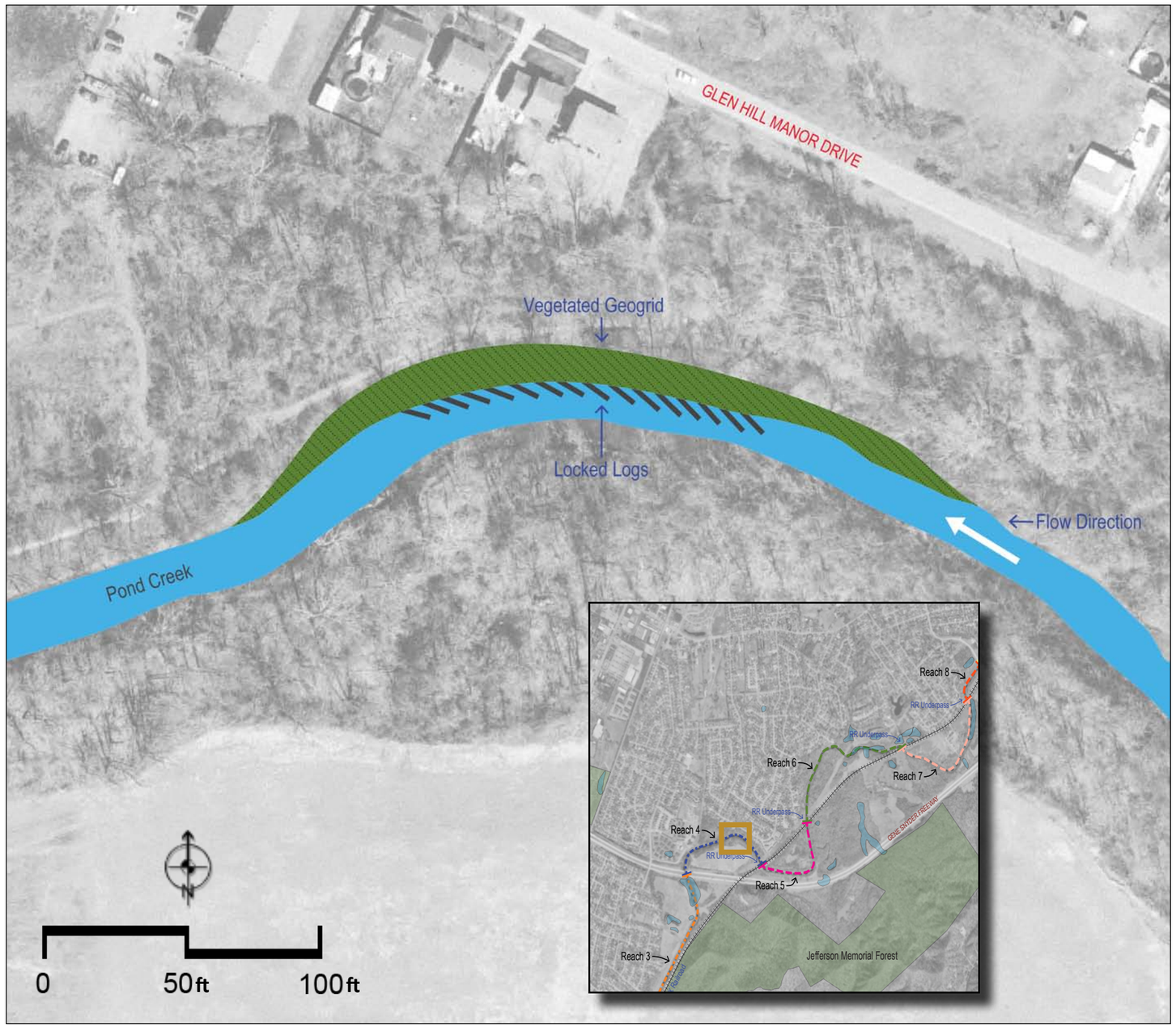


FIGURE 4.35



RIPARIAN REACH 4

This reach is within MSD property. Floodplain benching is an option for flood attenuation and bank protection to mitigate the steep bank slopes of this area. The use of bank protection measures that would also provide in-stream habitat would also benefit this reach.

Benefit summary – As shown in Figure 4.35, protecting the north bank of the channel at the outside of the curve with vegetated geogrid will prevent bank erosion during high flood events and gentler slopes on the bank will lead to increased channel capacity. Outer bank erosion at the curve in the channel alignment can lead to the channel encroaching into MSD property and also impair the shared used path if constructed close to the channel. Protection of the bank against erosion decreases the probability of the channel alignment shifting at the curve location. Bank protection and in-channel habitat would be the most benefited categories. Flood attenuation would continue to benefit downstream properties. The proximity to MSD property and all shared-use path alternatives would provide opportunities for public education and recreation.

RIPARIAN REACH 5

This reach is short, forested, and constricted by the Gene Snyder Expressway. Its physical characteristics are similar to those of RR 4.

Benefit summary – Bank protection and in-channel habitat would be the most benefited categories. Flood attenuation benefits would increase when compared with reaches lower in the water because of the potential for an increased area of risk management. The proximity to MSD property and all shared-use path alternatives would provide opportunities to access the creek and provide public education and recreation.

RIPARIAN REACHES 6 AND 7

Both of these reaches are in an undeveloped area that contains remnant floodplain depressional forested wetlands. Both reaches have a high overall existing functioning. However, bank protection is still a condition that needs to be addressed. Flood attenuation would benefit downstream properties.

Benefit summary – As shown in Figure 4.36, placing locked logs on the outside bend of the curve (north bank) of the channel will provide protection against erosion of the bank and increase bank habitat diversity and vegetation. Bank protection and in-channel habitat would see the most increase in function and physical improvements as a result of the enhancement measures implemented in these reaches. Flood attenuation would continue to benefit downstream properties.

RIPARIAN REACH 8

This is a very short reach between two bridge locations. Considering its short length, the benefit for flood attenuation is minimal, but in-stream habitat could be improved. Buffer continuity and width would be difficult to improve because of existing constrictions (residential homes and the CSX rail line).

Benefit summary – Due to the short length of RR 8, activities in this reach would have less overall benefit than in other reaches.

FIGURE 4.36

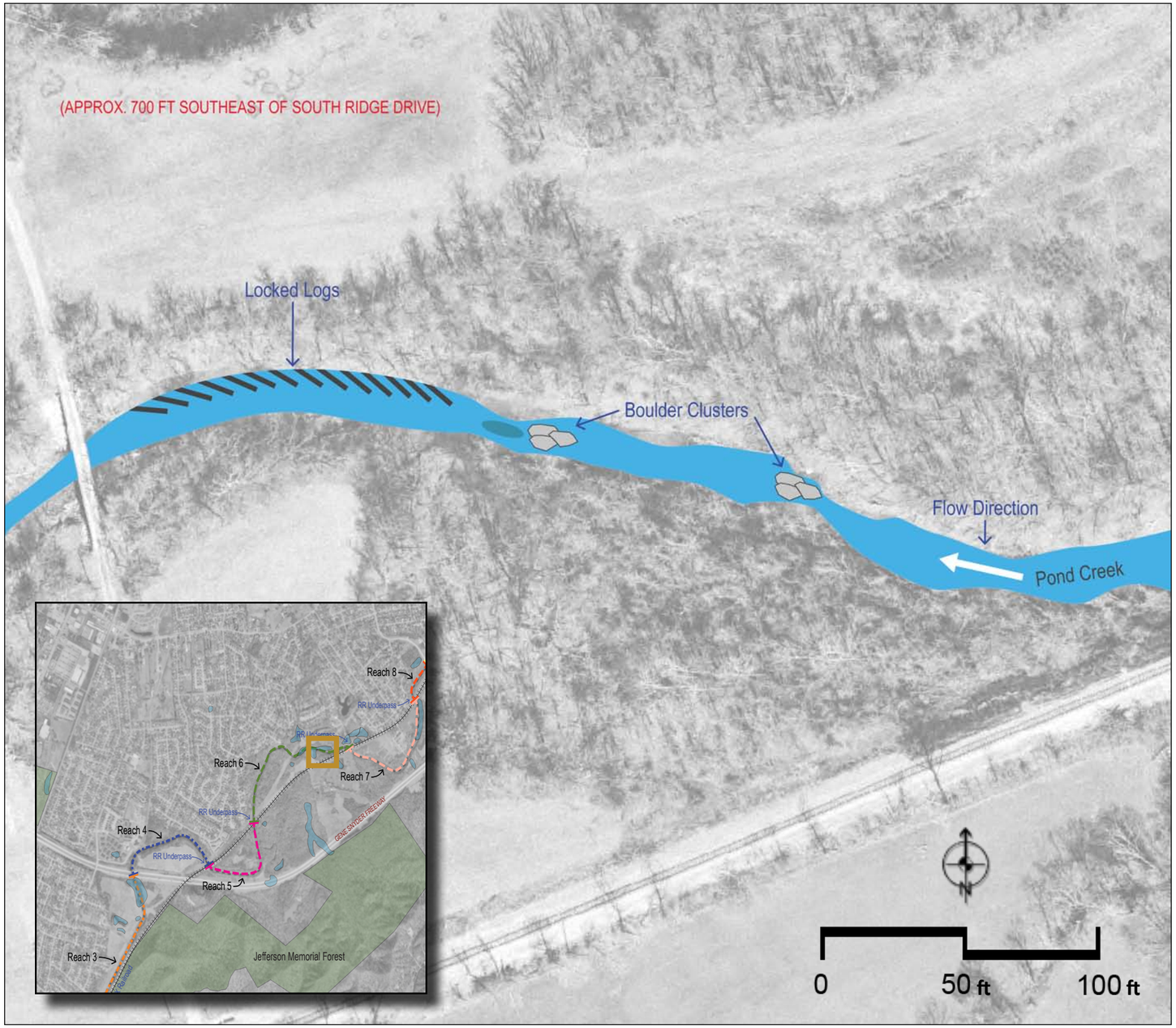
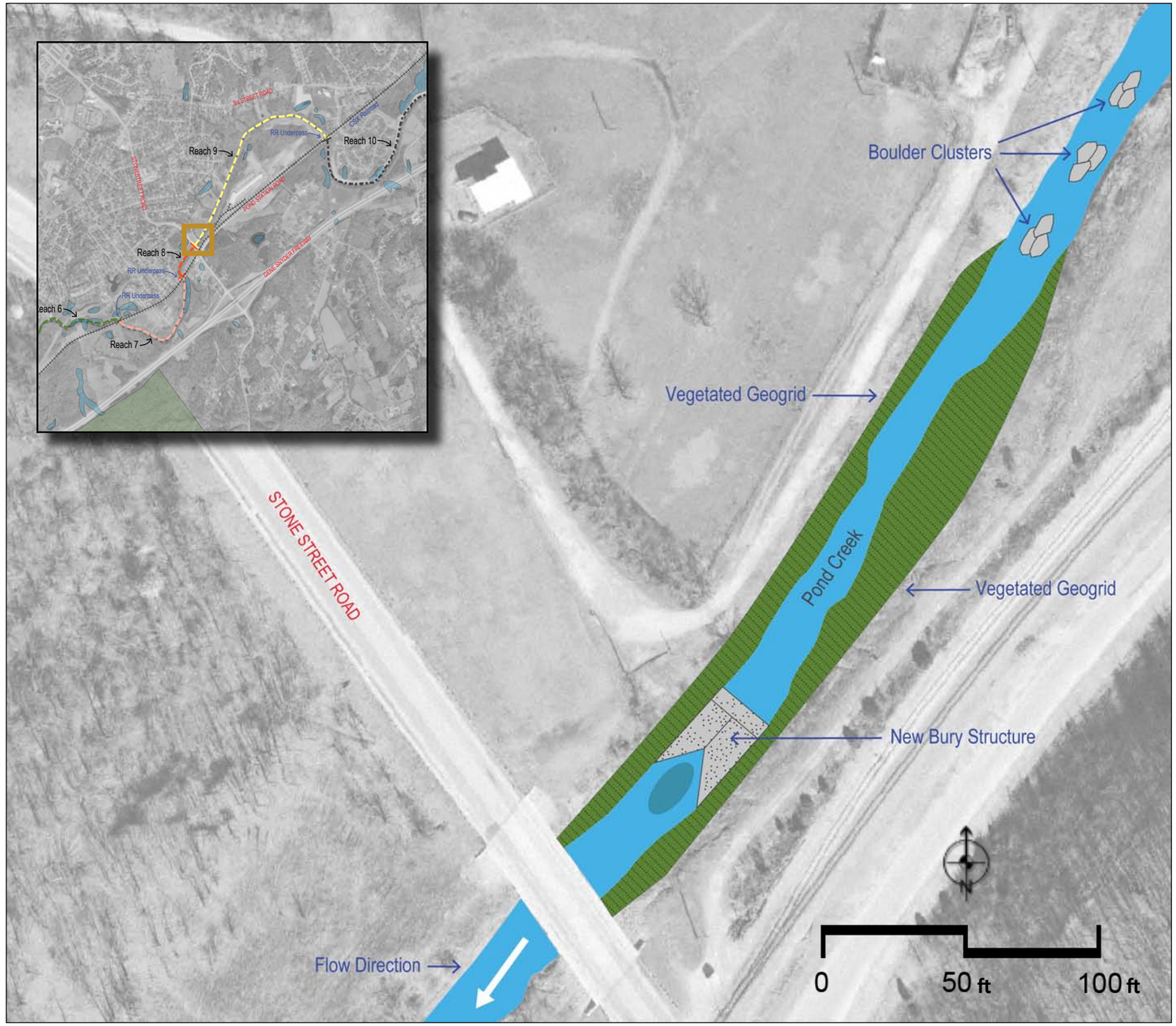


