Section 5

ENVIRONMENTAL CONSEQUENCES

5.0 Environmental Consequences

In addition to the No-Build Alternative, impacts for four Build Alternatives were evaluated that extend from Chicago, IL to St. Louis, MO and are comprised of various combinations of the seven sections described in Chapter 3, Section 3.3.7.1 and illustrated in Exhibit 3.3-10. The descriptions of these full-length Build Alternatives and the sections that they are comprised of are presented in Chapter 3, Section 3.3.7.2.

The impacts presented in this chapter are based on a Tier 1 level of analysis which does not involve detailed design and field surveys. Although these impacts are presented at this level for the Springfield area, they are also presented in Volume II of this document as part of the more detailed analysis associated with the Springfield Rail Improvements Project Tier 2 Environmental Evaluation. Any differences in impacts in the Springfield area between the Tier 1 and Tier 2 studies are a result of their different levels of analysis.

5.1 Land Use Impacts

5.1.1 No-Build Alternative

Although some land use changes would be likely under the No-Build Alternative, attempting to estimate such changes would be speculative. Therefore, no additional potential impacts were quantified for the No-Build Alternative. While there would be no displacements or additional right-of-way needed for the No-Build Alternative, the long-term land use benefits discussed below for the build alternatives would not be realized under the No-Build Alternative.

5.1.2 Alternative A

5.1.2.1 *Regional Implications*

Alternative A would utilize existing rail corridors that serve established cities and villages. As a result, no direct major influences in land use are anticipated at the regional level. The direct impact on land use and development would be a function of: land available for development or redevelopment; regional and local markets; and the plans, zoning ordinances, and economic development programs of local government. These potentials would occur in each of the cities where there would be a station stop for high-speed rail service.

Alternative A would provide an alternative to driving or flying for business or personal activities and would reduce travel time for thousands of trips along the corridor. Over 1.5 million residents live within a five-mile radius of six of the stations in the corridor: Chicago, Joliet, Bloomington-Normal, Springfield, Alton, and St. Louis. Each of these communities offers unique economic, educational, medical, and cultural opportunities. By facilitating access to these corridor communities, high-speed rail service could enhance the way people live, work, shop, go to school, interact with other businesses and services, and choose to participate in cultural and recreational activities.

Improved rail service would increase the opportunities and convenience of attending universities or visiting medical centers. Decreased commuting time could provide part-time students with options for living at home to save money, and opportunities for people to obtain work in other communities along the corridor. Students and workers could also use high-speed rail service for weekend trips and for traveling to research and conference centers, such as in Springfield. Similarly, since Bloomington and Springfield would be more quickly accessible from Chicago, the way some businesses view these areas as places to locate and to market could change. Access to major medical centers would be enhanced, especially for those traveling long distances for specialized and/or frequent medical care. High-speed rail service would also expand possibilities for one-day field trips for school and special interest groups. The presence of these opportunities could create an environment favorable for new economic activity and investment. New businesses considering relocation in Illinois stress the importance of local transportation options, the work force within a reasonable commuting time, and access to nearby cities and markets.

Beneficial long-term land use impacts are expected to occur as a result of program implementation. A more efficient and safer transportation facility would be completed that yields greater user benefits in respect to travel time, traffic congestion, traveler safety, energy consumption, and travel reliability. Improved transportation efficiency under Alternative A would also benefit communities along the HSR corridor. As a result of this improvement, land development would be expected to increase along or near the HSR corridor through conversion of low density residential and zoned rural land to more intensive uses, such as higher density residential and commercial uses. As a result of the change in the intensity of the land use, employment opportunities, earnings, and tax collection would also increase.

5.1.2.2 *Rural Areas and Small Communities*

Freight trains currently pass through all of the communities where high-speed rail service would operate. Freight trains are longer and heavier than the proposed high-speed rail trains. Impacts from high-speed rail service would be nominal compared to the No-Build Alternative, considering freight train traffic would be the same with either the No-Build or Alternative A.

Concern has been expressed about safety where there are established land uses on either side of the railroad tracks that attract pedestrian movement across or along the right-of-way. Of particular concern are children who are used to walking to school or recreational activities by trespassing on the railroad right-of-way.

In January 2004, FHWA and FRA issued a ROD for a 2003 Chicago - St. Louis High-Speed Rail Project FEIS allowing improvements in the Dwight to St. Louis portion of the HSR corridor to be advanced. In addition to the 2004 ROD improvements, a 2011 EA/FONSI was approved to allow proposed improvements to a section of the UP track between Joliet and Dwight. The projects that have advanced based on the 2004 ROD and 2011 FONSI are described in Chapter 3 Alternatives, Table 3.2-1. Because of additional needs for improved intercity passenger services, IDOT and FRA are now

evaluating the provision of a full double-track corridor between Chicago and St. Louis in this Chicago to St. Louis HSR Tier 1 DEIS.

As part of the 2004 ROD, IDOT agreed to contact each community in the Chicago to St. Louis High-Speed Rail corridor south of Dwight to discuss the possibility of fencing along the railroad tracks. If a community was interested in having fencing installed, IDOT coordinated with that community to determine the location, style, and height of the proposed fencing as well as whether the fencing would be on one or both sides of the railroad tracks. If an agreement could be reached, fencing was to be installed. Fencing was not installed unless agreed to by the local community.

In all affected areas that have existing fencing or fencing was installed as part of the 2004 ROD, fencing would be replaced under Alternative A. Where fencing was not already installed as part of the 2004 ROD, fencing would be considered within many of the urbanized areas as part of Alternative A. Where fencing is provided, it would be designed to provide the best possible protection to discourage trespassing and to direct pedestrians to a nearby warned crossing, usually within one block of the existing crossing. IDOT would work with local communities on the detailed design of fencing. Communities with historic qualities and unique architecture could request more decorative fencing along the railroad. Fencing would not be installed unless agreed to by the local community.

5.1.2.3 *Displacements*

The HSR corridor under Alternative A would run on existing rail lines and on a second mainline track adjacent to existing rail lines. In the majority of the study corridor under Alternative A, proposed improvements would occur within the existing right-of-way and would not require additional right-of-way. However, there are areas that the right-of-way would need to be modified and widened.

An adverse long-term land use impact under Alternative A would be the conversion of currently developed residential and commercial areas to rail and associated right-of-way uses and the displacement of residences and businesses within the proposed right-of-way. Using aerial photography, areas of new proposed right-of-way for the HSR were evaluated to determine the number of buildings that may need to be relocated. Some of the buildings in the new right-of-way were residential homes, farm silos, sheds, barns, and outbuildings. These numbers are subject to change during the final design and acquisition phase as these are aerial estimates. The results are shown in Table 5.1-1. Under Alternative A, 134 buildings would be displaced. Based on the Tier 1 evaluation, Alternative A would not impact sensitive land use facilities (i.e., schools, hospitals, or churches).

Table 5.1-1. Buildings Potentially Displaced by Alternative A

Section	Number of Buildings Potentially Displaced
Full Length Alternative	134
1	38
3	47
4	8
6	34
7	7

In addition, Alternative A would require between 336 to 352 acres of proposed new right-of-way in which land use changes could occur (Table 3.3-4). Right-of-way acquisition could also result in the fragmentation of larger parcels along the HSR corridor, which could no longer support existing land uses. Since these are estimates based on review of aerial photography, these numbers are subject to change during Tier 2 studies and the final design and acquisition phase. Displacement impacts would not be significant as commercial and industrial uses are typically located along railways, and these uses buffer residential development from the railroad. In some instances, relocation of the displaced residences and businesses could result in loss of existing open space as replacement homes could be constructed on existing vacant lands. The majority of the land in the more densely developed affected areas is currently zoned for residential and commercial mixed land uses. Therefore, this would not result in major changes to anticipated land uses in the study corridor.

5.1.2.4 *Land Use Compatibility*

Many counties and cities within the study corridor have developed long-term comprehensive land use and transportation plans that focus on economic growth and physical growth and development. Examples of these plans that consistently support rail transportation improvements in their communities include the GoTo 2040 Comprehensive Regional Plan (Chicago Metropolitan Agency For Planning, 2010), the Bloomington-Normal Long-Range Transportation Plan 2035 (McLean County Regional Planning Commission, 2007), the Springfield Comprehensive Plan (Springfield-Sangamon County Regional Planning Commission, 2000), the Logan County Comprehensive Plan (Logan County Regional Planning Commission, 2006), the Will County 2030 Transportation Plan (CH2M HILL Inc., 2009), the Madison County 2020 Land Use And Resource Management Plan (Madison County Planning and Development Department, 2000), and the St. Louis Metropolitan Area Regional

Transportation Plan 2040 (East-West Gateway Council of Governments, 2011). The HSR Program would generally compliment these future plans.

Local plans focus on permitted land uses and development scale within land use zones. Because Alternative A is adjacent to the existing transportation corridors, the majority of the adjacent land uses are related to commercial or industrial uses. Where Alternative A would be located within areas zoned for residential there would be a land use inconsistency. However, the alignment would be adjacent to the existing corridors and, as discussed in the following Section 5.2, Socioeconomic and Environmental Justice Community Impacts, field reviews, meetings, and coordination with community leaders would be conducted to minimize any potential impacts to community routes and facilities.

Alternative A would convert some agricultural lands to a transportation-related use, which would not be consistent with the local plans and policies that are related to the protection and conservation of agricultural lands. As described above, the design of the alternatives has been adjacent to existing transportation corridors to the extent possible to minimize agricultural impacts. In addition, the HSR station areas would encourage higher densities, which would protect agricultural lands by reducing sprawl. Impacts on agricultural lands are described in Section 5.4, Agriculture.

Effects related to increased density around the HSR stations would promote transit-oriented development. The stations could help revitalize the downtown areas of communities along the study corridor, including Chicago, Joliet, Bloomington-Normal, Springfield, St. Louis, and others, and associated impacts would be beneficial. Development of parking to accommodate demand at the HSR stations would evolve as the number of passengers increases, would be consistent with applicable plans, and would be compatible with adjacent land uses. The additional parking would therefore result in negligible impacts. IDOT and the operators would work with local communities to meet their needs for circulation improvements to support the expanded passenger ridership.

Overall, the proposed HSR Alternative A would be highly compatible with local and regional plans that support rail systems and transit-oriented development. This Alternative would also provide improved inter-modal connectivity with existing local and commuter transit systems.

5.1.3 Alternative B

Alternative B would have similar land use impacts to those listed under Alternative A above. However, Alternative B would require more right-of-way acquisition and displacements than Alternative A. Alternative B would require approximately 373 acres of proposed new right-of-way. Potential displacements for this alternative are shown in Table 5.1-2 and include 189 buildings.

Table 5.1-2. Buildings Potentially Displaced by Alternative B

Section	Number of Buildings Potentially Displaced
Full Length Alternative	189
1	38
3	47
5	63
6	34
7	7

Since the listed displacements are estimates based on review of aerial photography, these numbers are subject to change during Tier 2 studies and the final design and acquisition phase . Based on the Tier 1 evaluation, Alternative B would not impact sensitive land use facilities (i.e., schools, hospitals, or churches).

Impacts to land use compatibility under Alternative B would be similar to those under Alternative A. Local community comprehensive plans support rail transportation improvements. Alternative B may have slightly more impacts than Alternative A because it includes Section 5 in the City of Springfield, which has a small section of proposed new alignment that is not along existing rail corridor. Where Alternative B would be located within areas zoned for residential there would be a land use inconsistency. However, the majority of the alignment would be adjacent to the existing rail corridors and, as discussed in Section 5.2, Socioeconomic and Environmental Justice Community Impacts, field reviews, meetings, and coordination with community leaders would be conducted to minimize any potential impacts to community routes and facilities.

5.1.4 Alternative C

Alternative C would have similar land use impacts to those listed under Alternative A above. However, Alternative C would require more right-of-way acquisition and displacements than Alternatives A or B. Alternative C would require between 394 and 410 acres of proposed new right-of-way. Potential displacements for this alternative are shown in Table 5.1-3 and include 213 buildings.

Table 5.1-3. Buildings Potentially Displaced by Alternative C

Section	Number of Buildings Potentially Displaced
Full Length Alternative	213
2	117
3	47
4	8
6	34
7	7

Since these are estimates based on review of aerial photography, these numbers are subject to change during Tier 2 studies and the final design and acquisition phase. Based on the Tier 1 evaluation, Alternative C would not impact sensitive land use facilities (i.e., schools, hospitals, or churches).

Impacts to land use compatibility under Alternative C would be similar to those under Alternative A. Local community comprehensive plans support rail transportation improvements. Alternative C may have slightly more impacts than Alternative A because it includes Section 2 in the City of Chicago and Chicago suburbs, which has new alignment that is not along existing Amtrak rail corridor. Where Alternative C would be located within areas zoned for residential there would be a land use inconsistency. However, the majority of the alignment would be adjacent to the existing rail corridors, Section 2 has existing commuter rail service, and, as discussed in Section 5.2, Socioeconomic and Environmental Justice Community Impacts, field reviews, meetings, and coordination with community leaders would be conducted to minimize any potential impacts to community routes and facilities.

5.1.5 Alternative D

Alternative D would have similar land use impacts to those listed under Alternative A above. However, Alternative D would require more right-of-way acquisition and displacements than the other three alternatives. Alternative D would require approximately 431 acres of proposed new right-of-way. This is the highest acreage of proposed new right-of-way of all the alternatives. Potential displacements for this alternative are shown in Table 5.1-4 and include 268 buildings, also the highest of all of the alternatives.

Table 5.1-4. Buildings Potentially Displaced by Alternative D

Section	Number of Buildings Potentially Displaced
Full Length Alternative	268
2	117
3	47
5	63
6	34
7	7

Since these are estimates based on review of aerial photography, these numbers are subject to change during Tier 2 studies and the final design and acquisition phase. Based on the Tier 1 evaluation, Alternative D would not impact sensitive land use facilities (i.e., schools, hospitals, or churches).

Impacts to land use compatibility under Alternative D would be similar to those under Alternative A. Local community comprehensive plans support rail transportation improvements. Alternative D may have slightly more impacts than Alternative A because it includes Section 2 in the City of Chicago and Chicago suburbs, which has new alignment that is not along existing Amtrak rail corridor, and Section 5 in the City of Springfield, which has a small section of proposed new alignment that is not along existing rail corridor. Where Alternative D would be located within areas zoned for residential there would be a land use inconsistency. However, the majority of the alignment would be adjacent to the existing rail corridors, Section 2 has existing commuter rail service, and, as discussed in Section 5.2, Socioeconomic and Environmental Justice Community Impacts, field reviews, meetings, and coordination with community leaders would be conducted to minimize any potential impacts to community routes and facilities.

5.1.6 Summary of Land Use Impacts

Table 5.1-5 contains a summary of the land use impacts for comparison of the program alternatives. Alternative D would have the highest area of new right-of-way and number of displacements. Therefore, Alternative D would have the highest likelihood for land use conversions along the corridor from residential and commercial uses to rail and associated right-of-way uses. Furthermore, Alternative D would have the highest potential for land use incompatibility because it contains both Section 2 and Section 5, which would follow new routes along primarily existing railroad corridors between Chicago and Joliet and through Springfield. Alternative A would have the lowest

amount of new right-of-way, potentially displace the least amount of people, and the entire route runs along existing Amtrak alignment. Alternative A would have the lowest probability for impacts to land use.

Table 5.1-5. Comparison of Land Use Impacts between Alternatives

Alternative	Number of Buildings Potentially Displaced	Proposed New Right-of-Way (Acres)	Land Use Compatibility – Proposed New Routes
Alternative A	134	336-352	None
Alternative B	189	372-373	Section 5 - Springfield
Alternative C	213	394-410	Section 2 – Chicago to Joliet
Alternative D	268	430-431	Section 2 and Section 5 Chicago to Joliet and Springfield
No-Build	0	0	None

5.1.7 Mitigation

Right-of-way purchases conducted pursuant to a federally funded program would follow the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Uniform Relocation Act) (Title 42 United States Code Sections 4601-4655), as amended, which applies to all federal or federally assisted activities that involve the acquisition of real property or the displacement of residences or businesses. IDOT would implement the provisions of the State of Illinois Relocation Assistance Plan in accordance with the Uniform Relocation Act.

5.2 Socioeconomic and Environmental Justice Community Impacts

5.2.1 Methods for Evaluating Impacts

Potential socioeconomic impacts include:

- Changes to neighborhood or community cohesion such as splitting neighborhoods, isolating a portion of a neighborhood, or separating residents from community facilities or changes to community/neighborhood travel patterns and accessibility
- Potential displacements of households, businesses, recreation areas, and community facilities

- Changes to the regional and/or local economy from employment opportunities, construction expenditures, and increased rail operations.

Potential environmental justice impacts include any change that would cause disproportionate adverse effects on low-income and/or minority populations.

The HSR Program will follow "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities," 36 CFR Part 1191 to ensure all Americans with Disabilities Act (ADA) goals are met. In addition, in accordance with Title VI of the Civil Rights Act of 1964, no groups or individuals have been or will be excluded from participation in public involvement activities, denied the benefit of the program or subjected to discrimination in any way on the basis of race, color, age, sex, national origin, disability or religion.

5.2.2 No-Build Alternative

Under the No-Build Alternative, construction would not occur; therefore, there would be no impacts from construction. There would be no displacements and no impacts to low-income or minority population. The long-term socioeconomic benefits discussed below for the build alternatives would not be realized under the No-Build Alternative.

5.2.3 Alternative A

Increases in train speeds along the high-speed rail corridor may require grade separations at some crossings, temporary crossing closures during construction, increases in the level of grade, or increased traffic warnings and protection. All of those changes have the potential to impact community cohesion, access to community facilities, and vehicle routes. Information on ambulance, police, fire, school district, and agri-businesses would be considered when making any crossing treatment recommendations. Access to properties would be maintained. Field reviews, meetings, and coordination with community leaders would be conducted to provide additional background information about each crossing to minimize any potential impacts to community routes and facilities.

Construction activity could create a temporary increase in traffic congestion and disruption of patterns and accessibility in neighborhoods and communities. There may be temporary inconveniences to people living in areas surrounding construction. Additional traffic and noise from construction may also temporarily diminish quality of life for nearby residents. These adverse impacts would be temporary during the construction phase.

The majority of the HSR Program occurs on existing rail lines and existing right-of-way, therefore the number of potential displacements would be minimized. However, there are areas that the right-of-way would need to be modified and widened.

As previously indicated in Table 5.1-1, Alternative A would result in approximately 134 displacements. Most of the displacements occur in the major communities along the route, which would have sufficient housing opportunities both for sale and for rent to

accommodate those displaced. Neighborhoods in the dense, urban areas that lose 1 or 2 households in a neighborhood may not experience any changes to community or neighborhood cohesion. However, in rural areas, housing along the proposed program route is in small clusters. The loss of 1 or 2 households in a small neighborhood community could be meaningful. It is anticipated that, when possible, many of the displaced families would prefer and attempt to relocate in the same general area. To minimize impacts, the guidelines in the "Uniform Relocation Assistance and Real Property Acquisition Act of 1970" would be followed and "just compensation" would be provided for any property acquisition. There do not appear to be any community facilities (i.e., schools, hospitals, or churches) in the proposed right-of-way, so there are no anticipated impacts to community facilities.

Alternative A would have direct impacts to employment throughout northern and central areas of Illinois and portions of Missouri near St. Louis. The location of new employment would depend on which companies are hired to do the work. A high proportion of the work would most likely be in Northeastern Illinois near Chicago, because there are major engineering, manufacturing, and construction firms in this area of the state. The overall program would create jobs, both in the production of materials and equipment used and the on-site construction activities. During the construction period, communities along the route would benefit from the construction crews spending money at local hotels, restaurants, gas stations, and shops. The wages that individuals and firms receive while working would have indirect impacts on the economy. Their wages would be recycled throughout the economy as workers buy houses, furniture, groceries, and clothes. These expenditures create new jobs and increased sales in the economy, producing a multiplier effect on the economy. The geographic distribution of these economic impacts would depend on the location of firms supplying the labor and materials, but they have the potential to be dispersed throughout Illinois and to some extent the Midwest.

The operation of the HSR system would result in the creation of new jobs for ticket agents and other railroad personnel from increased services at existing stations. The impacts from expenditures for operations would most likely be concentrated in the communities that the line would serve. The HSR system would also increase the flow of travelers between cities along the route and enhance economic activity in communities with stations on the line (Chicago, Summit, Joliet, Dwight, Pontiac, Normal, Lincoln, Springfield, Carlinville, Alton, and St. Louis). Many of the HSR system passengers would likely be commuters, whose travel may have occurred whether or not the high speed rail was in place. However, there would be recreational or tourist-oriented induced ridership of people travelling for weekend trips to Chicago, St. Louis, or even historic areas of Springfield. Other communities with stations may experience small increases in economic activity from induced ridership. Detailed information on ridership is available in Chapter 3.

Along the Alternative A corridor, there are three Census Tracts with greater than 50 percent of the population below the poverty line. The low-income tracts are located in Cook County and McLean County. Of the 38 Census block groups with minority

populations of 50 percent or greater, approximately 63 percent of them are located along the corridor in Cook County. Table 5.2-1 shows geographic distribution of low-income and minority populations by section.

Table 5.2-1. Alternative A Geographic Distribution of Low-income and Minority Populations

Section	Census Tracts		Census Block Groups	
	Total Affected	Populations Below Poverty Line (>50)[1]	Total Affected	Minority Populations (>50)[2]
Full Length Alternative	132	3	230	38
1	36	0	53	24
3	45	1	95	6
4	12	0	18	0
6	35	0	58	3
7	4	2	6	5

Source: U.S. Census Bureau, 2010

[1] Tracts in this column have 50 percent or more of the population below the poverty line.

[2] Block groups in this column have 50 percent or more of the population identified as a minority.

Except for the St. Louis and Chicago area, no new proposed right-of-way occurs in low-income or minority block groups identified in Table 5.2-1, so there are no anticipated disproportional displacements of those populations. The buildings that could potentially be displaced around downtown St. Louis do not appear to be neighborhoods or residences. In Chicago, no low-income tracts would be impacted by the proposed right-of-way; however, approximately 18 Block Groups with minority populations greater than 50percent also have areas near proposed right-of-way. There is the potential for some minority populations to be displaced around Chicago. Based on preliminary information, there is no indication that the impacts will be disproportionately borne by minority or low-income populations. This, however, would require more detailed analysis during the Tier 2 studies.

5.2.4 Alternative B

The employment, economic, and operation impacts from the HSR Program would be realized on a regional level because of the extensive scope of the program. Economic, employment, and operation impacts associated with Alternative B would be similar to those discussed under Alternative A.

There is a potential for a greater number of displacements (approximately 189), and the impacts would be similar to Alternative A because of the track shift near Springfield.

However, impacts would be similar to those discussed under Alternative A since most of the displacements occur in the major communities along the route. There do not appear to be any community facilities (i.e., schools, hospitals, or churches) in the proposed right-of-way, so there are no anticipated impacts to community facilities.

Alternative B includes approximately six more block groups than Alternative A with minority populations greater than 50 percent that would be impacted. New proposed right-of-way occurs in minority block groups around Chicago and St. Louis, so there is a potential for minority populations to be displaced. In addition, new proposed right-of-way occurs in St. Louis in low-income neighborhoods identified in Table 5.2-2. However, the buildings that could potentially be displaced around downtown St. Louis do not appear to be neighborhoods or residences. Approximately 18 Block Groups in the Chicago area with minority populations greater than 50 percent have areas in the proposed right-of-way. Based on preliminary information, there is no indication that the impacts will be disproportionately borne by minority or low-income populations. This, however, would require more detailed analysis during the Tier 2 studies.

Table 5.2-2. Alternative B Geographic Distribution of Low-income and Minority Populations

Section	Census Tracts		Census Block Groups	
	Total Affected	Populations Below Poverty Line (>50)[1]	Total Affected	Minority Populations (>50)[2]
Full Length Alternative	133	3	230	44
1	36	0	53	24
3	45	1	95	6
5	13	0	18	6
6	35	0	58	3
7	4	2	6	5

Source: U.S. Census Bureau, 2010

[1] Tracts in this column have 50 percent or more of the population below the poverty line.

[2] Block groups in this column have 50 percent or more of the population identified as a minority.

5.2.5 Alternative C

The employment, economic, and operation impacts from the HSR Program would be realized on a regional level because of the extensive scope of the program. Economic,

employment, and operation impacts associated with Alternative C would be similar to those discussed under Alternative A.

There is a potential for a greater number of displacements (approximately 213) because of the route chosen through Chicago. The area is more densely populated, and, thus, there is a greater potential for displacements. There also appear to be more neighborhoods with row houses and townhouses. More than half of the displacements occur in Cook County, which would have sufficient housing opportunities both for sale and for rent to accommodate those displaced. There do not appear to be any community facilities (i.e., schools, hospitals, or churches) in the proposed right-of-way, so there are no anticipated impacts to community facilities.

Alternative C includes approximately seven more tracts and 45 more block groups with minority populations greater than 50 percent than Alternative A that would be impacted. New proposed right-of-way occurs in low-income and minority block groups identified in Table 5.2-3 near Chicago and St. Louis. In Chicago, approximately 32 block groups that have greater than 50 percent minority and five census tracts with greater than 50 percent below poverty have potential displacements in the right-of-way. The buildings that could potentially be displaced around downtown St. Louis do not appear to be neighborhoods or residences. Based on preliminary information, there is no indication that the impacts will be disproportionately borne by minority or low-income populations. This, however, would require more detailed analysis during the Tier 2 studies.

Table 5.2-3. Alternative C Geographic Distribution of Low-income and Minority Populations

Section	Census Tracts		Census Block Groups	
	Total Affected	Populations Below Poverty Line (>50)[1]	Total Affected	Minority Populations (>50)[2]
Full Alternative	167	10	294	83
2	71	7	117	69
3	45	1	95	6
4	12	0	18	0
6	35	0	58	3
7	4	2	6	5

Source: U.S. Census Bureau, 2010

[1] Tracts in this column have 50 percent or more of the population below the poverty line.

[2] Block groups in this column have 50 percent or more of the population identified as a minority.

5.2.6 Alternative D

The employment, economic, and operation impacts from the HSR Programwould be realized on a regional level because of the extensive scope of the program. Economic, employment, and operation impacts associated with Alternative D would be similar to those discussed under Alternative A.

There is a potential for the greatest number of displacements (approximately 268) under this alternative because of the more densely populated route chosen through Chicago and the construction of new tracks through Springfield. However, Cook County and Sangamon County are major metropolitan areas, which would have sufficient housing opportunities both for sale and for rent. There would be more than enough housing to accommodate those displaced. There do not appear to be any community facilities (i.e., schools, hospitals, or churches) in the proposed right-of-way, so there are no anticipated impacts to community facilities.

Under Alternative D approximately 7 more tracts and 51 more block groups with minority populations greater than 50 percent than Alternative A that would be impacted. New proposed right-of-way occurs in low-income and minority block groups identified in Table 5.2-4 near Chicago and St. Louis. In Chicago, approximately 32 block groups that have greater than 50 percent minority and 5 census tracts with greater than 50 percent below poverty also have displacements in the right-of-way. The buildings that could potentially be displaced around downtown St. Louis do not appear to be neighborhoods or residences. Based on preliminary information, there is no indication that the impacts would be disproportionately borne by minority or low-income populations. This, however, will require more detailed analysis during the Tier 2 studies.

Table 5.2-4. Alternative D Geographic Distribution of Low-income and Minority Populations

Section	Census Tracts		Census Block Groups	
	Total Affected	Populations Below Poverty Line (>50)	Total Affected	Minority Populations (>50)
Full Alternative	168	10	294	89
2	71	7	117	69
3	45	1	95	6
5	13	0	18	6
6	35	0	58	3
7	4	2	6	5

5.2.7 Summary of Socioeconomic and Community Impacts

Table 5.2-5 contains a summary of the socioeconomic and community impacts for comparison of the Build Alternatives. Alternative D has the possibility to displace the greater number of people; furthermore, it has the highest potential to displace low-income and minority populations because it would require the highest acreage of new right-of-way among all the alternatives. In addition, it passes through a more densely populated part of Chicago. Alternative A would potentially displace the least amount of people and would potentially impact the smallest number of low-income and minority populations. Alternative A requires the lowest acreage for new proposed right-of-way. Although all of the Build Alternatives have the potential to impact environmental justice populations, there is not enough information available at this Tier 1 level of analysis to make a determination as to whether or not they would result in disproportional impacts. A more detailed analysis will be conducted during the Tier 2 studies to determine these impacts and to ensure compliance the Executive Order 12898.

Table 5.2-5. Comparison of Socioeconomic and Community Impacts between Build Alternatives and Sections

Build Alternative/ Section	Number of Buildings Potentially Displaced	Census Tracts with Populations Below Poverty Line (>50)	Census Block Groups with Minority Populations (>50)
Alternative A	134	3	38
Alternative B	189	3	44
Alternative C	213	10	83
Alternative D	268	10	89
No-Build	0	NA	NA
Chicago to Joliet Sections			
1	38	0	24
2	117	7	69
Joliet to Springfield Section			
3	47	1	6
Springfield Sections			
4	8	0	0
5	63	0	6
Springfield to Alton Section			
6	34	0	3
Alton to St. Louis Section			
7	7	2	5

5.3 Energy

5.3.1 Energy Consumption during Construction

5.3.1.1 *No-Build Alternative*

The No-Build Alternative would not require any construction. Therefore, no changes in energy consumption are expected.

5.3.1.2 *Build Alternatives*

During construction of any of the Build Alternatives, additional energy would be expended beyond what would be used for normal rail operations. This additional energy would be consumed on a short-term basis by construction of improvements required to implement the HSR service and by construction-related delays to existing freight, Metra commuter, and Amtrak passenger service. However, as described below, once the HSR service begins, long-term energy savings would be realized.

5.3.2 Energy Consumption during Operation

The program alternatives were evaluated in terms of their potential to realize savings in energy consumed by all major modes of transportation in the study corridor. As noted in Section 4.3, under existing conditions, travel by rail is the most energy efficient mode of transportation. As a result, any substantial increase in rail ridership associated with any of the Build Alternatives that would shift ridership from the other less efficient modes of transportation would result in conservation of travel-related energy.

The estimated passenger-miles of travel by mode and alternative are shown in Table 5.3-1. For the purposes of this evaluation, it was assumed that Alternatives A, B, C, and D would have same ridership and passenger-miles of travel.

Table 5.3-1. Annual Passenger-Miles of Travel (millions)

Alternative	Rail	Automobile	Bus	Air	Total
Existing (2010)	114	6,499	26	140	6,779
No-Build (2030)	203	7,871	35	236	8,345
A, B, C, or D	328	7,753	31	214	8,326

As Table 5.3-1 shows, when comparing the No-Build Alternative with the Build Alternatives, there would be an increase in rail passenger-miles while the other three modes of transportation would experience a decrease. This could be attributed to a shift in ridership from the other three modes to rail.

The future energy use of all the modes in the corridor was estimated by calculating the total passenger-miles of travel projected for 2030 by mode for the No-Build and Build

Alternatives, and then applying the same energy consumption rates that were used for the existing conditions, as described in Section 4.3. Annual energy consumption by mode and alternative is summarized in Table 5.3-2.