FIGURE 4.37



RIPARIAN REACH 9

This reach is constricted on the lower end by the CSX rail line on one side and a residential road on the other side of Pond Creek. However, bank protection techniques in the lower end of this reach would be beneficial. The upper end of RR 9 would benefit from and has capacity adjacent to the creek for floodplain benching for bank protection and flood attenuation. Shared-Use Path Alternative C is proposed along the right bank of the creek, providing recreation and educational opportunities.

Benefit summary – As shown in Figure 4.37, both banks of the channel upstream of the bridge will be protected against erosion using vegetated geogrid. The proposed Newbury riffle structure will provide grade control, aerate the water and create shallow pools upstream and downstream of the structure thereby enhancing in-channel habitat. Boulder clusters placed in the channel will create flow separation thereby promoting aquatic habitat diversity. Bank protection and flood attenuation would be beneficial for existing and downstream users. In-stream habitat features would be beneficial in this reach.

RIPARIAN REACH 10

This reach is along the existing MSD trail project. A review of the in-place features would be valuable to assess the performance of these features. No elements are proposed for this reach.

RIPARIAN REACH 11

This reach is in an engineered channel section. No improvements are proposed for this reach.

OPERATION AND MAINTENANCE

Periodic operation and maintenance (O&M) is always a consideration for any of the potential restoration management measures. As part of the design process, before implementation of any measure(s), an O&M manual should be developed that details the O&M requirements for a restoration project. The manual should include the party responsible for O&M, maintenance procedures, a method for inspection, access requirements, and contingency planning.

After restoration management measures have been implemented, there is a period during which the affected area of a restoration site reaches a state of equilibrium, meaning that changes to the affected area, as a result of the implemented measures, cease and a natural succession begins. Elements of change within the period of equilibrium vary depending on the restoration measures that are implemented. For example, as sediment deposits fill voids in rock used for bank protection, seed from native plants (such as willows and cottonwoods) will germinate on the sediment accumulations. Seedling formation can occur rapidly, and sapling growth is likely to occur within 3 to 5 years after construction. At some point, however, natural selection and carrying capacity will determine the vegetative diversity and density.

From a maintenance stand point, long-term success of vegetation would be dependent on the O&M performed. General maintenance and management measures will vary from year to year and should include mowing or prescribed burning (only if deemed safe by local authorities and laws) as well as the application of Environmental Protection Agency-approved herbicides for both aquatic and nonaquatic environments.

The rock cross-vanes, J-hook vanes, Newbury structures, rootwads, lunker logs, and locked logs would require minimum upkeep, thus reducing long-term costs. As discussed, rootwads, lunker logs, and locked log structures would be obtained on-site or near the site, thereby reducing costs. All rock for boulder clusters, crossvanes, J-hook vanes, and Newbury structures can be sourced from a local quarry close to the project to save on transportation costs. All plantings for live staking of trees as well as the upland and wetland grasses and forbs would consist of native species from locally grown sources that are ecologically adapted to regional growing conditions. Native plantings reduce maintenance costs and provide valuable habitat benefits.

4.5 NEXT STEPS

POND CREEK RIPARIAN REACHES

The initial assessment performed for this plan provides the information for planning purposes to determine the potential type of work and benefits of that work for each RR. The assessment will give decision makers the ability to assess the opportunities that are created within each RR as part of the implementation of a shared-use path or as part of other initiatives. Development of a shared-use path along portions of Pond Creek could provide a buffer between the creek and its floodplain from future development encroachment. Other initiatives could be related specifically to ecological restoration or flood risk management benefits.

As opportunities to refine a restoration concept become available, the following steps would be necessary:

- Hydraulic modeling – The visual inspection aided by the results of the hydraulic modeling of an RR(s) will help in determining the essential locations for the placement of the grade control structures, bank stabilization features, and habitat enhancement features required in conjunction with these structures.
- Survey – Whereas a topographic survey is required for the entire project reach, a detailed survey will be essential at the locations determined to be relatively unstable. Typical measurements for the survey of the channel as well as pool and riffle cross sections include, but are not limited to, the thalweg, edge of water, water surface elevations, bank vegetation line, top of low bank, and terrace features.

Criteria that are generally used to determine the existing physical condition of the channel and that would be used to aid in the development of concepts for ecological restoration of the channel include, but are not limited to:

- Width/depth ratio (the ratio of the bankfull width to the mean depth of the bankfull channel) – This indicates the channel's ability to dissipate energy and transport sediment.
- Entrenchment ratio (the vertical containment of the stream and the degree to which the channel is incised in the valley floor) – This indicates the stream's ability to access its floodplain.
- Slope (the change in water surface elevation per unit of stream length) – The slope can be analyzed over the entire reach or over sections to determine the condition of pools and riffles.
- Sinuosity (the ratio of stream length to valley length) – Extremely low sinuosity channels typically indicate a straightened channel in this topographic region.
- Channel material – Bed and bank materials indicate the channel's resistance to hydraulic stress and ability to transport sediment.
- Baseline ecological information – As an RR is identified for potential stream restoration work, a more in-depth analysis of the baseline conditions of that reach should be performed. This analysis would provide a solid foundation for the baseline conditions of the flora and fauna of the reach, and would identify elements for consideration, such as human disturbance potential and cultural resources.

INVESTIGATION OF TRIBUTARY DISCUSSION

There are also opportunities to provide water quality and floodplain benefits to Pond Creek by reviewing its tributaries. The most effective way to manage for overall improved water quality is to manage water quality in the upper portions of a watershed and in tributaries to larger creeks, streams, and rivers. There are multiple tributaries within the Study Area that could be reviewed for water quality protection and flood attenuation opportunities. They include Bear Camp Run, Slate Run, Salt Block Creek, and Bee Lick Creek.

REFERENCES

Corn Island Archaeology. June 24, 2009. "Environmental and Cultural Contexts." The Culture History of the Jefferson Memorial Forest. Report 8009. Prepared for Jefferson Memorial Forest Master Plan 2008. Louisville, Kentucky: Corn Island Archaeology.

Derrick, D.L., 2008. Presentation entitled "Kansas City District Talk", at USACE District Kansas City, MO.