Table 5.3-2. Annual Energy Consumption (billions of BTUs)

Alternative	Rail	Automobile	Bus	Air	Total
Existing (2010)	199	22,754	69	411	23,433
No-Build (2030)	354	27,558	93	692	28,697
A, B, C, or D	572	27,143	83	628	28,426

The results in Table 5.3-2 show that the total energy consumption from intercity passenger travel under the No-Build Alternative would be higher than the Build Alternatives. Although the Build Alternatives would result in an increase in energy consumption compared to the No-Build Alternative with regard to rail transportation, all of the other three modes would experience a decrease, thereby, resulting in an overall net decrease in energy consumption. As previously mentioned, this could be attributed to a shift in ridership from the other three less energy efficient modes to rail.

5.4 Agriculture

The Farmland Protection Policy Act requires federal agencies to assess a project's impact on farmland by coordinating with the US Department of Agriculture Natural Resources Conservation Service (USDA NRCS) to complete a Land Evaluation and Site Assessment (LESA). Sites are evaluated using a Farmland Conversion Impact Rating Form that uses a point system to score the agricultural quality of the project corridor, including the presence or absence of prime farmland soils. Sites receiving a score of less than 160 points do not require further evaluation. If a site scores greater than 160 points, then new alternatives should be proposed. Federal agencies may also deny funding to state and local agencies for projects with high LESA scores; however, this is not required.

5.4.1 No-Build Alternative

No impacts.

5.4.2 Build Alternatives

Coordination has not yet been conducted with the USDA NRCS but will be completed later in program development. Because the proposed HSR corridor closely follows existing railroad tracks, few impacts to farmland would occur. Soils classified as "prime farmland" would be acquired; however, impacts to agricultural operations along the corridor would be minimal. It is not expected that the program's LESA score will approach or exceed 160 points.

Impacts to soils classified as prime farmland would range from 1,643 acres (Alternative B) to 1,655 acres (Alternative C), a difference of approximately twelve acres. Alternative A would convert 309 acres of prime farmland soils to right-of-way, Alternative B would convert 322 acres, Alternative C would convert 358 acres, and Alternative D would convert 370 acres of prime farmland soils to right-of-way. The remaining impacts are to soils within existing right-of-way. These impacts are listed in Tables 5.4-1 and 5.4-2. Sections in Cook and Madison counties (Sections 1, 2, and 7) were excluded because they are completely within urban boundaries within these counties, thus exempting them from consideration under the Farmland Protection Policy Act.

Table 5.4-1. Prime Farmland Soil Impacts by Section

Section	Right-of-Way Type	County	Acres Impacted
1	Construction in Proposed New ROW	Will	0
1	Construction in Existing ROW	Will	2
1	Construction in Existing ROW	Will	86
1	Construction in Proposed New ROW	Will	1
2	Construction in Proposed New ROW	Will	49
2	Construction in Existing ROW	Will	49
3	Construction in Proposed New ROW	Sangamon	20
3	Construction in Existing ROW	Sangamon	104
3	Construction in Proposed New ROW	McLean	107
3	Construction in Existing ROW	McLean	396
3	Construction in Existing ROW	Logan	205
3	Construction in Proposed New ROW	Logan	45
3	Construction in Existing ROW	Livingston	49
3	Construction in Proposed New ROW	Livingston	12
3	Construction in Proposed New ROW	Grundy	26
3	Construction in Existing ROW	Grundy	102
4	Construction in Existing ROW	Sangamon	24
4	Construction in Proposed New ROW	Sangamon	5
5	Construction in Existing ROW	Sangamon	9
5	Construction in Proposed New ROW	Sangamon	17

Table 5.4-1. Prime Farmland Soil Impacts by Section (continued)

Section	Right-of-Way Type	County	Acres Impacted
6	Construction in Proposed New ROW	Sangamon	42
6	Construction in Existing ROW	Sangamon	125
6	Construction in Proposed New ROW	Macoupin	52
6	Construction in Existing ROW	Macoupin	243

Table 5.4-2. Prime Farmland Soil Impacts by Alternative

Alternative	Existing ROW Acres Impacted	Proposed New ROW Acres Impacted	Total Acres Impacted
A	1,336	309	1,645
B	1,321	322	1,643
C	1,297	358	1,655
D	1,282	370	1,652
No-Build	0	0	0

As the HSR corridor would follow the existing railroad tracks, no farms would be bisected by any of the alternatives. The increase in train traffic along the corridor could result in increased delays at railroad crossings, as farm vehicles would be required to stop more frequently for trains crossing roadways. The program proposes safety upgrades at railroad crossings along the corridor. These safety upgrades would include the installation of safety features such as flashing lights, warning bells, and gates, to warn motorists of approaching trains. The improved safety at these crossings would positively impact farm vehicles.

5.5 Cultural Resources

This section identifies the potential for program activities to have an adverse effect (impact) on resources protected by Section 106 of the National Historic Preservation Act.

An adverse effect is found when a Federal action alters, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Examples of adverse effects that could occur as result of this program include:

- Physical destruction of or damage to all or part of the property;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance; and

- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features.

Properties listed on, or eligible for listing on, the NRHP are also protected under Section 4(f) of the Department of Transportation Act.

5.5.1 Historic Architectural Resources

5.5.1.1 No-Build Alternative

No impacts.

5.5.1.2 Build Alternatives

The properties identified in Section 4.5.1 were reviewed for potential impacts. Potential impacts were considered where proposed improvements (construction activity) would physically impact the property on which the resource lies.

A list of potentially impacted historic architectural resources is provided by section in Table 5.5-1 while Table 5.5-2 presents the number of these resources potentially impacted for each alternative. Following these tables is a detailed discussion of each property by section. Further evaluation will be needed during the Tier 2 studies in order to identify potentially eligible historic properties that are currently unknown and to make determinations of effect in accordance with Section 106.

Table 5.5-1. Potentially Impacted Historic Architectural Resources

Resource	City/County	Section
Lockport Historic District	Lockport/Will	1
Joliet Steel Works	Joliet/Will	1
Hamilton Park	Chicago/Cook	2
Dwight Chicago and Alton Railroad Depot	Dwight/ Livingston	3
Bridge over Market Street FAU6359 carrying Southern Pacific Railroad	Bloomington/ McLean	3
Lincoln Courthouse Square Historic District	Lincoln/ Logan	3
Susan Lawrence Dana House	Springfield/ Sangamon	4
Route 66, Girard to Nilwood	Macoupin	6

Table 5.5-2. Summary of Potentially Impacted Architectural Resources

Section	Alternative A	Alternative B	Alternative C	Alternative D	No-Build
1	2	2	-	-	0
2	-	-	1	1	0
3	3	3	3	3	0
4	1	-	1	-	0
5	-	0	-	0	0
6	1	1	1	1	0
7	0	0	0	0	0
Total	**7**	**6**	**6**	**5**	**0**

5.5.1.1 *Section 1*

Lockport Historic District

This district, bounded by Seventh, Eleventh, Canal and Washington Streets, was added to the NRHP in 1975 based on its engineering significance and association with significant events. Improvements in this area would include construction of a second track, and the acquisition of an additional right-of-way at this crossing between Seventh and Ninth Streets (Exhibit 5.5-1). Direct impacts to the Gaylord Building are not anticipated.

Joliet Steel Works (Joliet)

The site of a former steel mill that was dismantled in the 1930s, the site is now owned and maintained by the Forest Preserve District of Will County. The site was added to the NRHP in 1991 based on its association with events that made a significant contribution to history. The site includes a 1.5 mile interpretive trail through the remains of the mill, as well as a picnic shelter and restroom. Improvements in this section would include the construction of a third track, including several areas where additional strips of right-of-way would be required (Exhibit 5.5-2).

5.5.1.2 *Section 2*

Hamilton Park (513 West 72nd Street, Chicago)

This 30-acre park in the Englewood neighborhood is located adjacent to the west side of Section 2, between 72nd and 74th Streets. The park, owned by the Chicago Park District, includes a swimming pool; baseball/softball diamonds; basketball, handball, and tennis courts; a playground; and a gymnasium. It was listed on the NRHP in 1995. Improvements in this area would include construction of an additional track and would require a strip of additional right-of-way approximately 20 feet wide, totaling approximately 0.6 acres (Exhibit 5.5-3).

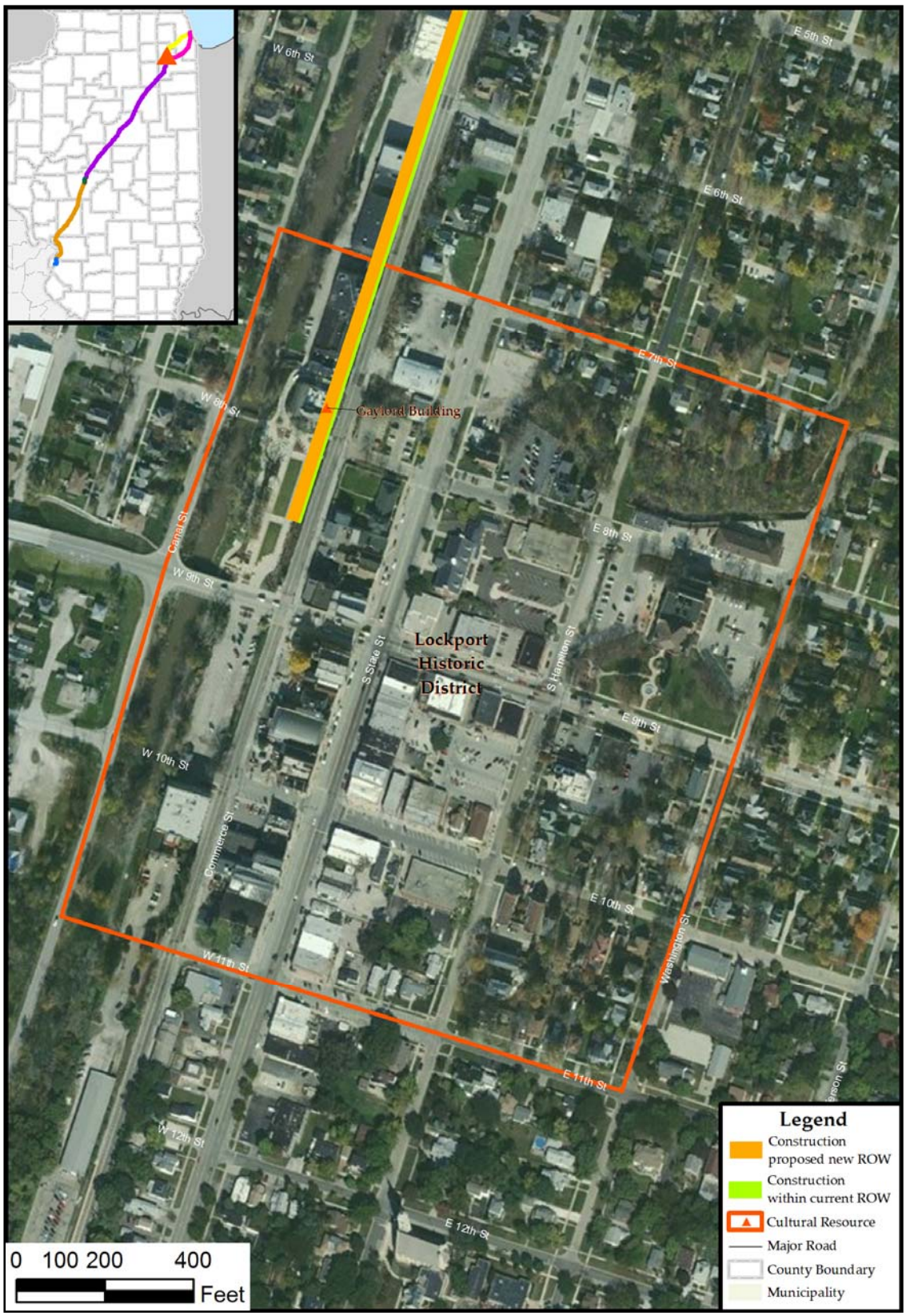


Exhibit 5.5-1. Potential Impacts to the Lockport Historic District

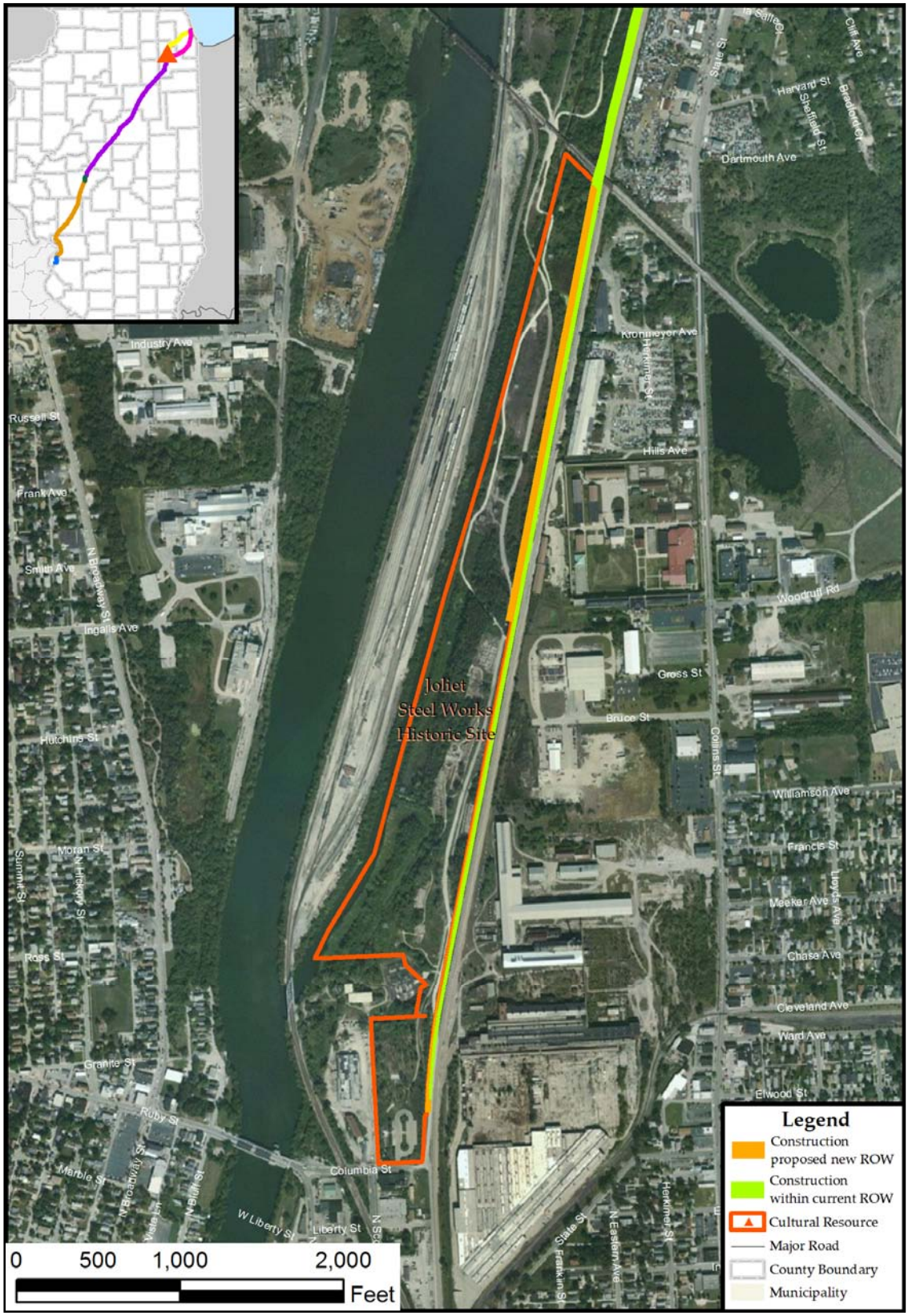


Exhibit 5.5-2. Potential Impacts to the Joliet Steel Works Historic Site

Exhibit 5.5-3. Potential Impacts to the Hamilton Park

Section 3

Dwight Chicago and Alton Railroad Depot (119 West Main Street, Dwight)

This depot was originally built in 1891 and was added to the NRHP in 1982 based on its Richardsonian Romanesque style and its association with significant events. Improvements in this area would include construction of a second track, including the potential acquisition of additional right-of-way from the property (Exhibit 5.5-4).