Doll, B.A., G.L. Grabow, K.R. Hall, J. Halley, W.A. Harman, G.D. Jennings and D.E. Wise, 2003, "Stream Restoration: A Natural Channel Design".

Sylte, T.L., and Fischenich, J.C. (2000). "Rootwad Composites For Streambank Stabilization And Habitat Enhancement," EMRRP Technical Notes Collection (EDRC TN-EMRRP-SR-21), U.S. Army Engineer Research and Development Center, Vicksburg, MS., http://www.wes.army.mil/el/emrrp

Fischenich, J.C, and Seal, R. (1999). "Boulder clusters," EMRRP Technical Notes Collection (EDRC TN-EMRRP-SR-11), U.S. Army Engineer Research and Development Center, Vicksburg, MS., http://www.wes.army.mil/el/emrrp

US Army Corps of Engineers. 2008. "Part III Characteristics and Indicators of Hydrophytic Vegetation, Hydric Soils, and Wetland Hydrology", http//www.wetlands.com

Jones. 1978. _____.

____. 1990. _____.

MSD. 2000. Pond Creek Watershed Restoration Conceptual Plan.

Stantec. October 29, 2008. Pond and Mill Creek Recreational Concept Plan Report.

USACE. EM 1110-2-1601.

USACE. 1990. Reconnaissance Study.

USACE. March 1994. "Pond Creek Channel Improvement and Recreation."Interim Feasibility Report for Pond Creek Flood Protection Project Report. Louisville District. Louisville, Kentucky.

5.0 Shared-Use Path and Ecological Restoration- Final Recommendations

5.1 RECOMMENDED ALIGNMENTS

The following section presents the recommended shared-use and soft surface path alignments for the Pond Creek Corridor of the Louisville Loop. The recommended alignments are a culmination of the planning process that included three public meetings and detailed corridor analysis. The final step in the planning process took the three preliminary alignments (presented at the final public meeting), and consolidated them into primary routes and alternate routes based upon public input, construction and right of way cost, connectivity potential, safety value, sensitivity to the environment, and overall user experience.

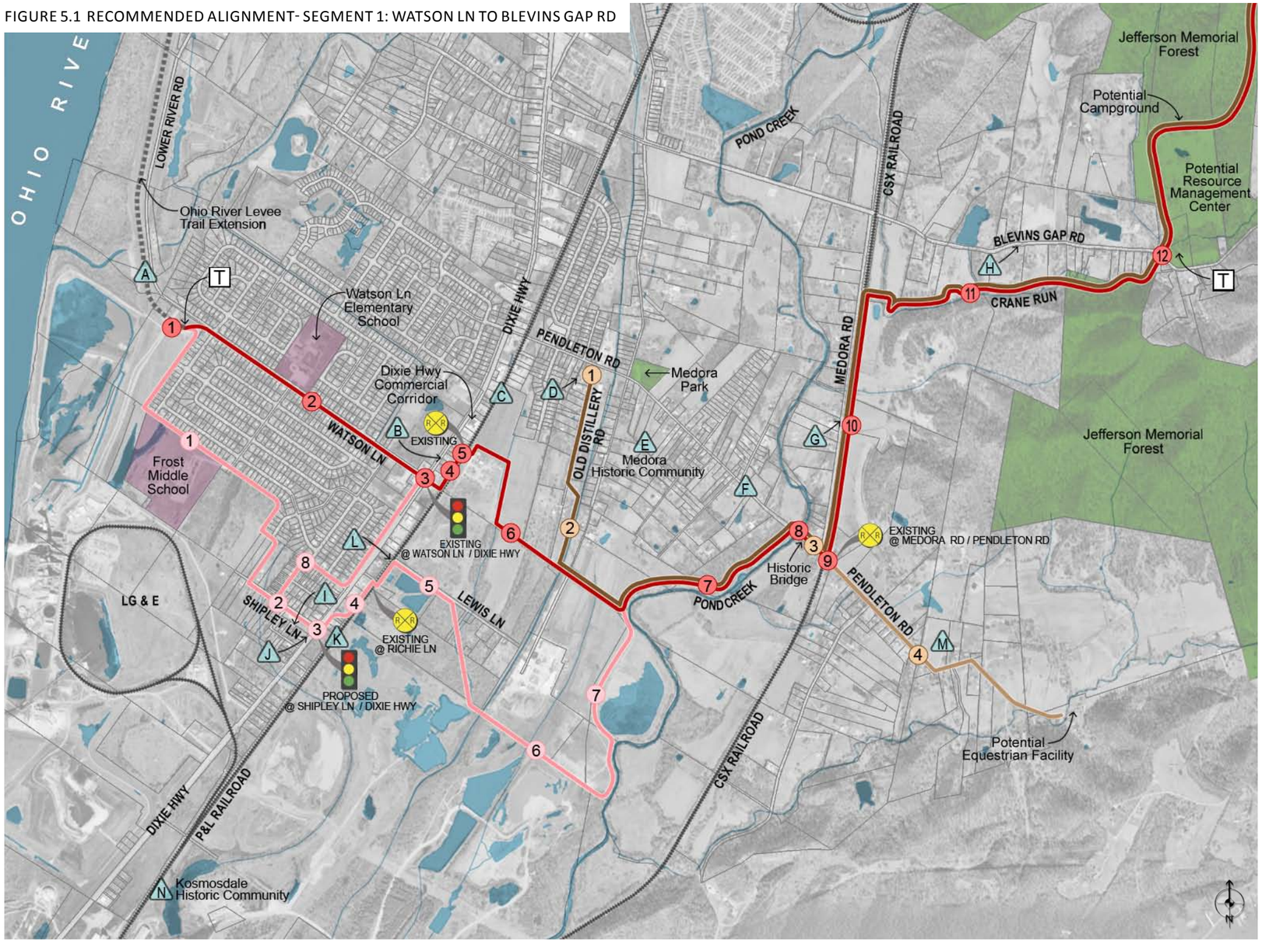
The Recommended Shared-use Alignment would be a transportation route as well as a recreational amenity for southwest Louisville. The path would connect neighborhoods to schools, parks, and commercial districts. Some of the primary destinations along the route would include: Watson Lane Elementary School, Frost Middle School, Fairdale High School, Fairdale Elementary School, the Fairdale Commercial District, Dixie Highway Commercial District, Jefferson Memorial Forest, Nelson Hornbeck Park, and the Fairdale Public Library. The alignment would also provide bicycle/pedestrian connectivity across major transportation barriers (such as the P&L Railroad, CSX Railroad, and Gene Snyder Freeway) thereby creating greater mobility between communities that are now isolated from one another.

The 17 mile primary shared-use path would be predominantly an off-road facility, although there would be short segments of sharrows with adjacent sidewalks. The path would pass through fields, forests, wetlands, residential neighborhoods and commercial districts, and would take advantage of existing corridors, often paralleling roadways, railroads, and creeks. The soft surface route would approximately be 14 miles long; it would begin at an equestrian stable facility in the Pendleton/Medora area and roughly follow the shared-use path to the Jefferson Memorial Forest Welcome Center. The typical sections presented in Section 3.3 illustrate the various path conditions along the recommended alignments.

The recommended primary route (for both the shared-use path and the soft surface path), is the most desirable alignment based upon current knowledge of the corridor; the alternate segments provide flexibility in the planning and design process moving forward. This flexibility will be particularly important for reacting to future changes in land use, road/railroad crossing opportunities, funding opportunities, and land availability. The ability to acquire land from willing landowners is the most difficult element to predict, and has the largest effect on the viability of certain routes, making the flexibility of alternate routes extremely important.

The following section breaks the corridor into 4 segments: Segment 1 (Watson Lane to Blevins Gap Road), Segment 2 (Blevins Gap Road to Stonestreet Road), Segment 3 (Stonestreet Road to Manslick Rd), and Segment 4 (Manslick Road to National Turnpike). Each segment map illustrates the primary and alternate routes through each segment. Notes, keyed into the maps, discuss important aspects of the route including geographical context, segment justifications, environmental/cultural considerations, crossing locations, and areas of cultural-historical significance. Some areas of cultural-historic significance are included that are not directly on the primary or alternative routes. However, potential for interpretation exists for these areas on both the recommended alignments and for planning purposes for connector trails.

FIGURE 5.1 RECOMMENDED ALIGNMENT- SEGMENT 1: WATSON LN TO BLEVINS GAP RD



RECOMMENDED ALIGNMENT- SEGMENT 1

LEGEND

- Shared-Use Path - Primary Route
- Shared-Use Path - Alternate Route
- Soft Surface Path - Primary Route
- Soft Surface Path - Alternate Route
- Parcels
- Schools
- Parks, Golf Courses, and Cemeteries
- Waterways
- Shared-Use Primary Route Keyed Note
- Shared-Use Alternate Route Keyed Note
- Soft Surface Route Keyed Note
- Cultural-Historic Sites with Potential for Historic Interpretation
- Proposed Trailhead

0 1/3 mile 2/3 mile 1 mile

SHARED-USE PATH PRIMARY ROUTE

1. The alignment would begin at the trailhead near the entrance to the LG&E facility on Watson Ln. This trailhead will be constructed as part of the Ohio River Levee Trail Extension.
2. Watson Ln right of way (ROW) is wide enough to accommodate an off-road path and would provide a connection to an existing signalized Dixie Hwy crossing point.
3. The Watson Ln and Dixie Hwy intersection would require signalization upgrades and potentially a pedestrian refuge island.
4. The path would parallel the P&L railroad line through the back side of private properties. Following the back side of the properties would provide significant separation from Dixie Hwy, and would avoid driveway conflicts along Dixie Hwy as well.
5. The P&L railroad crossing is located at an existing private driveway crossing. Because this is a small, private crossing, significant improvements and railroad coordination would be required to make this a public path crossing.
6. The path would follow scenic undeveloped open fields to Pond Creek. Much of this property is owned by Riverport; planning for the path should be incorporated into Riverport's future development plans.
7. The path would follow a scenic portion of Pond Creek en route to Pendleton Rd. Opportunities for a combined path and stream restoration project would occur along this route.
8. The path would be adjacent to Pendleton Rd (as an off-road path) and cross over Pond Creek with a proposed pedestrian bridge.
9. The path would cross the CSX Railroad at the existing Pendleton Rd near Medora Rd. This crossing would require widening and pedestrian upgrades in order to install a path.
10. The path would parallel the CSX ROW (east side) through the edge of large residential properties. The scenery of the adjacent forest would provide a good user experience.
11. The path would be adjacent to Crane Run, a small scenic stream. There are opportunities for floodplain storage of the Crane Run watershed at Medora. Context sensitive design is important as Crane Run is currently a high quality stream. Opportunities may exist for improvements to riparian buffer vegetation composition.
12. The path would cross Blevins Gap Rd at a midblock location requiring an enhanced crosswalk design that includes signage, striping, and potentially in-pavement lights.