Bridge over Market Street FAU6359 carrying Southern Pacific (now Union Pacific) Railroad (Bloomington)

This bridge, owned by Union Pacific, which carries three tracks over Market Street in Bloomington, was constructed in 1889. It was evaluated by IDOT and placed on the Historic Bridge List, which meant that it was determined to be eligible for the NRHP based on its engineering/bridge type. Improvements in this area, which includes construction of a second mainline track, would occur within existing railroad right-of-way, but could include alterations to this existing structure (Exhibit 5.5-5).

Lincoln Courthouse Square Historic District

This district, roughly bounded by Sangamon, Pekin, Chicago, Delaware, Broadway, and Pulaski Streets, was added to the NRHP in 1985 based on its architectural significance and association with significant events. The proposed alignment passes through the district and the existing Amtrak station is a contributing resource for the district, as is the former Gulf, Mobile and Ohio (GMO) Railroad Freight Station. Improvements in this area would include construction of a second track, including additional right-of-way on both sides of the track (Exhibit 5.5-6).

5.5.1.3 *Section 4*

Susan Lawrence Dana House (301 Lawrence Avenue, Springfield)

The Dana-Thomas House, designed by Frank Lloyd Wright, was completed in 1904. The site was added to the NRHP in 1974 based on its architectural significance; it became a National Historic Landmark in 1976 and a State Historic Site in the 1980s. Improvements in this area would include the construction of a second track, including additional right-of-way from the local street (South 3rd Street) in front of the property (Exhibit 5.5-7). These improvements would result in the loss of access to the carriage house and backyard.

5.5.1.4 *Section 6*

Route 66, Girard to Nilwood

After being designated as part of Route 66 in 1926, this section was quickly replaced in 1930 with a new alignment to the east. This section crosses the proposed alignment in two locations. Just south of Girard, Route 66, now named Cambridge Road, crosses the railroad in a section where no improvements are proposed. The second crossing occurs in Nilwood, where Route 66, now Morean Street, crosses the railroad in the center of town. Improvements in this area would include construction of a second track, including the acquisition of additional right-of-way at this crossing (Exhibit 5.5-8).