SHARED-USE PATH ALTERNATE ROUTE 1

1. The path would follow through LG&E and Frost Middle School properties en route to Shipley Ln. This route would be more scenic and have fewer vehicular conflicts than the primary route along Watson Ln.
2. The path would follow Shipley Ln as a sharrow with an adjacent sidewalk.
3. A proposed traffic signal or pedestrian bridge would be required to cross Dixie Hwy, neither of which are presently good options. Current traffic volumes do not warrant the installation of a signal in this location, and the expense and property required to build a pedestrian bridge currently make that option unreasonable. If existing conditions change to make either a signal or pedestrian bridge more feasible, then Alternate 1 would be preferred to the primary route.
4. The path would follow the back side of private properties adjacent to the P&L railroad to an existing railroad crossing at Richie Lane, and then continue to follow the railroad corridor to Lewis Lane. Following the back side of the properties would provide significant separation from Dixie Hwy, and would avoid driveway conflicts along Dixie Hwy as well.
5. The path would parallel Lewis Ln as an off-road path. Lewis Ln is a dead end roadway through vacant property, but in the future, will sit within the Riverport development.
6. The path would follow scenic floodplain forest and fields en route to Pond Creek.
7. The path would utilize CID owned property adjacent to Pond Creek and continue along Pond Creek before merging back to the primary route.

SHARED-USE PATH ALTERNATE ROUTE 1A

8. An alternate route within Alternate 1 would turn onto Henderson Ave from Shipley Ln, continue to Bowen Ave, follow Bowen Ave to the frontage drive along Dixie Hwy, and follow the frontage drive to Watson Ln. This alternate would provide a connection to the signalized Dixie Hwy crossing, without having to use the Watson Ln, which has safety concerns associated with the significant number of driveway crossings.

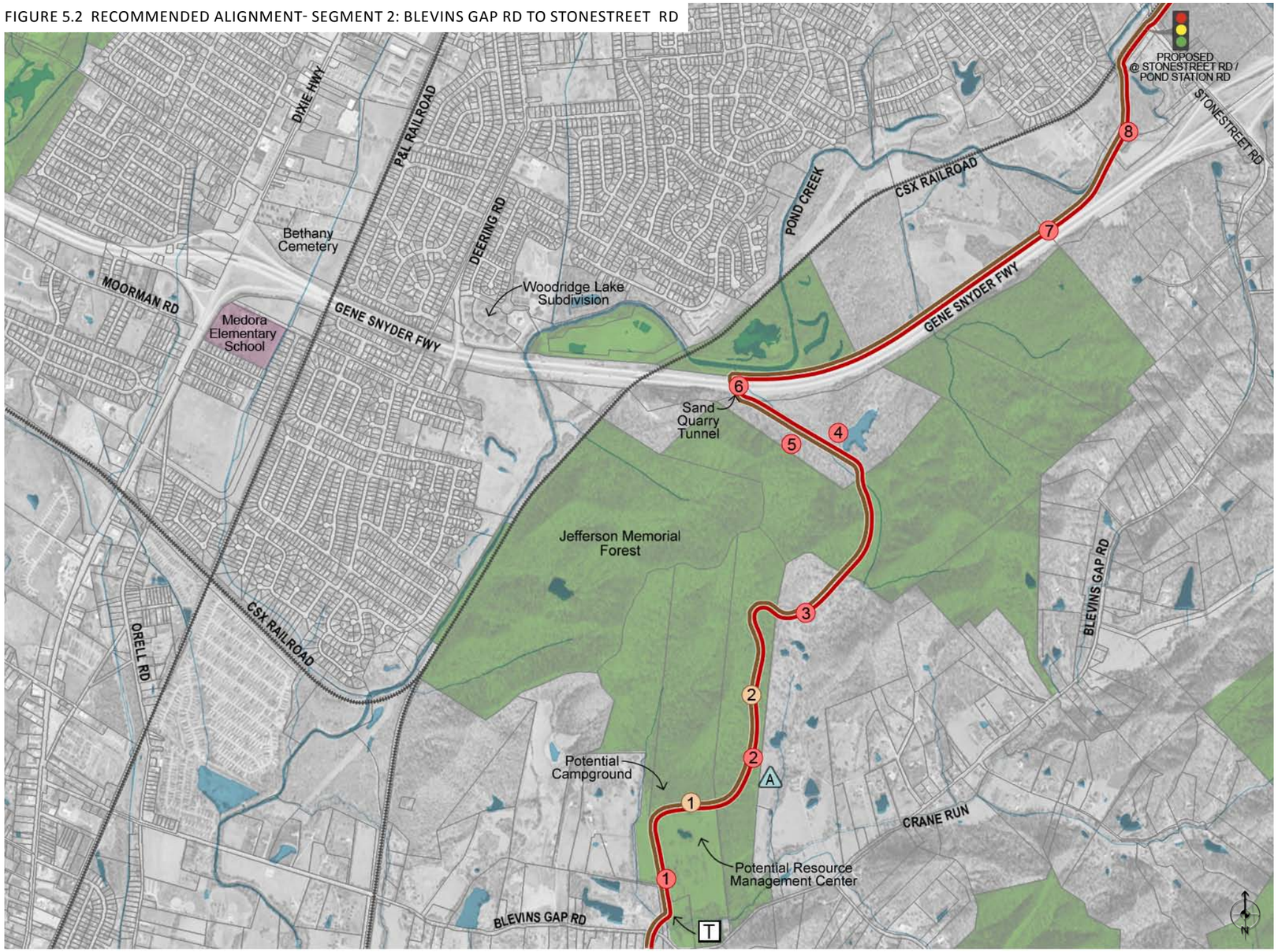
SOFT SURFACE ROUTE

1. The primary soft surface route would begin at an existing equestrian stable facility on Old Distillery Rd.
2. The route would follow Old Distillery Rd and an existing stream corridor to the primary shared-use route. The soft surface path would then roughly parallel the shared-use path.
3. The proposed bridge across Pond Creek would need to be designed for equestrian use as well as pedestrian use.
4. An alternate soft surface route would turn southeast onto Pendleton Rd and continue adjacent to the roadway to a potential equestrian facility proposed in the Jefferson Memorial Forest Master Plan. This alternate would only be viable if the equestrian facility was constructed.

CULTURAL-HISTORIC SITES WITH POTENTIAL FOR HISTORIC INTERPRETATION

MAP CODE	INTERPRETIVE OPPORTUNITY	LOCATION
A	HISTORIC OHIO RIVER TRANSPORTATION CORRIDOR	OHIO RIVER CORRIDOR
B	HISTORIC DIXIE HIGHWAY TRANSPORTATION CORRIDOR	DIXIE HIGHWAY CORRIDOR
C	COMMERCIAL BUILDING	DIXIE HIGHWAY
D	W L WELLER HOUSE	PENDLETON ROAD
E	MEDORA HISTORIC COMMUNITY-INCLUDES REGIONAL HISTORY	MEDORA AND PENDLETON ROAD
F	PENDLETON ROAD-INCLUDES 19TH CENTURY FOLK HOUSE AND HISTORIC BRIDGE	PENDLETON RD
G	MEDORA HISTORIC RR CORRIDOR	MEDORA RD
H	BLEVINS GAP ROAD-INCLUDES OCTAGONAL FOLK HOUSE AND HISTORIC BRIDGE	BLEVINS GAP ROAD
I	HISTORIC HOUSE	14312 HIGHWAY 60
J	HISTORIC HOUSE	14400 HIGHWAY 60
K	HISTORIC HOUSE (SURVEY LOST)	DIXIE HIGHWAY AT SHIPLEY
L	HISTORIC HOUSE	14011 DIXIE HIGHWAY
M	BROWN CEMETERY	PENDLETON ROAD
N	KOSMOSDALE HISTORIC COMMUNITY-INCLUDES AFRICAN AMERICAN HISTORY	NNE OF DIXIE HWY AND HWY 44

FIGURE 5.2 RECOMMENDED ALIGNMENT- SEGMENT 2: BLEVINS GAP RD TO STONESTREET RD



RECOMMENDED ALIGNMENT- SEGMENT 2

LEGEND

- Shared-Use Path - Primary Route
- Shared-Use Path - Alternate Route
- Soft Surface Path - Primary Route
- Soft Surface Path - Alternate Route
- Parcels
- Schools
- Parks, Golf Courses, and Cemeteries
- Waterways
- Shared-Use Primary Route Keyed Note
- Shared-Use Alternate Route Keyed Note
- Soft Surface Route Keyed Note
- Cultural-Historic Sites with Potential for Historic Interpretation
- Proposed Trailhead

0 1/3 mile 2/3 mile 1 mile

SHARED-USE PATH PRIMARY ROUTE

1. The path would enter the very scenic Jefferson Memorial Forest from its western edge at Blevins Gap Rd
2. The path would traverse scenic, steep, forested terrain which may require walls or extensive grading. Path design and construction should be sensitive to the forest ecosystem.
3. The path would travel through the back side of a private parcel in order to maintain a 5% grade through the steeply sloping topography.
4. A scenic pond would provide a destination for path users, and an opportunity for aquatic resource enhancement and shoreline protection.
5. A stream channel restoration project (completed in 2011) would provide opportunities for environmental interpretation.
6. The existing tunnel would provide a safe freeway crossing location with ample vertical clearance and horizontal space for a path.
7. The path would follow the freeway through forest and open fields. Two forested knobs would have to be crossed, which would require walls or extensive grading. The portion of the segment along the Gene Snyder Freeway could potentially be placed on the highway right-of-way if the private property owners are not willing to sell a portion of their property.
8. The route would follow Pond Creek to the CSX Railroad corridor, and then continue to Stonestreet Rd, just outside of the CSX right of way. Potential restoration opportunities exist along Pond Creek.

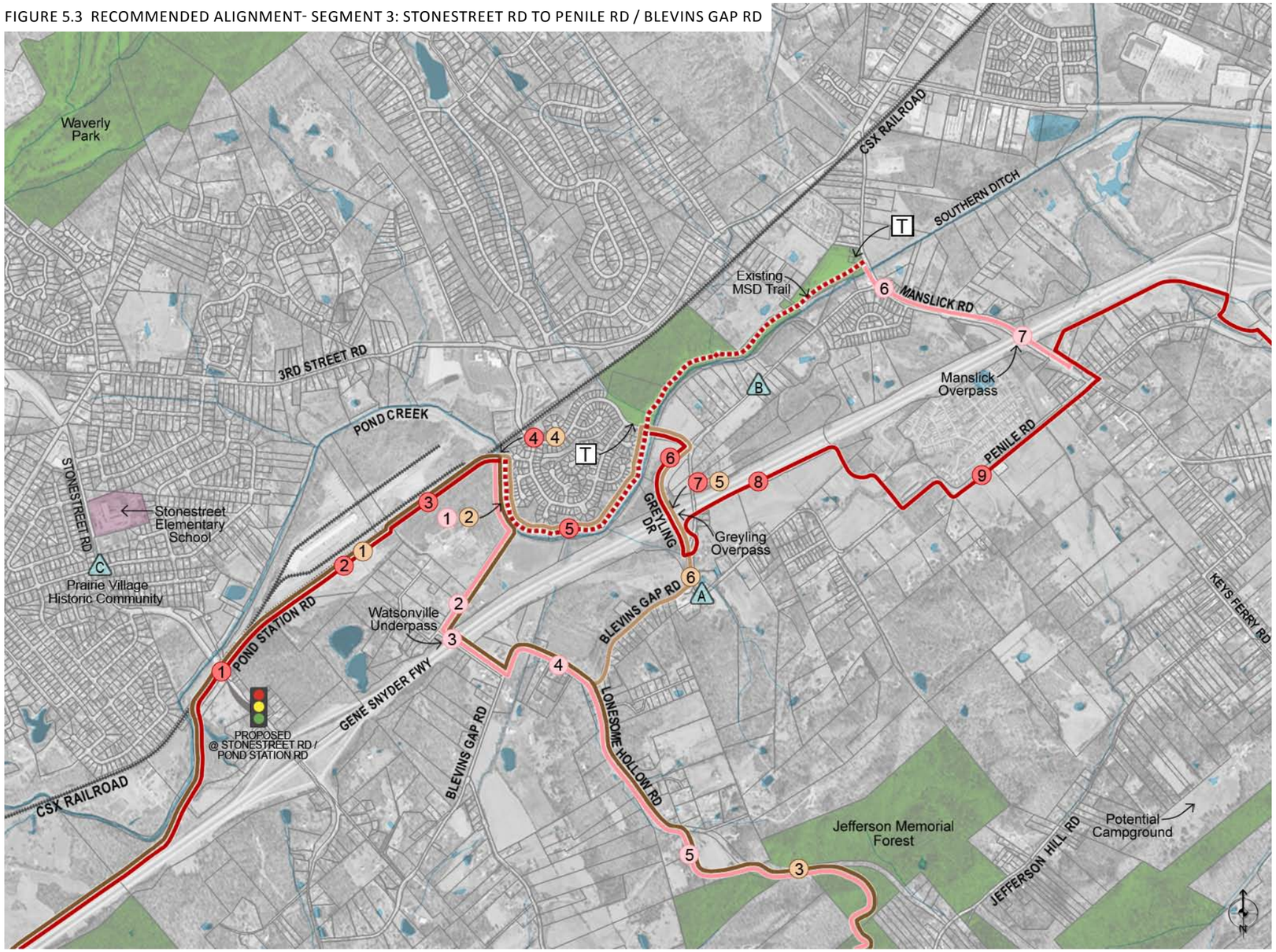
SOFT SURFACE ROUTE

1. The soft surface route would roughly follow the shared-use path throughout this segment.
2. The soft surface route could have a much wider separation from the shared-use path within the publicly owned parcels of the forest.

CULTURAL-HISTORIC SITES WITH POTENTIAL FOR HISTORIC INTERPRETATION

MAP CODE	INTERPRETIVE OPPORTUNITY	LOCATION
A	HISTORIC HOUSE	4701 BLEVINS GAP ROAD

FIGURE 5.3 RECOMMENDED ALIGNMENT- SEGMENT 3: STONESTREET RD TO PENILE RD / BLEVINS GAP RD



RECOMMENDED ALIGNMENT- SEGMENT 3

LEGEND

- Shared-Use Path - Primary Route
- Shared-Use Path - Alternate Route
- Soft Surface Path - Primary Route
- Soft Surface Path - Alternate Route
- Parcels
- Schools
- Parks, Golf Courses, and Cemeteries
- Waterways
- Shared-Use Primary Route Keyed Note
- Shared-Use Alternate Route Keyed Note
- Soft Surface Route Keyed Note
- Cultural-Historic Sites with Potential for Historic Interpretation
- Proposed Trailhead

0 1/3 mile 2/3 mile 1 mile

SHARED-USE PATH PRIMARY ROUTE

1. The path would cross Stonestreet Rd at a proposed traffic signal at Pond Station Rd. A traffic signal would be required due to high traffic volume that includes truck traffic and significant freeway commuter traffic.
2. The route would parallel Pond Station Rd (off-road on south side). The south side of the road is currently undeveloped; the path could be worked into the future development planned for this portion of the industrial park.
3. The path would parallel the CSX Railroad right of way through forested property to Pond Creek. Metro Parks has an easement through this property. Potential for restoration opportunities exist along Pond Creek, and could continue restoration work upstream.
4. A proposed pedestrian bridge would be required to cross Pond Creek.
5. The route would follow the existing MSD Trail.
6. The path would parallel Lamborne Blvd and Greyling Dr across the freeway.
7. The existing Greyling Dr overpass is not wide enough to accommodate a shared-use path. Therefore a separate pedestrian bridge is proposed that would parallel Greyling Dr.
8. The path would parallel the freeway through open fields and then would follow a small stream to Penile Rd. Planting, sound walls, and a large buffer acquisition would greatly improve the experience along the freeway. The portion of the segment along the Gene Snyder Freeway may be placed on the highway right-of-way if the private property owners are not willing to sell a portion of their property.
9. The route would parallel Penile Rd, a narrow, low volume road that would provide a safe corridor through a scenic rural landscape. The path would follow the south side of the road which is predominantly undeveloped.

SHARED-USE PATH ALTERNATE ROUTE 2

1. This alternate route would turn at Pond Creek (prior to crossing it) and follow the creek and property lines to Watsonville Road.
2. Watsonville Rd is a low volume road with limited right of way, so the path section would be a sharrow with an adjacent sidewalk.
3. The Watsonville Rd underpass is an excellent freeway crossing point with ample room for a path and roadway.
4. From Watsonville Road, the path would parallel Blevins Gap Rd and Lonesome Hollow Road into the Jefferson Memorial Forest. The west side of Lonesome Hollow is relatively undeveloped and would be a scenic safe location for an off-road route.
5. Although the road ends, the Lonesome Hollow ROW continues to Jefferson Hill Rd. A house appears to be built within this ROW, so the proposed route circles around the house (along the property line) and then continues up the ROW into the Jefferson Memorial Forest.

SHARED-USE PATH ALTERNATE ROUTE 3

6. Alternate Route 3 would follow the existing MSD Trail from Lamborne Blvd to Manslick Rd.
7. The route would parallel the east side of Manslick Rd, and cross the freeway with a proposed pedestrian bridge to the existing overpass.