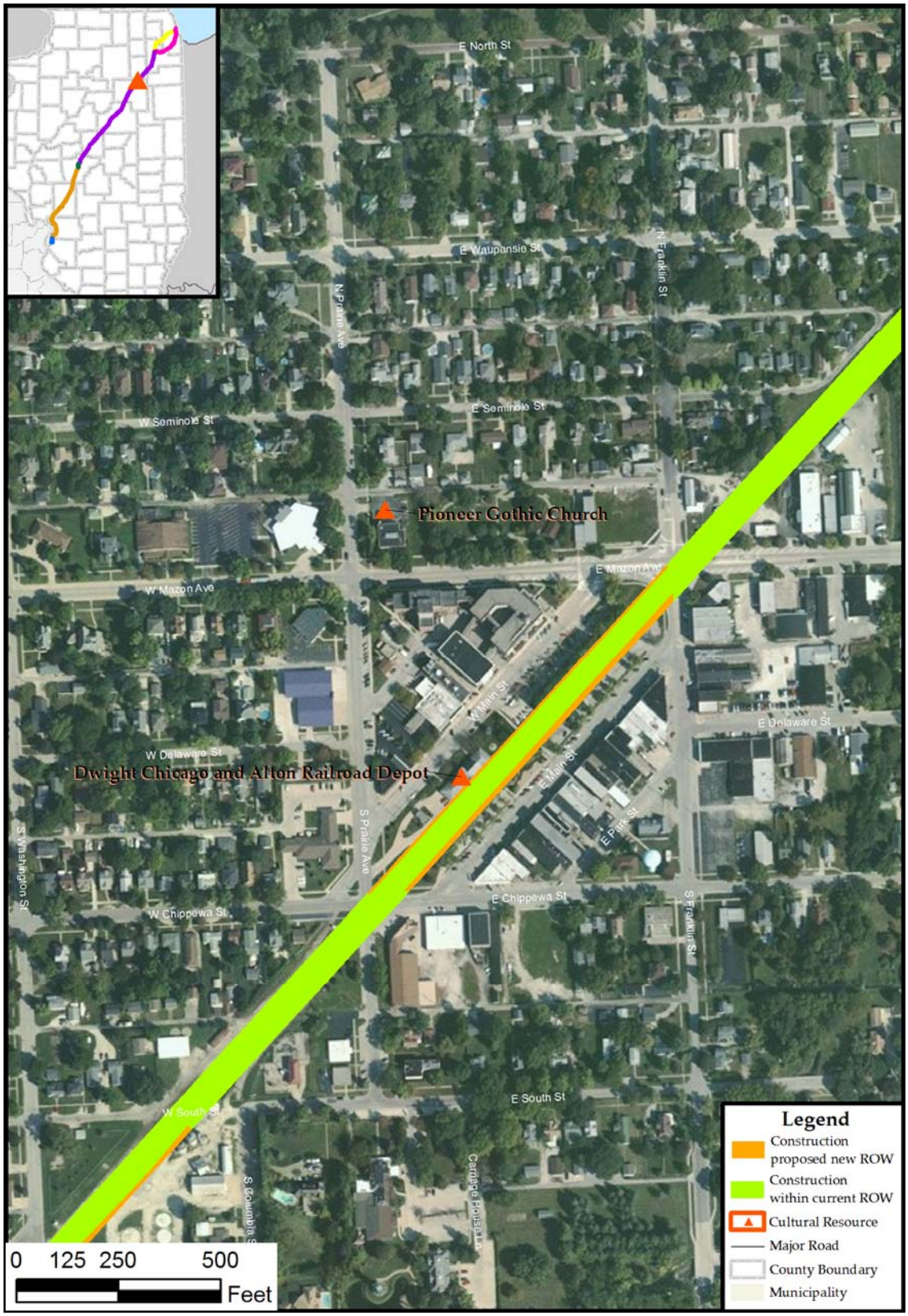


Exhibit 5.5-4. Potential Impacts to the Dwight Chicago and Alton Railroad Depot

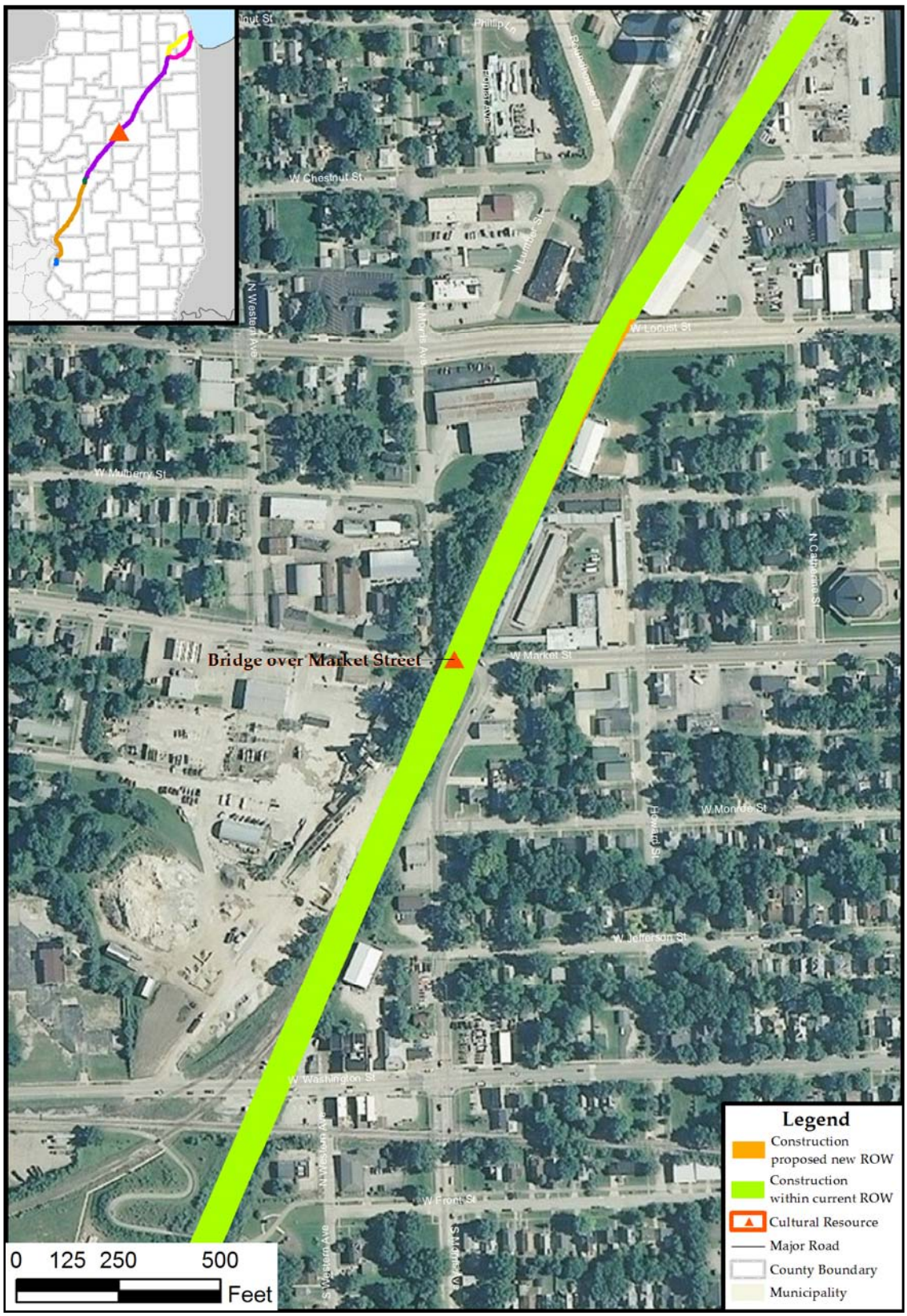


Exhibit 5.5-5. Potential Impacts to the Bridge Over Market Street

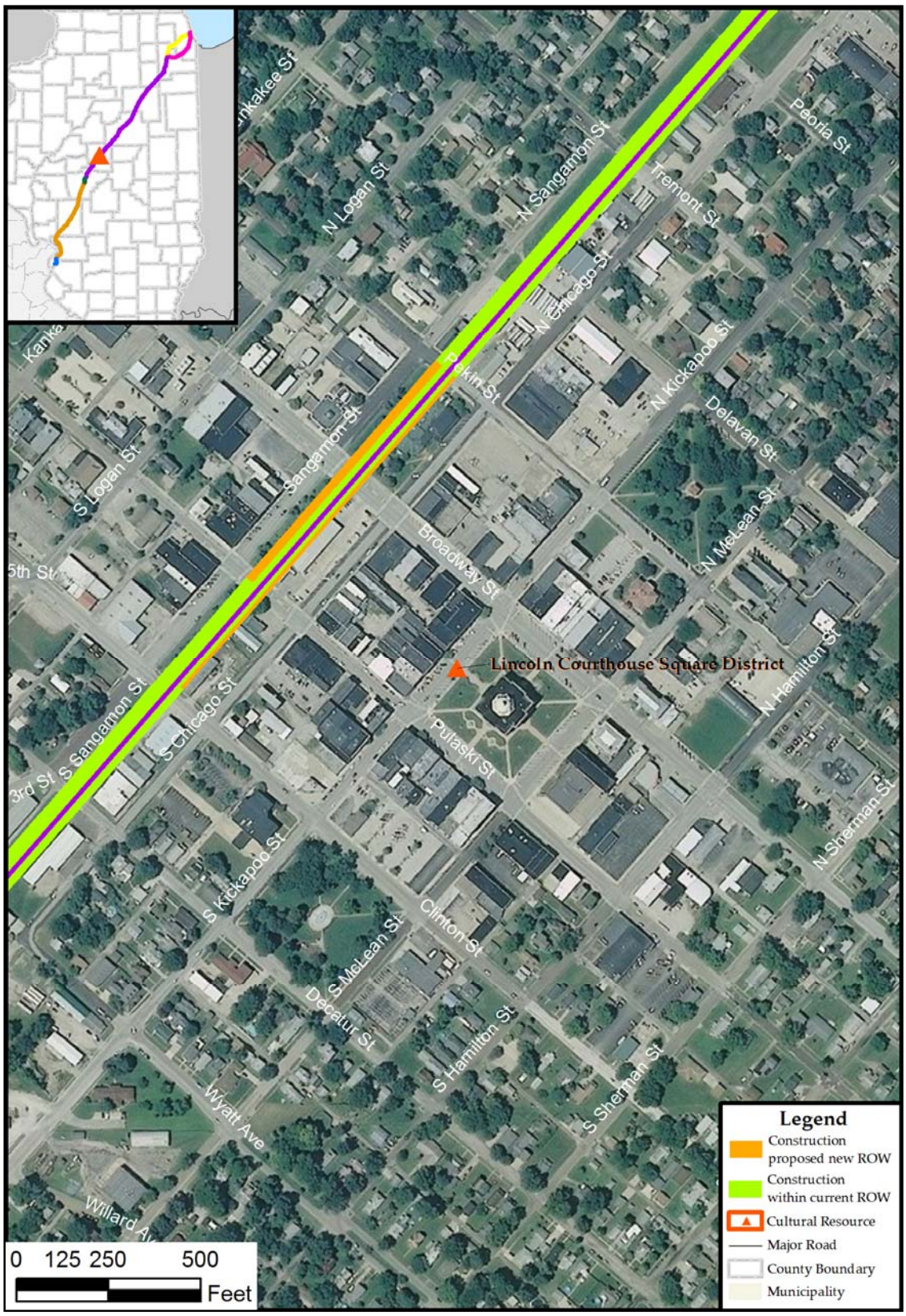


Exhibit 5.5-6. Potential Impacts to the Lincoln Courthouse Square District

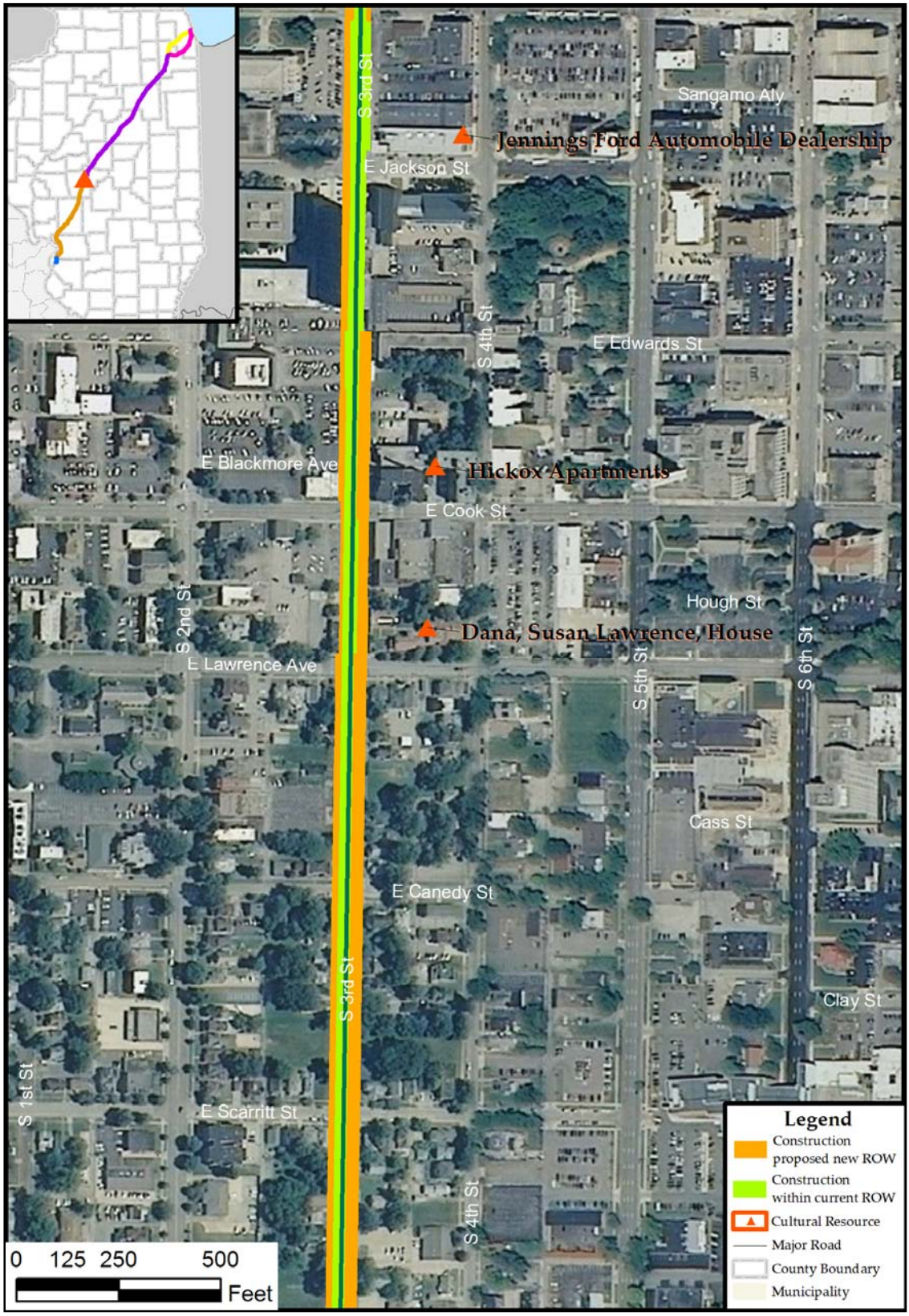


Exhibit 5.5-7. Potential Impacts to the Susan Lawrence Dana House

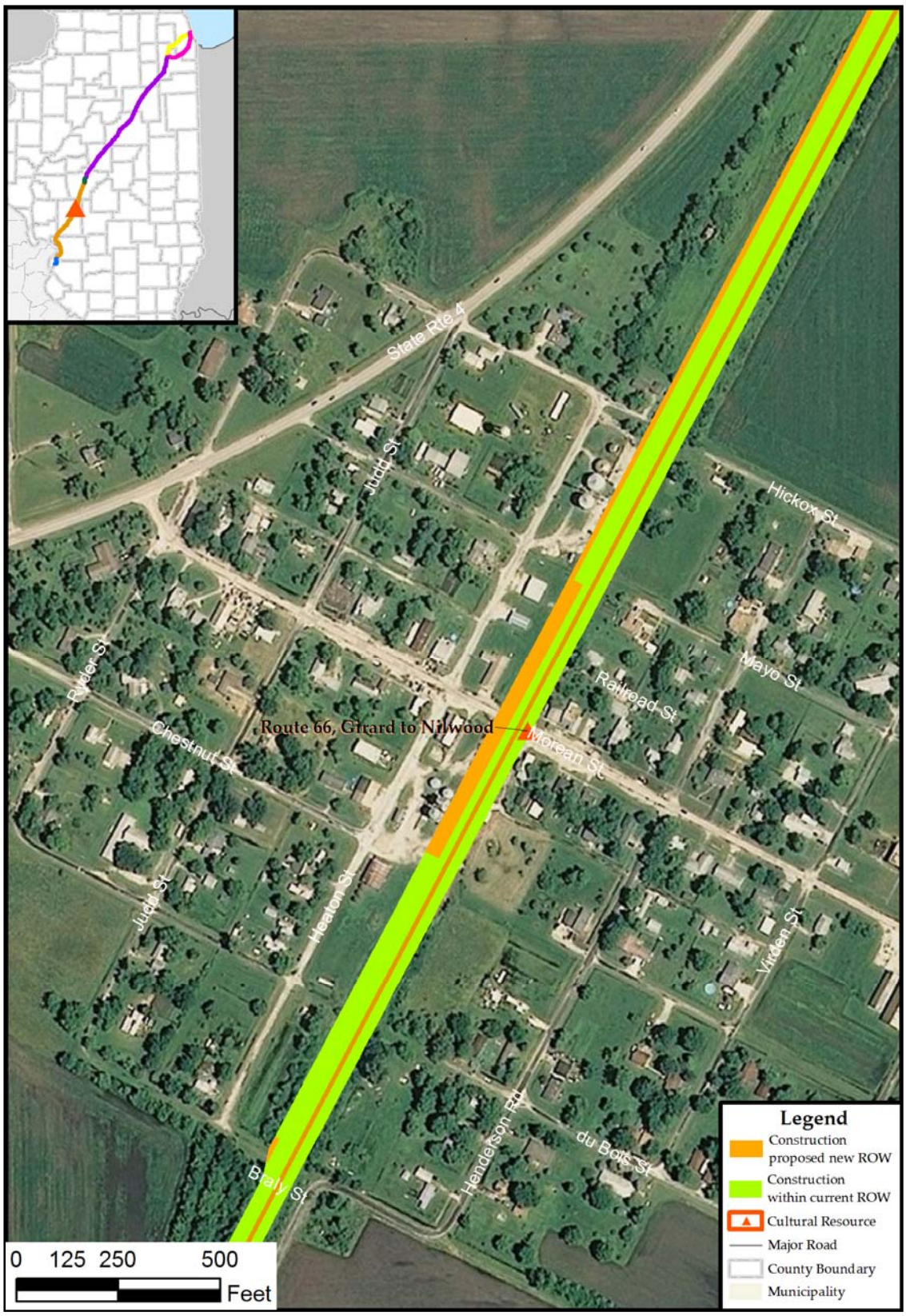


Exhibit 5.5-8. Potential Impacts to Route 66, Girard to Nilwood

5.5.2 Archaeological Resources

5.5.2.1 *No-Build Alternative*

No impacts.

5.5.2.2 *Build Alternatives*

The properties identified in Section 4.5.2 were reviewed for potential impacts. Potential impacts were considered where proposed improvements (construction activity) would physically impact the property on which the resource lies or would be immediately adjacent to the construction activity such that temporary impacts could result. Because the resources lay belowground, noise, vibration, and visual impacts were not considered.

One site, 11MP4, located adjacent to Section 6 in Macoupin County is adjacent to an area where construction activities would occur. Further evaluation will be required during Tier 2 studies to determine if the construction would have an adverse effect on the resource. As noted in Section 4.5.2, this evaluation was based only on previously-identified resources. Additional investigations will be required during Tier 2 studies to identify potential archaeological resources.

5.6 Natural Resources

5.6.1 No-Build Alternative

No impacts.

5.6.2 Build Alternatives

5.6.2.1 *Geology and Soils*

The program is not likely to have a negative impact on geology and soils, except for agricultural soils that would be acquired for new right-of-way (discussed in Section 5.4, Agriculture). Thick deposits of glacial till and loess are found throughout the study corridor, and in some places these deposits may contain unconsolidated materials. Appropriate construction techniques will be incorporated into the design to ensure stability in these areas. Soil erosion could occur during construction but will be minimized by the implementation of BMP's.

Because the southern end of the program, particularly Madison County, is in proximity to the New Madrid Seismic Zone, consideration should be given to design features that would prevent potential earthquake damage.

5.6.2.2 *Ecological Resources*

Wildlife Habitat

Impacts to forested areas, prairie, native vegetation, and water resources would result in loss of wildlife habitat. These cover types are discussed in detail below. The greatest impact to terrestrial wildlife would come from the removal and modification of habitat

within and surrounding the construction zone. Where removal of wildlife habitat is unavoidable, impacts would be minimized as much as possible.

Forests

Impacts to forests within the construction limits are listed by section and alternative in Tables 5.6-1 and 5.6-2. Forest locations were determined using land cover data sets for Illinois (http://www.isgs.uiuc.edu/nsdihome/webdocs/landcover/gap.html). Forest fragmentation and its detrimental effect on wildlife habitat is not a major concern for this program as it would follow existing right-of-way and no forest blocks would be bisected. As shown in Table 5.6-2, all alternatives would impact forests. Alternative A would impact 183 acres of forest, Alternative B would impact 181.3 acres, Alternative C would impact 200 acres, and Alternative D would impact 198.3 acres.

Table 5.6-1. Acreage of Impact to Natural Resources by Section

Section	Forest	Prairie Remnants	Protected Natural Areas	Designated Critical Habitat (Hines Emerald Dragonfly)
1	5.9	0.0	0.0	3.7
2	22.9	0.0	0.3*	0.0
3	71.7	216.8	16.3**	0.0
4	2.1	0.0	0.0	0.0
5	0.3	0.0	0.0	0.0
6	100.0	15.0	0.0	0.0
7	3.2	0.0	0.0	0.0

*Hickory Creek Barrens Nature Preserve

**Funks Grove Nature Preserve (0.9 acres), Thaddeus Stubblefield Grove Nature Preserve (7 acres), Hitts Siding Prairie Nature Preserve (0.6 acres), and Funks Grove Land and Water Reserve (7.8 acres)

Table 5.6-2. Acreage of Impact to Natural Resources by Alternative

Alternative	Forest	Prairie Remnants	Protected Natural Areas	Designated Critical Habitat (Hines Emerald Dragonfly)
A	183.0	231.8	16.3	3.7
B	181.3	231.8	16.3	3.7
C	200.0	231.8	16.6	0.0
D	198.3	231.8	16.6	0.0
No-Build	0.0	0.0	0.0	0.0

Prairie

The majority of all the program alternatives would pass through agricultural land. The Illinois Department of Transportation maintains a list of prairie remnants that occur along roadways and railways (http://www.dot.state.il.us/desenv/environment/roadsideprairie.html). As shown in Table 5.6-2, all alternatives would impact 231.8 acres of documented prairie remnants.

5.6.2.3 *Threatened and Endangered Species*

Designated Critical Habitat within the proposed alternatives: Hine's emerald dragonfly (E) – Alternatives A and B in Section 1 would impact approximately 3.7 acres of USFWS designated Critical Habitat for the federally endangered Hine's emerald dragonfly (Tables 5.6-1 and 5.6-2). Analysis of the impacts to this habitat will be addressed in more detail in the Tier 2 environmental documentation. The location of the Critical Habitat is shown in Exhibit 4.6-11 while the general description of habitat for the Hine's emerald dragonfly is presented in Appendix C. Alternatives C and D would not impact this Critical Habitat.

In addition to the potential direct loss of Critical Habitat for the Hine's emerald dragonfly, the only other notable impact to the species could be the potential increase in train-dragonfly collisions due to the increase in the number of round trips through the Section 1 corridor associated with Alternatives A and B. It is anticipated, however, that this potential increase would have a minimal overall impact on the species.

Based on the IDNR EcoCAT database and coordination with USFWS and IDNR, there are no other Critical Habitats or known habitats or populations of other federally listed species located within the study corridor that could be impacted by any of the program alternatives. However, this Tier 1 level of documentation did not include detailed fieldwork to identify potential habitats and/or populations of threatened and endangered species. Therefore, conclusions about impacts to listed species or their habitat cannot be made at this time. Further coordination with USFWS and IDNR will continue during the Tier 2 stage.

Species listed as threatened or endangered by the state, which have recorded occurrences within the existing or proposed right-of-way based on the Natural Heritage Data Base are included in Table 5.6-3. General descriptions of habitat for these species are presented in Appendix C. The location of these species records is shown on Exhibits 5.6-1 through 5.6-3. There are no known occurrences of federally threatened or endangered species within the existing or proposed right-of-way other than the designated Critical Habitat for the Hine's emerald dragonfly. Most of the records for state listed species within the right-of-way occur in Sections 3 and 6. Since these sections are included in all alternatives, there is little difference in the species records for each alternative. All species listed in Table 5.6-3 are present in the right-of-way of Alternatives A and B, with the exception of Mead's milkweed, which is only known for Section 2. All species listed in Table 5.6-3are present in the right-of-way of Alternatives C and D, with the exception of the leafy prairie clover, which is only known for Section 1.

Table 5.6-3. State Threatened and Endangered Species Recorded within the Existing and Proposed ROW

Common Name	Scientific Name	State Status	Number of Records	Section
Mammal				
Franklin's Ground Squirrel	Spermophilus franklinii	Threatened	8	3 and 6
Birds				
Loggerhead Shrike	Lanius ludovicianus	Endangered	1	3
Upland Sandpiper	Bartramia longicauda	Endangered	5	3
Reptile				
Blanding's Turtle	Emydoidea blandingii	Endangered	10	3
Fish				
River Redhorse	Moxostoma carinatum	Threatened	2	3
Invertebrates				
Eryngium Stem Borrer	Papaipema eryngii	Endangered	8	3
Salamander Mussel	Simpsonaias ambigua	Endangered	2	3
Spike	Elliptio dilatata	Threatened	2	3
Plants				
Blazing Star	Liatris scariosa var. nieuwlandii	Threatened	9	2 and 6
Bunchflower	Melanthium virginicum	Threatened	4	6

Table 5.6-3. State Threatened and Endangered Species Recorded within the Existing and Proposed ROW (continued)

Common Name	Scientific Name	State Status	Number of Records	Section
Ear-leaved Foxglove	Tomanthera auriculata	Threatened	12	3 and 6
Large Ground Plum	Astragulus crassicarpus var. trichoclyx	Endangered	2	6
Leafy Prairie Clover	Dalea foliosa	Endangered	1	1
Mead's Milkweed	Asclepias meadii	Endangered	2	2
Oklahoma Grass Pink Orchid	Calpogon oklahomensis	Endangered	7	3

5.6.2.4 *Natural Areas*

The Illinois Nature Preserves Commission maintains a list of the protected areas of Illinois. Five natural areas are located within the construction limits of the program alternatives: Hickory Creek Barrens Nature Preserve (0.3 acres), Funks Grove Nature Preserve (0.9 acres), Thaddeus Stubblefield Grove Nature Preserve (7 acres), Hitts Siding Prairie Nature Preserve (0.6 acres), and Funks Grove Land and Water Reserve (7.9 acres). Impacts to protected natural areas are identified by section and alternative in Tables 5.6-1 and 5.6-2. As shown in Table 5.6-2, Alternative A and B are the alternatives with the least impact to protected natural areas (16.3 acres); Alternatives C and D would impact 16.6 acres.

5.7 Air Quality

5.7.1 No-Build Alternative

The No-Build Alternative would not cause any air quality impacts. When evaluating pollutant emissions in this section, the No-Build Alternative is used a baseline to compare the impacts of the Build Alternatives.

5.7.2 Build Alternatives

The Build Alternatives would result in an increase in rail operations between Chicago, Illinois and St. Louis, Missouri. While diesel train emissions would be offset by decreases in regional roadway vehicle miles traveled (VMT) and vehicular congestion, the elements that could adversely affect air quality levels along the study corridor include increases in diesel locomotive emissions from the additional diesel train service,

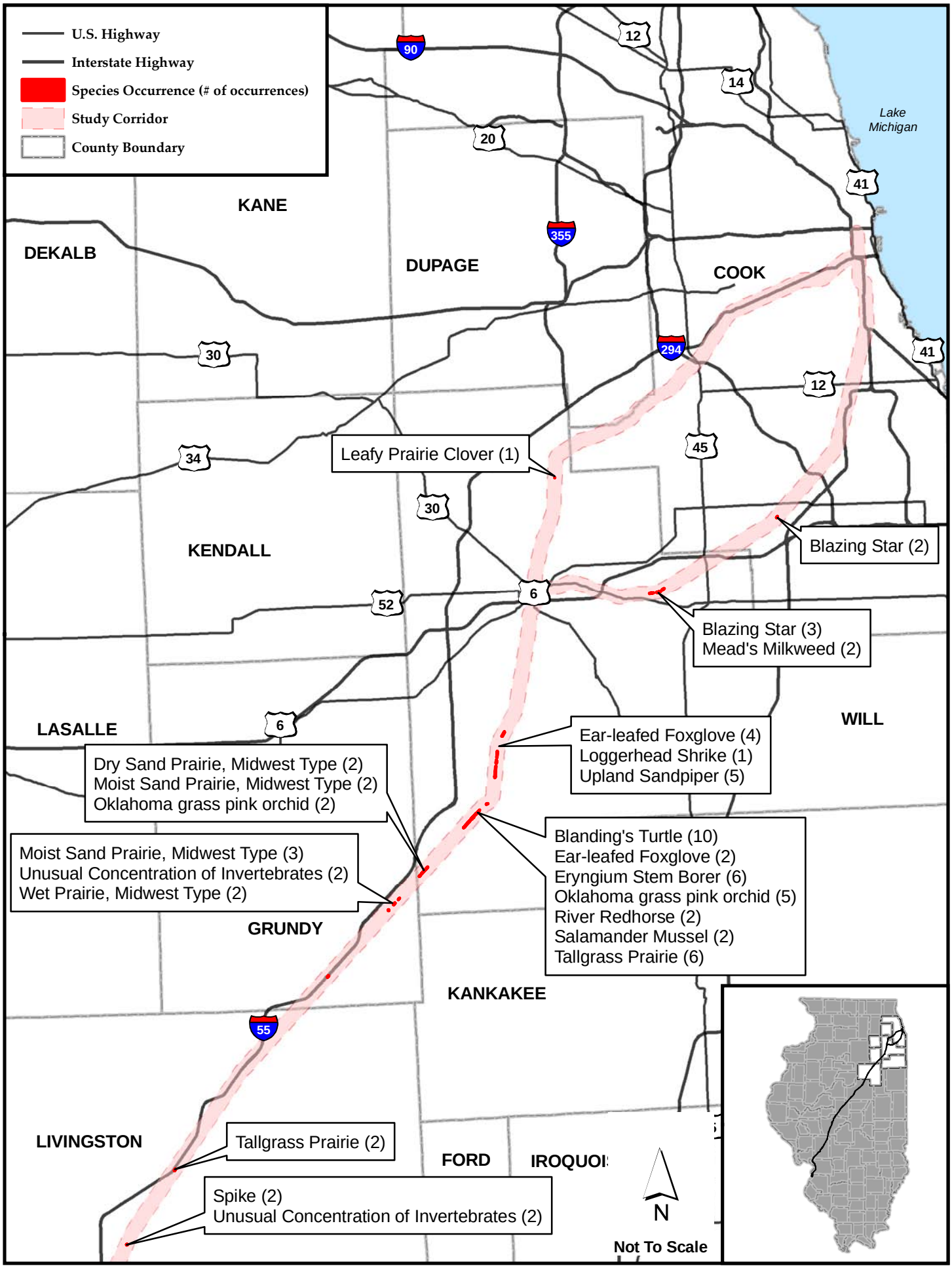


Exhibit 5.6-1. State Threatened and Endangered Species Records and Prarie Remnant Locations (1 of 3)

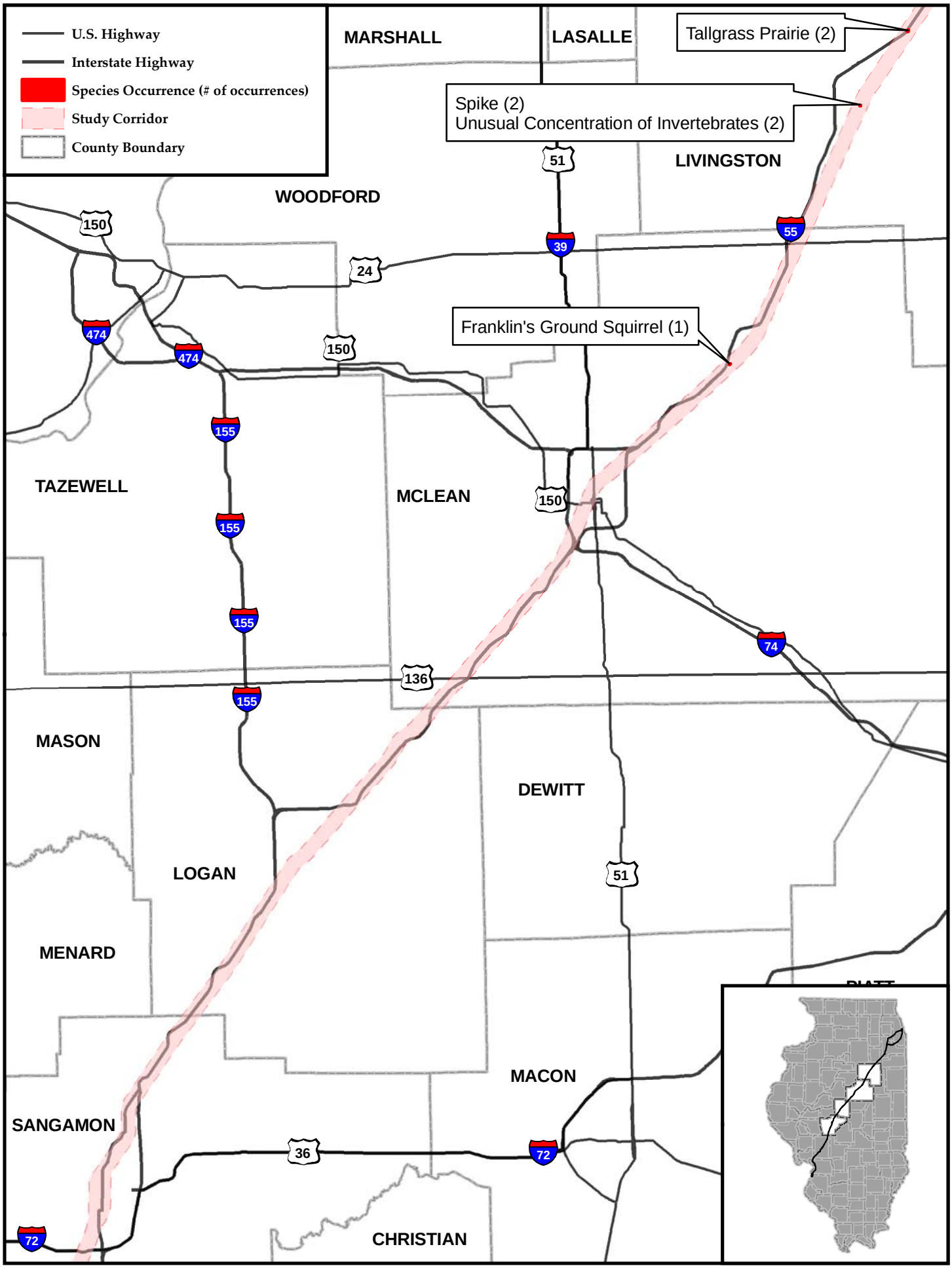


Exhibit 5.6-2. State Threatened and Endangered Species Records and Prarie Remnant Locations (2 of 3)

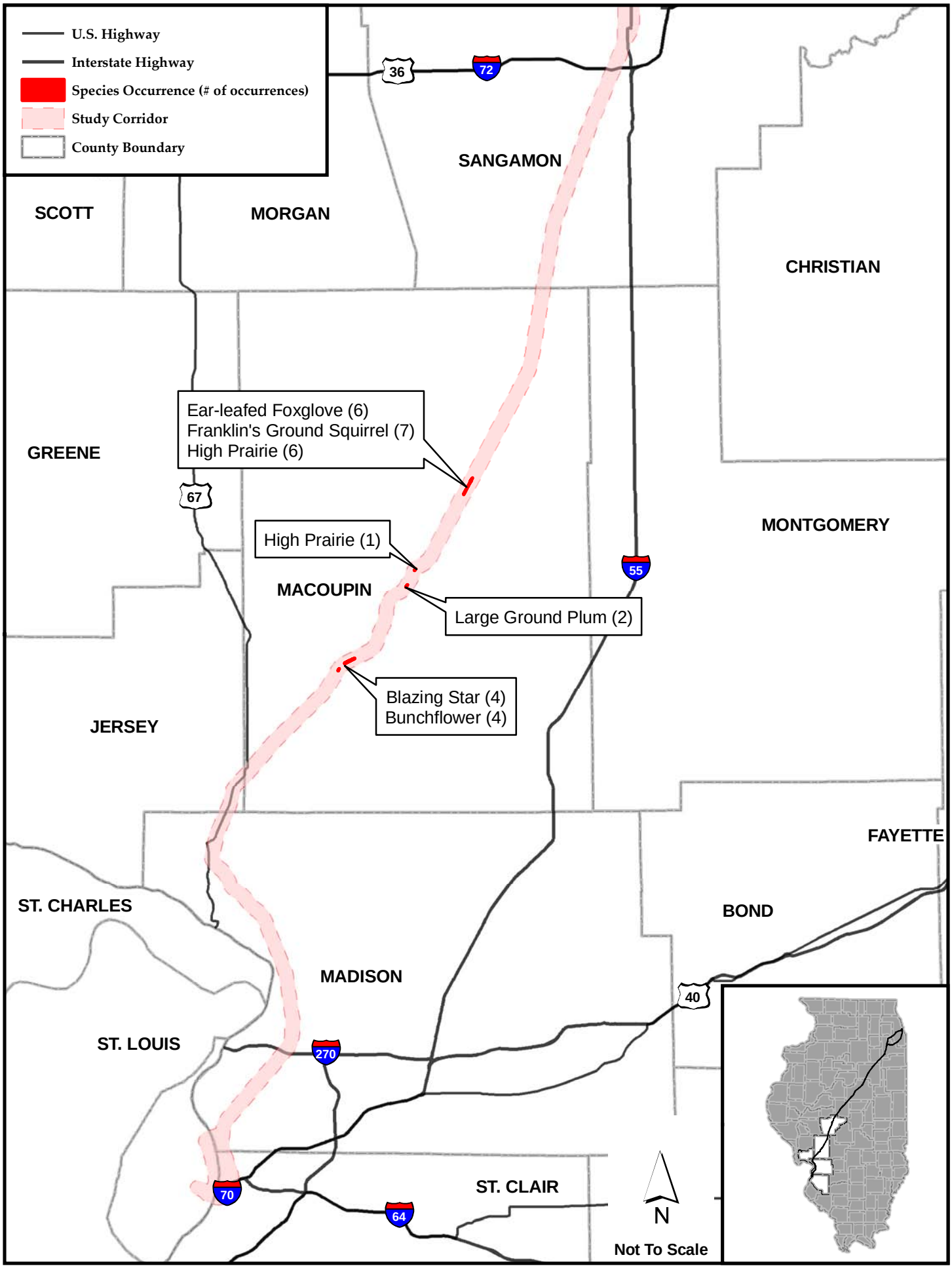


Exhibit 5.6-3. State Threatened and Endangered Species Records and Prarie Remnant Locations (3 of 3)

idling and moving trains near stations, and train operations and associated service at maintenance and/or storage facilities.

However, the Build Alternatives are unlikely to cause or exacerbate a violation of applicable NAAQS, or measurably increase air toxics or MSAT levels. It is also unlikely that the construction of a Build Alternative, which would follow state and local regulations regarding construction activities and equipment, would cause a violation of the applicable standards. As a result, the program is not anticipated to result in significant adverse impacts to public health related to air pollutants and air toxics or contributions to greenhouse gas (GHG) emissions.

5.7.2.1 *Nonattainment Air Quality Impacts*

The Build Alternatives would impact the counties of Cook, Will, and Grundy in the northeastern Illinois nonattainment area, and the counties of Jersey, Madison, St. Clair, and St. Louis in the St. Louis nonattainment area. While the Build Alternatives would increase diesel locomotive emissions, these increases would be offset by decreases in regional mobile source auto VMT and modest increases in average driving speeds.

Emissions of criteria air pollutants from diesel locomotives were estimated based upon fuel consumption data from the Air Quality Technical Report for the 2000 Chicago - St. Louis High-Speed Rail Project EIS (Parsons, 2000) and fuel-consumption-based emission rates published by the EPA (EPA, 2009). Among the multiple locomotive types considered in that report, the type assumed to consume fuel at the greatest rate was selected. This assured a conservative analysis pending the development of more detailed and up-to-date assumptions in future environmental studies.

Table 5.7-1 shows that program-generated net increases in predicted annual pollutant emissions, from high-speed rail passenger service, in nonattainment areas are all below general conformity de minimis threshold values. Pursuant to the General Conformity Rule, EPA considers program-generated emissions below these de minimis values to be minimal. Such programs do not require formal conformity determinations.

5.7.2.2 *Potential Local Air Quality Impacts*

Along the Rail Right-of Way

The Build Alternatives would increase the emissions of diesel exhaust and associated directly-emitted air pollutants along the rail line. However, the spatial and temporal density of these emissions would not be nearly sufficient to cause or substantially contribute to localized violations of applicable NAAQS.

For example, the technical documentation for the Carbon Monoxide Screen for Signalized Intersections (COSIM) Version 3.0 establishes pre-screen criteria for determining whether or not a COSIM analysis is warranted for a roadway intersection. For the Chicago area, the pre-screen threshold associated with the worst-case (closest) receptor distance is an average daily traffic (ADT) volume of 16,000 for one leg of the intersection. Associated CO emission factors (grams per mile per vehicle) range from

Table 5.7-1. Estimated Annual Operational Emissions of Key Criteria Air Pollutants in Nonattainment Areas[1]

Pollutant	Context	Operational Emissions[2] (tons/yr)		
		Chicago Nonattainment Area (ozone, $PM_{2.5}$)	St. Louis Nonattainment Area (ozone, $PM_{2.5}$)	Granite City Nonattainment Area (Pb)
VOC	Build	3.5	2.6	N/A
	No-Build	1.1	0.5	N/A
	Program Net	***2.4***	***2.1***	***N/A***
	De Minimis Threshold	***100***	***100***	***N/A***
	Threshold Exceeded?	***No***	***No***	***N/A***
NO_x	Build	104.7	77.8	N/A
	No-Build	31.9	15.1	N/A
	Program Net	***72.8***	***62.7***	***N/A***
	De Minimis Threshold	***100***	***100***	***N/A***
	Threshold Exceeded?	***No***	***No***	***N/A***
$PM_{2.5}$	Build	2.4	1.8	N/A
	No-Build	0.7	0.3	N/A
	Program Net	***1.7***	***1.5***	***N/A***
	De Minimis Threshold	***100***	***100***	***N/A***
	Threshold Exceeded?	***No***	***No***	***N/A***
Pb	Build	N/A	N/A	0.00003
	No-Build	N/A	N/A	0.00001
	Program Net	***N/A***	***N/A***	***0.00002***
	De Minimis Threshold	***N/A***	***N/A***	***25***
	Threshold Exceeded?	***N/A***	***N/A***	***No***

[1] Diesel fuel consumption rates from "Chicago to St. Louis High Speed Rail Project, Air Quality Technical Report, Appendix A", prepared by DeLeuw, Cather for Illinois Department of Transportation, October 1998.

[2] Emission rates are from USEPA estimates for 2035 (USEPA, 2009).

[3] General Conformity De Minimis Threshold values from 40 CFR §93.153.

10.2 to 22.1. By comparison, consider high-speed passenger train service along the study corridor. Assume eight daily round-trips and a reasonable worst-case (low) travel speed of 40 mph due to a localized speed constraint. For 4,000-horsepower locomotives emitting CO at the maximum rate permitted under federal regulation, total CO emissions per mile per day along this portion of the corridor would be equivalent to approximately 46 to 100 daily motor vehicles, well below the 16,000 ADT trigger for COSIM analysis at roadway intersections. This means program-generated increases in wayside train activity would not be expected to be sufficiently large to cause or substantially contribute to a localized violation of the CO NAAQS. Similar reasoning would apply to $PM_{2.5}$ – another criteria air pollutant that can be associated with localized impacts – as well as air toxics.