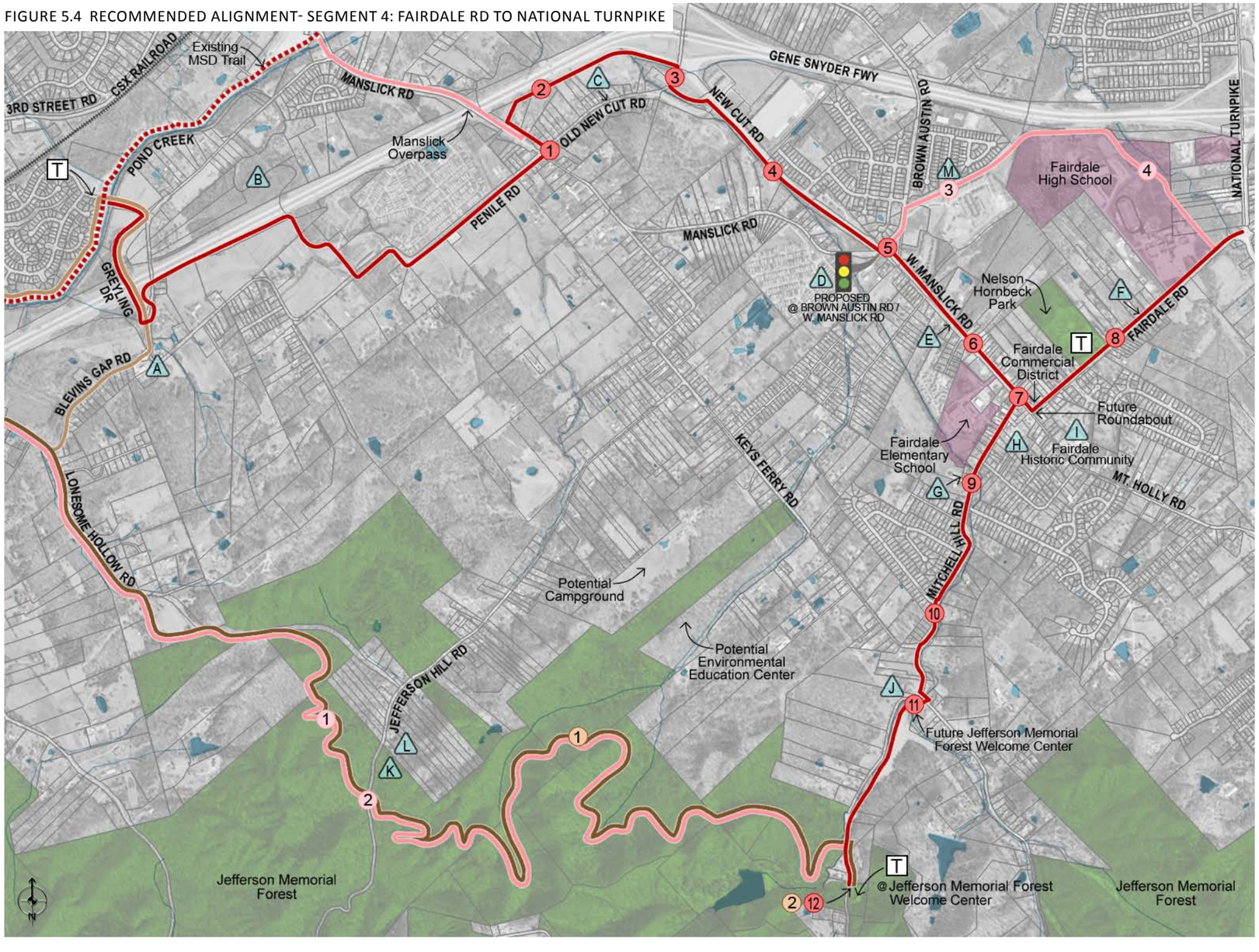
SOFT SURFACE ROUTE

1. The primary soft surface route would roughly parallel the primary shared-use path to Pond Creek.
2. The primary soft surface route would turn at Pond Creek and then follow the alternate 2 shared-use path route into the forest.
3. The soft surface route could have a much wider separation from the shared-use path within the publicly owned parcels of the forest.
4. An alternate soft surface route would follow the primary route across Pond Creek, requiring a bridge design that would accommodate equestrian as well as pedestrian use.
5. Should the alternate soft surface route be implemented, the proposed bridge over the freeway (at Greyling Dr.) would require a design that could accommodate equestrian as well as pedestrian use.
6. The alternate soft surface route would depart from the shared-use route on Greyling Dr and follow Blevins Gap Rd to Lonesome Hollow Rd, where it would reconnect with the primary soft surface route.

CULTURAL-HISTORIC SITES WITH POTENTIAL FOR HISTORIC INTERPRETATION

MAP CODE	INTERPRETIVE OPPORTUNITY	LOCATION
A	PENILE BAPTIST CHURCH	PENILE ROAD AT BLEVINS GAP
B	HERBERT HOUSE	ACRES LANE
C	PRAIRIE VILLAGE HISTORIC COMMUNITY	VALLEY STATION ROAD AND STONESTREET ROAD

FIGURE 5.4 RECOMMENDED ALIGNMENT- SEGMENT 4: FAIRDALE RD TO NATIONAL TURNPIKE



RECOMMENDED ALIGNMENT- SEGMENT 4

LEGEND

- Shared-Use Path - Primary Route
- Shared-Use Path - Alternate Route
- Soft Surface Path - Primary Route
- Soft Surface Path - Alternate Route
- Parcels
- Schools
- Parks, Golf Courses, and Cemeteries
- Waterways
- Shared-Use Primary Route Keyed Note
- Shared-Use Alternate Route Keyed Note
- Soft Surface Route Keyed Note
- Cultural-Historic Sites with Potential for Historic Interpretation
- Proposed Trailhead

0 1/3 mile 2/3 mile 1 mile

SHARED-USE PATH PRIMARY ROUTE

1. The path would cross Manslick Rd at the Penile Rd intersection and parallel Manslick Rd (as an off-road path) to the freeway ROW.
2. The route would parallel the freeway ROW through a wetland and open fields to a road that was once New Cut Road. Although the route along the freeway could be noisy, it would be a safe route (no driveway crossings) that affects only a few private properties. Planting, sound walls, and a large buffer would greatly improve the experience along the freeway.
3. The path would be an off-road path, parallel to the east side of a dead end residential road (that was once New Cut Road) and follow a small stream corridor to New Cut Rd.
4. The route would parallel the west side of New Cut Rd as an off-road path. A small stream would follow the west side of the path, providing opportunities for restoration, but also creating potential topographical concerns that may require boardwalk.
5. A proposed signal at the Newcut Rd/Brown Austin Rd intersection would provide a location to cross busy New Cut Road. This crossing location is preferred to the Old New Cut intersection because there would be less traffic, generally slower traffic speeds, and the crossing distance is 15' shorter.
6. The route would go through the Fairdale commercial district and provide connectivity to restaurants and shops. The path should be an impetus for economic development in Fairdale. Current conditions are difficult in Fairdale due to limited ROW, and numerous, almost continuous curb cuts leading into parking lots. Narrowing and consolidation of driveways will be critical to the development of a path through Fairdale. The path could initially take the form of bike lanes with narrow adjacent sidewalks, and eventually (as the area redevelops) the path could become a cycletrack with an adjacent wide sidewalk/ pedestrian path.
7. A proposed roundabout will connect Mitchell Hill Rd. and Fairdale Rd. The path would utilize the roundabout in a spur trail connection to the Jefferson Memorial Forest.
8. The path would parallel the west side of Fairdale Rd as an off- road path, and would provide connections to the Fairdale commercial district, Nelson Hornbeck Park, and Fairdale High School. Driveway conflicts would be a safety concern along this segment; but, the connectivity potential of the route would make it desirable.
9. The primary route includes a spur trail that would extend southward on Mitchell Hill Rd. to the Jefferson Memorial Forest. This route would be an off-road path along the east side of the road.
10. Big Bee Lick Creek runs along the east side of Mitchell Hill Rd. and would be a scenic amenity for the path and an opportunity for stream restoration. The path would have to cross, and follow the east side of the creek in a couple of locations which would encroach on private property. This route along Mitchell Hill Rd. is a modification of what was originally presented in the Preliminary Alignment Options.
11. Metro Parks recently acquired a parcel at the southwest corner of Holsclaw Hill Rd and Mitchell Hill Rd for a future Jefferson Memorial Forest Welcome Center. This would be a major destination for path users, and would serve as a trailhead for accessing the forest.
12. The spur trail ends at the current Jefferson Memorial Forest Welcome Center; this location also could also serve as a trailhead with restrooms.

SHARED-USE PATH ALTERNATE ROUTE 2 (CONTINUED FROM SEGMENT 2)

1. The Jefferson Memorial Forest property offers several advantages including extraordinary scenery, available property, environmental education potential, and connectivity to planned forest activity centers. However, the extreme topography within the forest also causes significant constraints including high development costs (due to grading, walls, and bridges), large area of disturbance to the forest, and prolonged steep path slopes that would be difficult for average path users. Path design and construction should be sensitive to the forest ecosystem
2. The Jefferson Hill Rd. crossing is in a midblock location that would require enhanced crosswalk design.

SHARED-USE PATH ALTERNATE ROUTE 4

3. An alternate route would avoid the difficult driveway and narrow right of way condition within the Fairdale commercial district by following Brown Austin Road and a gas easement to the Fairdale High School property. Although the main off-road path would go around the commercial core, sidewalks and bike lanes down West Manslick could provide bicycle/pedestrian connections from the Loop to the Fairdale commercial district.
4. The Fairdale High School property would be a major destination, does not require acquisition, and would provide a safe route between W. Manslick and Fairdale. The school would also be an excellent trailhead location due to existing parking availability.

SOFT SURFACE ROUTE

1. The primary soft surface route would roughly parallel the primary shared-use path; however, within the forest, there would be opportunity for the soft surface route to pull away from the shared-use path and have a more natural experience.
2. The soft surface route would terminate at the current Jefferson Memorial Forest Welcome Center.
3. A potential soft surface route would continue through the Forest to the future Welcome Center.

CULTURAL-HISTORIC SITES WITH POTENTIAL FOR HISTORIC INTERPRETATION

MAP CODE	INTERPRETIVE OPPORTUNITY	LOCATION
A	PENILE BAPTIST CHURCH	PENILE ROAD AT BLEVINS GAP
B	HERBERT HOUSE	ACRES LANE
C	OLD NEW CUT ROAD- INCLUDES HISTORIC HOUSE/STORE	OLD NEW CUT ROAD
D	CORINTHIAN COLUMNS (4)	MANSLICK ROAD AT PLANT ROAD
E	WEST MANSLICK ROAD- INCLUDES FAIRDALE MEMORIAL PLAYTORIUM, HISTORIC COMMERCIAL BUILDINGS	WEST MANSLICK ROAD
F	FAIRDALE ROAD- INCLUDES HISTORIC HOUSING	FAIRDALE ROAD
G	MITCHELL HILL ROAD- INCLUDES HISTORIC COMMERCIAL BUILDINGS	MITCHELL HILL ROAD
H	NELLIE HORINE HOUSE	10101 MITCHELL HILL ROAD
I	FAIRDALE HISTORIC COMMUNITY	WEST MANSLICK ROAD AND FAIRDALE ROAD
J	HISTORIC LOG HOUSE	MITCHELL HILL ROAD
K	HISTORIC HOUSE	11008 JEFFERSON HILL ROAD
L	HISTORIC HOUSE	11011 JEFFERSON HILL ROAD
M	UNNAMED CEMETERY	PINTO COURT

5.2 OPERATIONS AND MAINTENANCE

Proper operations and maintenance would ensure that the path remains safe, functional, and aesthetic once it is in use. Current marketing and promotional efforts surrounding the Louisville Loop have generated a lot of community interest in the Pond Creek project, and should attract many new users as segments of the path open. Operations and maintenance would be essential in keeping these new users coming back. The three most important aspects of operations and maintenance are: safety/security operations, routine corridor maintenance, and periodic infrastructure repair.

5.2.1 SAFETY/SECURITY

Trail safety and security is essential for both trail users and adjacent landowners. The most important means of obtaining a secure Pond Creek path would be to maintain visibility. Primarily, good visibility could be achieved by establishing a high level of trail use- a well used trail is, to a high degree, self policing. Therefore, to attract trail users, it would be important to continue marketing and promoting the path and to establish path connectivity to neighborhoods and destinations. Another key component of visibility is maintaining clear lines of sight throughout the corridor through proper vegetation maintenance. Vegetation should be cut and pruned to allow for clear visibility, both along the path corridor, as well as into the path corridor from neighboring houses, roadways, and businesses. In other words, trail users should be able to see and be seen.

A second aspect of maintaining safety/security along the route would be to establish periodic corridor patrols. This would include frequent security patrols by the Metro Police department , and safety inspections by Metro maintenance staff to look for hazardous conditions that exist along the path (such as fallen trees or slippery pavement). A Trail Watch program could also be established. These programs would enlist and educate volunteers to periodically inspect the path and report suspicious activity or other safety concerns.

Finally, rules, regulations, and emergency procedures should be established for the path. Regulations would cover items such as trail etiquette, speed limits, and hours of operations; these enforceable rules would aid in policing the trail and would prevent conflicts between different user groups.

5.2.2 ROUTINE CORRIDOR MAINTENANCE

Routine corridor maintenance would include the periodic upkeep tasks that would be required along the route. A well maintained trail corridor will last longer, and will attract and retain path users. Below is a list of recommended routine maintenance tasks and their frequency.

MAINTENANCE TASK	FREQUENCY
MOWING PATH SHOULDERS	MONTHLY-IN SEASON
PRUNING VEGETATION	1 TIME/YEAR
LEAF REMOVAL (WILL BE ESPECIALLY IMPORTANT IN ROUTES THROUGH FOREST)	WEEKLY - IN SEASON
LITTER PICK UP AND REMOVAL	WEEKLY
MAINTENANCE INSPECTION	WEEKLY
TRAIL SURFACE CLEANING	MONTHLY
DRAINAGE STRUCTURE CLEANING	2 TIMES/YEAR
GRAFFITI CLEAN UP	AS NEEDED (SHOULD BE DONE AS SOON AS IT APPEARS-OR IT WILL ATTRACT MORE GRAFFITI)

5.2.3 PERIODIC INFRASTRUCTURE REPAIRS

Trail infrastructure breaks down over time, whether it is weather, vandalism, pests, or just old age. Investment in more durable materials upfront will reduce repair costs in the long run. Below is a list of typical infrastructure repairs and replacement that could be anticipated for the Pond Creek Shared-use Path.

INFRASTRUCTURE REPAIR	FREQUENCY
REPAIR ASPHALT PAVEMENT	YEARLY-AS NEEDED
REPLACE ASPHALT PAVEMENT	15 YEARS
SITE FURNISHING REPAIR	YEARLY
ACCESS CONTROL DEVICE REPAIR	YEARLY
STRIPING AND SIGNAGE REPAIR/REPLACE	YEARLY
RE-VEGETATION	YEARLY
BOARDWALK/BRIDGE REPAIR	YEARLY

5.3 ORDER OF MAGNITUDE COST ESTIMATE

Now that this study has determined a recommended alignment, the focus turns to the formulation of a strategy to implement the plan and eventually construct the pathway. The primary obstacle that typically stands in the way of construction is the financial aspect of securing designated funds to be applied to the construction project. For the purposes of this study, a cursory look at the probable costs to develop the Pond Creek segment of the Louisville Loop were calculated on an order of magnitude basis and are presented within this section.

These costs can be separated into three primary categories:

- Acquisition of additional right-of-way, property, or easements that will accommodate a corridor for the pathway to be constructed.
- Costs to engineer and design the pathway.
- Costs of physically constructing the path and the various elements associated with it (bridge construction, retaining walls, utility relocation, upgraded intersections, etc).

5.3.1 PROPERTY ACQUISITION

In order to develop the shared-use path, sufficient property must be secured. This may include a strip of property along an existing roadway right-of-way, entire parcels, or a corridor through a private parcel. Louisville Metro's preferred approach is to acquire necessary land from willing landowners. Purchasing an access easement is another option, but is not as desired due to the fact that the property would still remain under private ownership.

This study reviewed data from the Jefferson County Property Valuation Administrator (PVA) and calculated that an average land value for this section of Jefferson County was approximately $35,000 per acre. This value was then used to determine the potential property acquisition costs within the study corridor. When calculating the amount of property that is required to construct the path, a 28' standard width was utilized for the path corridor. This includes the typical 12' wide paved path, 2' wide clear zones on each side of the path, and an additional 6'maintained area on each side of the path. In areas where the soft surface path is also shown to be located, an additional 12' of property is required, including 6' for the soft surface pathway, and 3' clear zones on either side. When the pathway was able to be accommodated within an existing right-of-way, no additional right-of-way was calculated to be added to the costs. When the pathway was able to be accommodated within an existing right-

of-way, no additional right-of-way was calculated to be added to the costs.

5.3.2 SHARED-USE PATH CONSTRUCTION COSTS

To estimate the potential costs involved with the construction of the shared-use pathway in the Pond Creek Corridor, an average cost per linear foot was utilized. It was determined that $125 per linear foot, equivalent to $660,000 per linear mile, should be used to place an estimated value on what the construction cost would be for the paved portion of the shared-use path. This $125 per linear foot cost involves many different factors, many which are included below:

- Clearing of the existing terrain. Removing sod, landscaping, trees, roots, rocks, boulders, and other impediments from the proposed corridor.
- Removing additional obstacles that would impede construction like existing pavement or other hardscape elements.
- Minor utility relocation (for example, converting open ditches to underground storm drainage pipes).
- Earthwork along the pathway corridor to ensure that the final slopes fall within the allowable limits as set by AASHTO, ADA and other pertinent regulations.
- Accommodating erosion control features to minimize the amount of soil that is leaving the construction site. Silt fences are a common method of controlling erosion on a linear corridor.
- Placement of a crushed gravel base for the asphalt pavement to be installed over.
- The final asphalt pavement surface that serves as the exposed portion of the pathway.
- Painting of appropriate pavement markings on the asphalt surface.

In addition to the standard cost per linear foot as described above, there are also miscellaneous costs that were calculated as additional expenses. These items are described as follows:

- Soft-Surface Path – Portions of the preferred alignment include accommodations for a soft-surface pathway, primarily with the equestrian user in mind. There are two different costs associated with the soft-surface trails, depending on whether it is adjacent to the shared-use path, or located separately. For those segments of the soft-surface path that are located adjacent to the shared-use path, a cost of $10 per linear foot was used in the calculations. In locations where the soft-surface path was located in a separate location from the shared-use path, a cost of $31 per linear foot was used.
- Driveway crossings – For each driveway that the off-street shared-use path crosses, it was calculated to cost an additional $1,500. This cost includes putting in new pavement, maintaining the proper cross slopes required for the pathway, and tying back into the existing driveway surfaces beyond the pathway.
- Rail Crossings – Each crossing of an existing rail line was assumed to require the placement of pre-fabricated concrete panel crossings. The estimated cost at each crossing was calculated as $3,000 for the panels. Any fees associated with the review of the plans either by CSX Railroad or P&L Railway is an additional expense that is not accounted for since they are widely varied and therefore difficult to estimate.
- New traffic signals – In certain locations, a new traffic signal was recommended in order to allow pathway users the opportunity to safely cross an existing roadway. Due to various factors, including utility relocation, wiring, engineering studies, and potential lane realignments, these are fairly expensive and were calculated as $200,000 per new signalized crossing.
- Bridges – There are three categories of bridges that were calculated for this study:
  - Since the topography of this corridor contains many ridges and valleys and the topography is generally hilly, there are many instances where a stream or drainageway would have to be crossed in order to construct the shared-use path. For these locations, it was determined that a pre-fabricated bridge, 15’ in width that is rated for emergency vehicles would be the best method of crossing at these locations. A typical span required for these stream crossings is 75’ in length and a sufficient bridge would cost about $150,000 installed.
  - In locations where the shared-use path is shown to cross Pond Creek, a longer bridge would be required since Pond Creek is a much wider stream that carries a higher volume of water. In these locations, a $50,000 premium is added to the base cost of a bridge for a total of $200,000 per crossing.
  - In two locations, the shared-use pathway is shown to cross over the Gene Snyder Freeway. In locations where this is indicated, existing roadways Manslick Road and Greyling Road are insufficient in width to accommodate a combination of bicycle lanes and a pedestrian sidewalk, so an additional pedestrian/bicycle bridge is required to cross the Gene Snyder. For a typical 15’ wide pedestrian bridge, the cost was calculated at $5,000 per linear foot. This cost is much higher than the pre-fabricated bridges discussed above due to the long spans and higher level of engineering analysis that are required to be conducted.

5.3.3 CONTINGENCY COSTS

Due to the level of detail that is used during the planning process, there are ultimately factors that are not known at this time that can significantly affect the cost to construct the Pond Creek Corridor shared-use path. These potential issues will be discovered during the future engineering design phase that will take a more thorough and detailed look at the pathway corridor and determine more precise costs. Some of these factors that can drive up the costs include major utilities that have to be re-routed or replaced (including fiber optic and high power transmission), permitting costs, inflation wetland mitigation, and the addition of retaining walls. To ensure that these future factors are accommodated for in the estimate of probable costs, a 25% contingency markup was applied to the estimated base cost of construction.