At Train Stations

The Build Alternatives are anticipated to increase vehicular (automobile) traffic near the proposed station locations. However, while the proposed program would substantially enhance passenger train travel speeds over an extended route, the frequency of service would be relatively modest. This would tend to reduce the temporal concentration of motor vehicles associated with trips to and from train stations along the corridor. Consider the COSIM pre-screen threshold introduced in the previous paragraph. Among the stations that would be served by high-speed rail along the study corridor, Chicago's Union Station would likely be the one with the highest proportion of rail passenger trip origins and destinations. It is reasonable to expect an increase of no more than approximately 600 daily automobile trips to and from Union Station as a result of the program. This prediction is based upon annual passenger mile data provided in Section 5.3 of this document, published data on station passenger access modes, and reasonably conservative assumptions about relationships between the rate of passenger access to the station and passenger miles associated with the proposed program. Six hundred daily automobile trips along a single section of roadway adjacent to Union Station would represent less than 4 percent of COSIM's 16,000-ADT pre-screening threshold. Therefore, the program would not be expected to generate additional automobile traffic related to station patronage sufficient to cause or substantially contribute to a violation of the CO NAAQS. Similar reasoning would apply to $PM_{2.5}$ – another criteria air pollutant that can be associated with localized impacts – as well as air toxics.

At-Grade Crossings

The Build Alternatives may increase vehicular delays at some at-grade crossings. However, given the relatively short length and rapid passages of high-speed passenger trains and modest predicted increases in the rates of train service, it is unlikely that these delays would result in any substantial impact on air quality levels. Delays could include closures of crossing gates as much as 90 seconds before each high-speed train crosses the affected at-grade intersection. Allowing for complete passage of the train and brief periods to complete the lowering and raising of gates, delays of approximately 110 seconds per train passage would be typical for an on-road vehicle approaching the at-grade crossing just as the gates are lowered. Delays would be shorter for vehicles

approaching after initial closure of the crossing. By comparison, average vehicle delays of up to 30 to 75 seconds per cycle are typical for multi-phase stoplight-controlled intersections. Assuming eight high-speed passenger train round trips per day, high-speed passenger train passages would be responsible for crossing closures lasting about two percent of each 24-hour day. The percentage would be slightly higher if only daytime and evening hours were considered.

Maintenance/Storage Yards

The additional trains associated with the Build Alternatives would increase maintenance and storage requirements and possibly train operations at these yards. However, it is unlikely that the small increase in these operations would adversely impact nearby sensitive land uses.

It is also unlikely, given the small projected increase in emissions from the increase in rail service and the offset of these emissions by decreases in vehicular emissions, that the program would substantially increase regional emissions of ozone precursors, air toxics, or GHG.

5.7.2.3 *Construction Impacts*

In general, construction-related effects of the Build Alternatives would be limited to short-term increased fugitive dust and mobile-source emissions during construction. State and local regulations regarding dust control and other air quality emission reduction controls would be followed.

5.7.2.4 *Greenhouse Gas Emission Impacts*

Greenhouse gas (GHG) emissions would also be generated during the construction phase of the program. However, these emissions are likely to be relatively minor given the nature and size of the program, and the limited duration of the construction activities.

CO_2 is the primary GHG of concern with respect to fossil fuel combustion in general and transportation emission sources in particular. Table 5.7-2 summarizes predicted emissions for four alternative modes of transportation utilized by travelers within the study corridor. These emission values were derived from mass emission rates per passenger mile (CCP/CNT, 2006) published by the Center for Clean Air Policy and Center for Neighborhood Technology and estimated/predicted annual passenger-miles of travel from Tables 5.3-1 of this Tier 1 DEIS.

This table demonstrates that increases in CO_2 emissions associated with increased rail service are expected to be more than offset by reductions in CO_2 emissions due to reduced use of other transportation modes.

Table 5.7-2. Predicted CO_2 Emissions for Key Alternative Transportation Modes within the Study Corridor

Mode	Emissions (metric tons/yr)		
	Build	No-Build	Difference
Rail	34,060	19,320	14,730
Automobile	1,863,830	1,892,330	-28,500
Bus	1,980	2,220	-240
Air	60,260	66,400	-6,140
Totals	**1,960,130**	**1,980,270**	**-20,150**

5.8 Noise and Vibration

The noise and vibration analysis was undertaken to identify and evaluate the potential noise and vibration impacts. Impacts were assessed in accordance with the guidelines set forth in the FRA *High Speed Ground Transportation Noise and Vibration Impact Assessment* manual (USDOT, 2005). The evaluation methods in the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment* manual (USDOT, 2006) and the *CREATE Noise Model* (USDOT, 2006) were also used for estimating noise and vibration levels attributable to freight trains since the FRA manual does not address this issue. The goals of this noise and vibration analysis were to identify the potential for impacts and to determine their order of magnitude.

5.8.1 Operation Noise Impact Criteria

The criteria in *High Speed Ground Transportation Noise and Vibration Impacts Assessment* (USDOT, 2005) were used to assess baseline (No-Build Alternative) ambient noise levels and future noise impacts from train operations. They are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. As the existing level of ambient noise increases, the allowable level of project noise increases, but the total allowable increase in community noise exposure is reduced. This reduction accounts for an unexpected result -- noise exposure levels that are less than the existing noise exposure can still cause impact. The FRA noise impact criteria are applicable to three categories of land use and are summarized in Table 5.8-1.

Table 5.8-1. Land Use Categories and Metrics for High Speed Rail Noise Impact Criteria

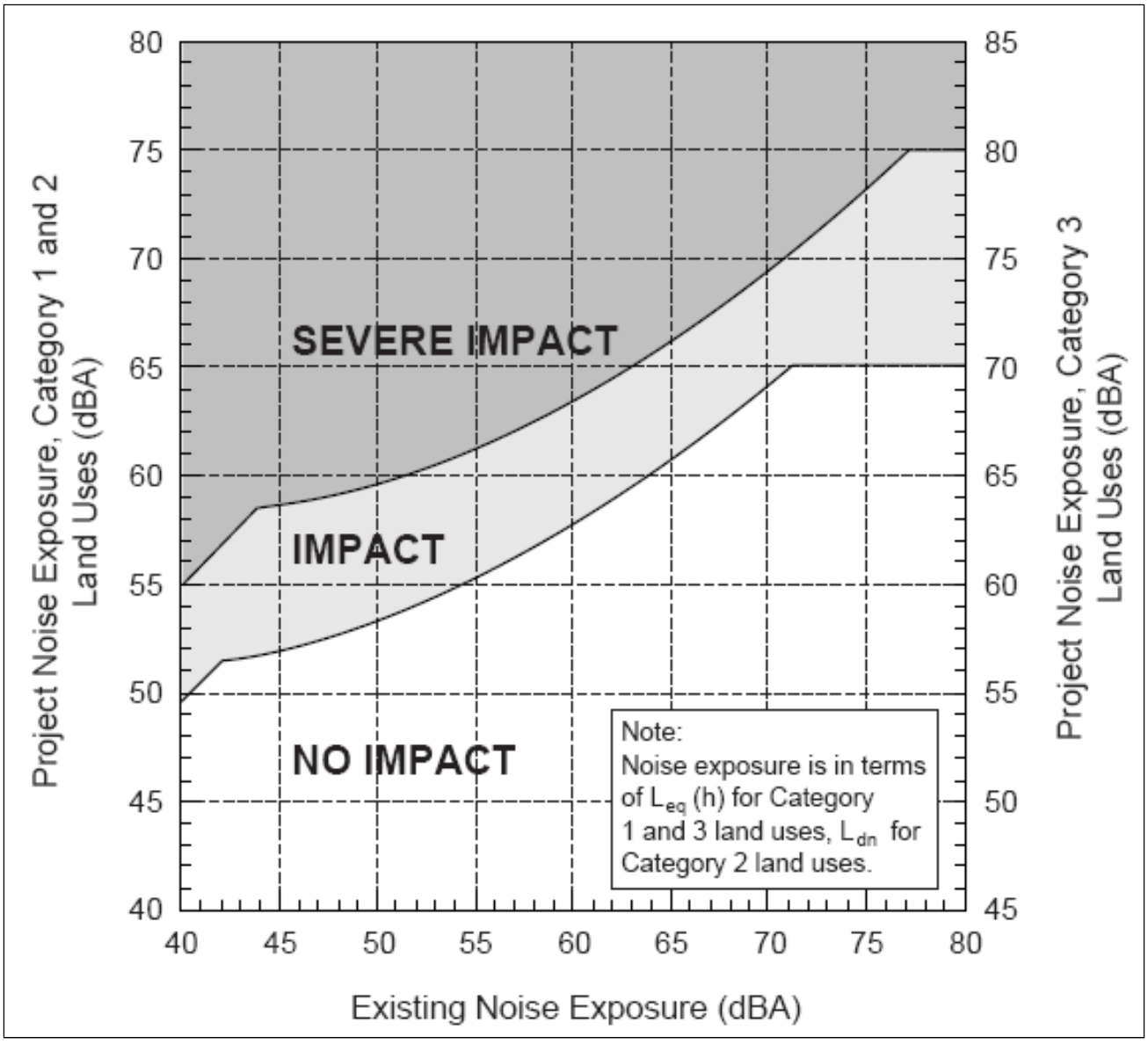
Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq}(h)$[1]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$[1]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

Source: USDOT, 2005

[1] L_{eq} for the noisiest hour of rail-related activity during hours of noise sensitivity (i.e., when these facilities are in use).

L_{dn} is used to characterize noise exposure for residential areas and hotels (Category 2). The maximum 1-hour L_{eq} during the period that the facility is in use is used for other noise sensitive land uses such as National Historic Landmarks with significant outdoor use (Category 1) or schools (Category 3). There are two levels of impact included in the FRA criteria, as shown in Exhibit 5.8-1. The interpretation of these two levels of impact is summarized below:

- **Severe**: Severe noise impacts are considered "significant" as this term is used in the National Environmental Policy Act (NEPA) and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical method of mitigating the noise.



Source: USDOT, 2005

Exhibit 5.8-1. Noise Impact Criteria for High Speed Rail Projects

- **Moderate**: In this range, other program-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost-effectiveness of mitigating noise to more acceptable levels.

Although the curves in Exhibit 5.8-1 are defined in terms of the program noise exposure and the existing noise exposure, it is important to emphasize that the increase in the cumulative noise – when the program noise is added to baseline noise – is the basis for the criteria. Exhibit 5.8-2 shows the noise impact criteria for Category 1 and 2 land uses in terms of cumulative noise exposure increase.

Exhibit 5.8-2 shows that the criterion for impact allows a noise exposure increase of 10 dBA if the baseline noise exposure is 42 dBA or less but only a 1 dBA increase when the baseline noise exposure is 70 dBA. As the existing level of ambient noise increases, the allowable level of program noise increases, but the total allowable increase in community noise exposure is reduced. As a result, program noise exposure levels that are less than the existing noise exposure can still cause an impact.

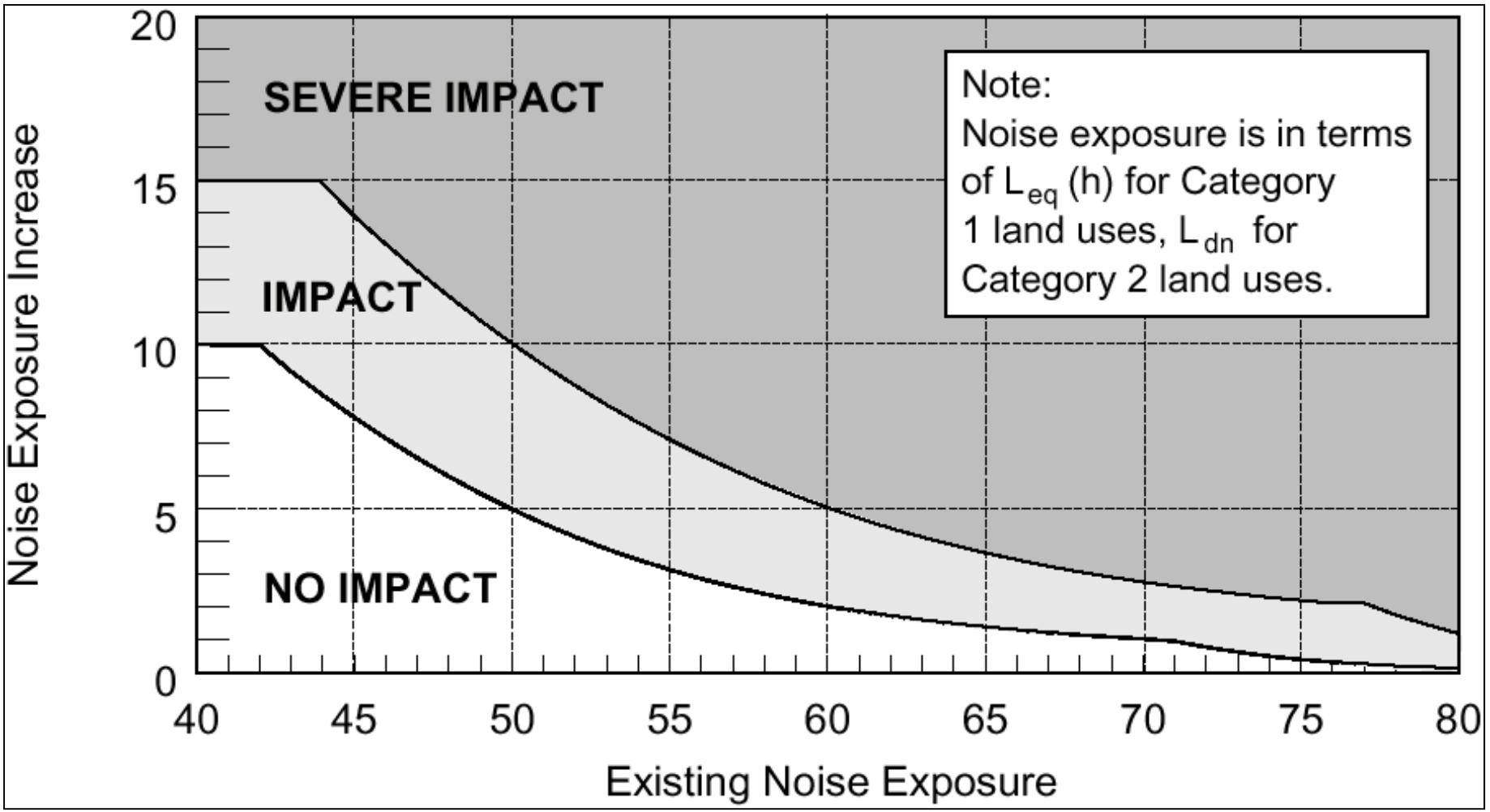
5.8.2 Operation Vibration Impact Criteria

The criteria in *High Speed Ground Transportation Noise and Vibration Impact Assessment* (USDOT, 2005) were used to evaluate vibration impacts from train operations. The evaluation of vibration impacts can be divided into two categories: (1) human annoyance, and (2) building damage.

5.8.2.1 *Human Annoyance Criteria*

Table 5.8-2 presents the criteria for various land use categories as well as the frequency of events. The criteria are related to ground-borne vibration causing human annoyance or interfering with the use of vibration sensitive equipment. The criteria for acceptable ground-borne vibration are expressed in terms of RMS velocity levels in VdB and are based on the maximum levels for a single event (L_{max}). Unlike the noise impact criteria, vibration impacts are not subcategorized as moderate and severe.