5.3.4 ENGINEERING COSTS

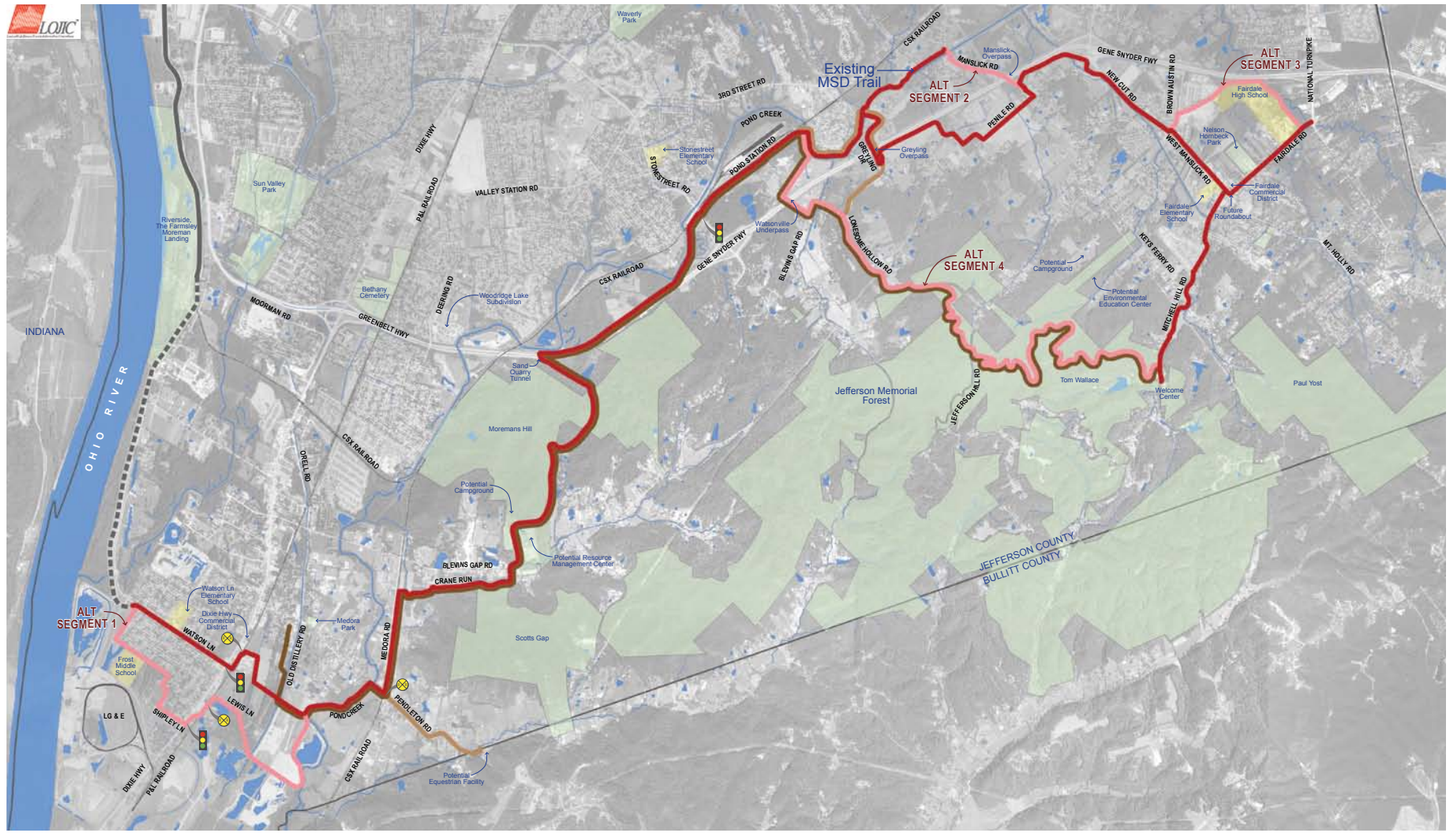
Professional engineering costs will ultimately be required in order to construct the shared-use pathway. These costs will include Environmental Studies, Landscape Architecture, Civil Engineering, Structural Engineering, Geotechnical Engineering, and Land Survey of the proposed corridor. For the purposes of this study, a 15% markup for engineering costs is added to the estimated base cost of construction.

5.3.5 PREFERRED ALIGNMENT COSTS

Costs for the primary route of the recommended alignment include both the soft-surface as well as hard-surface routes. This alignment includes a paved, shared-use path with a 17.05 mile linear distance when the existing MSD trail is included in the numbers. The master plan also shows a 13.87 mile linear distance for the soft-surface paths, with 8.11 miles located adjacent to the shared-use path, and 5.76 miles located separately from the shared-use path. The opinion of probable costs for the construction of the Pond Creek Corridor was determined to be just over $28 Million, with a yearly maintenance cost of about $205,000 for the shared-use sections of the corridor. These costs are outlined in the following chart:

Preferred Alternative	Quantity	Units	Unit Cost	Additional Cost	Total
12' shared-use path*	15.53	Miles	$660,000	$0	$10,249,800
Soft Surface Path-adjacent	8.11	Miles	$52,800	$0	$428,208
Soft surface path - separate	5.76	Miles	$163,680	$3,000,000	$3,942,797
Land Acquisition	35.48	Acres	$35,000	$0	$1,241,970
Driveway Crossings	142	EA	$1,500	$0	$213,000
New Traffic Signal	2	EA	$200,000	$0	$400,000
Rail Crossings	2	EA	$3,000	$0	$6,000
Bridges**	19	EA	$150,000	$1,675,000	$4,525,000
SUBTOTAL					$21,006,774
25% Contingency					$5,251,694
15% Engineering Fees					$3,151,016
TOTAL COST					**$29,409,484**
Annual Maintenance Costs* **					**$204,600**

*Existing MSD trail not included in numbers, it is an additional 1.52 miles
**Bridges across Pond Creek are an additional $50,000, over interstate is $5,000/LF
***MSD trail maintenance costs are included in this number



5.4 NEXT STEPS

5.4.1 NEXT STEPS FOR THE POND CREEK SHARED-USE PATH

Although Louisville Metro government has been fully supportive of the Louisville Loop for nearly a decade, one factor that goes into the long term viability of the overall Louisville Loop project is to have a reasonable phasing plan that will allow for the future implementation of the pathway. It is highly likely that much of the alignment that is shown in this plan will not be constructed for up to 20 years, depending on when sufficient property is secured and funding is available for construction. With the Recommended Alignments now identified, Louisville Metro government will have a blueprint and a plan of action when future development projects come about within this study corridor. If a proposed development project is submitted adjacent to where the preferred alignment is shown, Metro will be able to negotiate for the accommodation of the proposed shared-use path within their development proposal. Also, if any of the roadways are planned to be widened or upgraded along the alignment a shared-use path can be considered at that time.

It is important that each phase of the shared-use path construction is successful and continues to build momentum for the ensuing phases of the project. Constructing segments that are 1 to 3 miles in length at a time is perfectly reasonable. As mentioned earlier, the biggest hurdles to getting this pathway implemented is the available funding and the securing of sufficient right-of-way. Local, State, and Federal funding sources need to be identified that can be utilized to fund various portions of this alignment. Louisville Metro should also continue to hold discussions with various property owners along the Preferred Alignment to get their support and buy in on benefits of the project.

It is logical that the first priorities for phasing of the Pond Creek Corridor would be to connect to an already existing portion of the Louisville Loop, of which there are two such locations, at the Watson Lane terminus of the Ohio River Levee Trail and at the MSD trail. By expanding the Loop adjacent to these key locations first, it will create a more continuous feel and identity for what will eventually become part of a 100-mile network of paths throughout Louisville and Jefferson County.

5.4.2 NEXT STEPS FOR THE POND CREEK ENVIRONMENTAL RESTORATION

Section 4.5 describes the next steps for the development of a stream restoration project. In order to successfully implement watershed management projects, an integrated watershed planning approach provides the best potential for success. A three tiered structure provides the basis for this implementation:

- Watershed Planning – Includes the development and/or updating of a watershed management plan
- Organizational Planning – Formulation and/or activation of a management structure to oversee implementation of the watershed management plan
- Project Planning – Implementation of specific projects of the watershed management plan

Together, this structure provides the foundation for which to implement ecosystem and watershed management projects as part of an overall management plan. Partners of this structure includes Metropolitan Sewer District, Metro Parks, and the U.S. Army Corps of Engineers.

5.5 ALTERNATE ALIGNMENTS

In the case that the primary routes are not able to be constructed in their entirety, several alternate alignment segments have been identified that could be used as a backup to the preferred alignment. These locations are shown on the preceding master plan image and are also described below:

- Alternate Segment 1 – This alternate would bypass the numerous curb cuts located on Watson Lane, but would require either a new traffic signal or pedestrian bridge to cross Dixie Highway at Shipley Lane. This alternate would add 1.90 miles to the length of the preferred alignment and would also add $2.8 Million to $3.6 Million to the base cost, depending upon the usage of a bicycle/ pedestrian bridge to cross Dixie Highway.
- Alternate Segment 2 – This alternate would utilize the entire existing section of the MSD trail as part of the main alignment and cross the Gene Snyder Freeway near Manslick Road. This alternate would subtract 1.41 miles from the length of the preferred alignment and would also lower the base cost by a factor of $1.1 Million.
- Alternate Segment 3 – This alternate would bypass the Fairdale commercial district and avoid the potential safety issues associated with the many curb cuts that exist there. In return, the alternate would utilize the Fairdale High School property before connecting back to Fairdale Road. This alternate would add 0.68 miles to the length of the preferred alignment and the potential costs of this alternate would add $975,000 to the base cost.
- Alternate Segment 4 – This alternate would connect through the Jefferson Memorial Forest and connect to Mitchell Hill Road. This alternate would add 1.57 miles to the length of the preferred alignment. This alternate would also significantly increase the cost of the preferred alignment by $2.4 to $9.40 million, depending on the usage of retaining walls through the steep topography that exists in the forest.

This page intensionally left blank.