All of the sensitive receptors within the study corridor, (i.e., residences, churches, historical buildings, and cemeteries) fall under Land Use Category 2 or 3. Train activity varies throughout the corridor. The FRA criteria for "Infrequent Events" were used through most of the corridor where the number of daily trains is projected to be below 70. Through Springfield, along Section 5 (10th Street Corridor), more than 70 trains per day are projected. Therefore, the criteria for "Frequent Events" were used for Section 5 (see Table 5.8-2).



Source: USDOT, 2005

Exhibit 5.8-2. Increase in Cumulative Noise Levels Allowed by Criteria

Table 5.8-2. Ground-Borne Vibration Impact Criteria for Human Annoyance

Land Use Category	Ground-Borne Vibration Impact Levels (dB re 1 micro-inch/sec)	
	Frequent[1] Events	Infrequent[2] Events
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[3]	65 VdB[3]
Category 2: Residences and buildings where people normally sleep.	72 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	83 VdB

Source: USDOT, 2005.

[1] Frequent Events" is defined as more than 70 vibration events per day.

[2] Infrequent Events" is defined as fewer than 70 vibration events per day.

[3] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

5.8.2.2 *Building Damage Criteria*

Normally, vibration resulting from a train passby would not cause building damage. However, damage to fragile historic buildings located near the right-of-way can be a concern.

Vibrations generated by surface transportation are mainly in the form of surface or Raleigh waves. Studies have shown that the vertical component of transportation-generated vibrations is the strongest, and that peak particle velocity (PPV) correlates best with building damage and complaints.

The FRA provides a vibration damage threshold criterion of 13 mm/s (0.50 in/sec, approximately 102 VdB) PPV for fragile buildings and 3 mm/s (0.12 in/sec, approximately 90 VdB) PPV for extremely fragile historic buildings, for typical construction equipment operation (USDOT, 2005). The FRA recommends these criteria be used as a damage threshold for the fragile structures located near the right-of-way of a high speed rail project. High speed rail trains would generate a vibration level of 90 Vdb within 10 feet of the centerline of the track. Therefore, vibration impacts to fragile buildings from high speed rail passenger trains are not anticipated.

5.8.3 Noise Impacts during Operation

Train noise impacts were evaluated based on projected noise level increases relative to baseline (No-Build Alternative) conditions at noise-sensitive receptors. Depending upon the land use, this increase was measured in terms of either one-hour equivalent sound level ($L_{eq}(h)$) or the day-night sound level L_{dn}. The analysis accounts for train horn noise.

Distance-to-impact contours were developed for the different land use categories and existing noise levels. These distances were then used to identify and tabulate the number of sensitive receptors that would be impacted as a result of the HSR Program. A summary of projected noise impacts is provided in Table 5.8-3. The results in Table 5.8-3 represent a fairly conservative estimate in terms of the number of projected impacts. This is mainly due to the fact that maximum operating speed (i.e., 110 mph for intercity passenger rail service) was assumed throughout the corridor. In future studies, when more detailed analysis will be conducted, operating speeds through certain impacted areas will be evaluated further prior to making a final determination on mitigation. The sections with the highest number of projected impacts are sections 2 and 5. These are the two sections within the study corridor that are located within more urbanized areas and where intercity passenger rail service does not currently exist. Additionally, additional freight trains would be shifted to Section 5 as part of Alternatives B and D. Overall for the corridor-wide alternatives, projected noise impacts range from 218 to 809. Of the 540 impacts identified in Section 5, 149 are severe impacts, and 391 are moderate impacts.

Table 5.8-3 Noise Impacts[1,2] (Number of Sensitive Receptors)

Section	Alternative			
	A	B	C	D
1	6	6	Not part of Alternative C	Not part of Alternative D
2	Not part of Alternative A	Not part of Alternative B	130	130
3	80	80	80	80
4	73	Not part of Alternative B	73	Not part of Alternative D
5[3,4]	Not part of Alternative A	540	Not part of Alternative C	540
6	59	59	59	59
7	0	0	0	0
Total	218	685	342	809

[1] All impacts are moderate except within Section 5.

[2]Train noise impacts were evaluated based on projected noise level increases relative to baseline (No-Build Alternative) conditions at noise-sensitive receptors. Therefore, no impacts are identified for the No-Build Alternative.

[3] 149 Severe Impacts, 391 Moderate Impacts.

[4] Impacts in Section 5 do not recognize noise level reductions associated with the implementation of quiet zones which is considered as part of the Springfield Rail Improvements Project Tier 2 Environmental Evaluation.

5.8.4 Vibration Impacts during Operation

The FRA and FTA procedures provide a calculation method for predicting vibration levels for a generalized assessment. Freight trains generate higher vibration levels than high-speed rail passenger trains. Therefore, it could be concluded that the HSR Program would not result in any vibration impacts since freight trains operate throughout the corridor. Nonetheless, the corridor was evaluated to determine vibration impacts if there were only high speed rail trains operating. Additionally, through Springfield along Section 5 (10th Street Corridor), the vibration impacts associated with freight train activity were evaluated since that section would include the relocation of freight trains from 3rd Street to 10th Street.

Table 5.8-4 lists the distances from the track centerline that vibration impacts are predicted by land use type for both freight and high speed rail passenger trains. These distances were developed using the generalized vibration curves in the FRA and FTA manuals.

Table 5.8-4. Comparison of Ground Vibration Impact Curves

Ground Vibration Estimation Techniques	Distance to Human Annoyance (feet)	
	Residential	Commercial
FTA Generalized Curve for Freight Trains [1]	150	110
FRA Generalized Curve for High Speed Passenger Trains [2]	50	25

[1] The selected distances used to determine impacts along Section 5 (10th Street Corridor – Springfield).

[2] The selected distances used to determine impacts along Sections 1 through 4, 6, and 7.

Annoyance vibration impacts would occur at residences located 150 feet or closer to the proposed track between through Springfield along Section 5 and 50 feet or closer to the proposed track through the remainder of the corridor. For commercial and institutional uses, annoyance vibration impacts would occur at structures located 110 feet or closer to the proposed track through Springfield along Section 5 and 25 feet or closer to the proposed track through the remainder of the corridor. The annoyance impact criteria for residences and commercial/institutional property established by the FRA apply to vibrations inside building structures. Table 5.8-5 provides a summary of the number of vibration sensitive structures that would be impacted. Section 5 has the most impacts. As part of Alternatives B and D, intercity passenger rail service and UP freight trains will be shifted to Section 5.

The building damage criteria of 0.50 inch per second would not be exceeded at any building along the corridor due to train passbys. Therefore, the program is not expected to cause damage, due to vibration, to any buildings in the corridor.

Throughout the corridor, the vibration levels would be 5 to 10 VdB higher when there are crossovers, turnouts, jointed track, switches, or other special trackwork present. These conditions can cause annoying transients in the vibratory level characterized by a repetitive sounding, "thump-thump…thump-thump" that one would experience during a train passby. Vibration mitigation may be required for the areas were these conditions exist.

Table 5.8-5 Vibration Impacts[1,2] (Number of Sensitive Receptors)

Section	Alternative			
	A	B	C	D
1	60	60	Not part of Alternative C	Not part of Alternative D
2	Not part of Alternative A	Not part of Alternative B	40	40
3	80	80	80	80
4	73	Not part of Alternative B	73	Not part of Alternative D
5	Not part of Alternative A	106	Not part of Alternative C	106
6	59	59	59	59
7	0	0	0	0
Total	272	305	252	285

[1] Unlike the noise impact criteria, vibration impacts are not subcategorized as moderate and severe.

[2] The Build Alternatives were evaluated to determine vibration impacts from high speed rail trains. Additionally, through Springfield along Section 5 (10th Street Corridor), the vibration impacts associated with freight train activity were evaluated since that section would include the relocation of freight trains from 3rd Street to 10th Street.

5.8.5 Noise Impacts during Construction

Trucks and machinery used for construction produce noise that may affect some land uses and activities during the construction period. Individuals inhabiting the homes along the corridor would at some time experience perceptible construction noise from implementation of the program.

5.8.6 Vibration Impacts during Construction

Two types of construction vibration impact were analyzed: (1) human annoyance and (2) building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Fragile buildings such as historical structures are generally more susceptible to damage from ground vibration. Normal buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet based on typical construction equipment vibration levels. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. The potential for vibration annoyance and building damage was analyzed for major vibration producing construction equipment that would be used.

Vibration levels produced by construction equipment were obtained from *High Speed Ground Transportation Noise and Vibration Impact Assessment* (USDOT, 2005). Based on the typical vibration levels listed in Table 5.8-6, calculations were performed to determine the distances at which vibration impacts would occur according to the criteria discussed in Section 5.8.2. Table 5.8-7 shows the results of those calculations. The distances shown in Table 5.8-7 are the maximum distances at which short-term construction vibration impacts may occur. Mitigation measures would need to be considered if construction equipment were to operate near wood-framed buildings within the distances shown in Table 5.8-7.

Table 5.8-6. Vibration Source Levels for Construction Equipment

Equipment	PPV [1] at 25 feet (in/sec)	Approximate Velocity Level[2] at 25 ft (VdB)
Large bulldozer	0.089	87
Loaded trucks	0.076	86
Vibratory compactor/roller	0.210	94

Source: USDOT, 2005.

[1] Peak particle ground velocity measured at 25 feet unless noted otherwise.

[2] RMS ground velocity in VdB referenced to 1 micro-inch/second.

Table 5.8-7. Construction Equipment Vibration Impact Distances

Equipment	Distance to Vibration Annoyance [1] (feet)	Distance to Vibration Building Damage [2] (feet)
Large bulldozer	43	15
Loaded trucks	40	13
Small bulldozer	--	--
Auger/drill rigs	45	--
Vibratory hammer	130	25
Vibratory compactor/roller	73	26

[1] This is the distance at which the RMS velocity level is 80 VdB or less at the inside of the building structure. When propagating from the ground surface to the building structure foundation, there is a vibratory coupling loss of approximately 5 dB; however, this loss is offset by the building amplification in light-frame construction. Thus, no additional adjustments are applied.
[2] This is the distance at which the peak particle velocity is 0.20 inch/sec or less.
"—" indicates distance is less than 10 feet.

5.8.7 Mitigation during Construction

Noise and vibration impacts caused by construction activities are temporary. However, construction mitigation measures may be required to minimize these impacts. Construction activities conducted during daytime hours will have a lesser impact than nighttime construction. However, there may be locations where nighttime construction would be unobtrusive, such as commercial areas where the land use is unoccupied during nighttime hours, or industrial areas that are generally not sensitive to noise and vibration. Nighttime construction may be necessary to avoid unacceptable disruptions to current rail operations or street traffic during daytime hours. Once details of the construction activities become available, the contractor would need to work with local authorities to develop an acceptable approach to minimize interference with the business and residential communities, traffic disruptions, and the total duration of the construction.

There are a number of measures that can be taken to minimize intrusion without placing unreasonable constraints on the construction process or substantially increasing costs. These include noise and vibration monitoring to ensure that contractors take all reasonable steps to minimize impacts when near sensitive areas; noise testing and inspection of equipment to ensure that all equipment on the site is in good condition and effectively muffled; and an active community liaison program. The community liaison program should keep residents informed about construction plans so they can plan

around periods of particularly high noise or vibration levels and should provide a conduit for residents to express any concerns or complaints.

The following are possible control measures that can be implemented in order to minimize noise and vibration disturbances at sensitive areas during construction:

- Use newer equipment with improved noise muffling and ensure that all equipment items have the manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators intact and operational. Newer equipment will generally be quieter in operation than older equipment. All construction equipment should be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices (e.g., mufflers and shrouding, etc.).
- Perform all construction in a manner to minimize noise and vibration. Utilize construction methods or equipment that will provide the lowest level of noise and ground vibration impact, e.g., avoid impact pile driving near residences and consider alternative methods that are also suitable for the soil condition. The contractor should be required to select construction processes and techniques that create the lowest noise levels.
- Perform independent noise and vibration monitoring to demonstrate compliance with the noise limits, especially in particularly sensitive areas. Require contractors to modify and/or reschedule their construction activities if monitoring determines that maximum limits are exceeded at residential land uses.
- Conduct truck loading, unloading and hauling operations so that noise and vibration are kept to a minimum by carefully selecting routes to avoid going through residential neighborhoods to the greatest extent possible.
- Construction lay-down or staging areas should be selected in industrially zoned districts. If industrially zoned areas are not available, commercially zoned areas may be used, or locations that are at least 100 feet from any noise sensitive land use such as residences, hotels and motels. Ingress and egress to and from the staging areas should be on collector streets or greater (higher street designations are preferred).
- Turn off idling equipment.
- Minimize construction activities during evening, nighttime, weekend, and holiday periods. Permits may be required in some cities before construction can be performed in noise sensitive areas between 7:00 p.m. and 7:00 a.m.
- The construction contractor should be required by contract specification to comply with all local noise and vibration ordinances and obtain all necessary permits and variances.

It is expected that ground-borne vibration from construction activities would cause only intermittent localized intrusion along the rail corridor. Processes such as earth moving with bulldozers, the use of vibratory compaction rollers, and the operation of vibratory pile drivers can create annoying vibration. There are cases where it may be necessary to use this type of equipment in close proximity to residential buildings. Following are

some procedures that can be used to minimize the potential for annoyance or damage from construction vibration:

- When possible, limit the use of construction equipment that creates high vibration levels, such as vibratory rollers and hammers, operating within 130 feet of building structures.
- Require vibration monitoring during vibration-intensive activities.
- Restrict the hours of vibration-intensive equipment or activities such as vibratory rollers so that impacts to residents are minimal (e.g., weekdays during daytime hours only when as many residents as possible are away from home).

A combination of the mitigation techniques for equipment noise and vibration control as well as administrative measures, when properly implemented, can be selected to provide the most effective means to minimize the effects of construction activity impacts. Application of the mitigation measures will reduce the construction impacts; however, temporary increases in noise and vibration would likely occur at some locations.

5.8.8 Mitigation during Operation

5.8.8.1 *Train Noise Mitigation*

As this program progresses, a more detailed noise analysis would be required. During the future Tier 2 studies, the following mitigation measures should be considered and applied as appropriate:

Wheel Treatments

A major source from steel-on-steel high speed train systems is the wheel-rail interaction. Various wheel designs and other mitigation measures to reduce the wheel noise include: resilient or damped wheels, spin-slide control systems, and maintenance.

Rail Treatments

Rail surfaces that are degraded over time due to wear generate noise levels that are significantly higher than those produced by a well-maintained system. Roughness of rail surfaces can be eliminated by grinding rails.

Vehicle Treatments

Vehicle noise mitigation measures can be applied to various mechanical systems associated with ventilation and passenger comfort. Fan noise can be a major noise source. Fan quieting can be accomplished by installation of one of several new designs of quiet, efficient fans. The vehicle body design can also provide shielding and absorption of noise generated by the vehicle components.

Building Insulation

In cases where rights-of-way are restricted, the only practical noise mitigation measure may be to provide sound insulation for the building. The most effective treatments are

to caulk and seal gaps in the building and to install windows that are specially designed to meet acoustical transmission-loss requirements.

Noise Barriers

Noise reduction can be achieved by using noise barrier walls in areas along the corridor where significant train noise impacts have been identified. If the noise barrier walls are implemented prior to construction, the walls could then also serve as an effective means of mitigating construction noise impacts as well. The cost-effectiveness and optimum height of the walls would need to be determined by specific acoustical analysis for each area of impact identified. An important consideration in determining areas where noise mitigation might be questionable is whether the railroad corridor existed many years before any of the residential developments that have encroached upon the right-of-way. Sensitive land uses may be less sensitive to train noise because of its established, long history in the communities, and because of the services the rail operation provides to the communities. The U.S. Environmental Protection Agency (EPA, 1974) has indicated that these considerations would likely reduce community reactions to noise. Before implementation of a mitigation measure such as noise barrier walls, the FRA guidelines recommend that the community's agreement should be obtained. Some communities would rather not have a wall because of adverse visual effects.

5.8.8.2 *Train Vibration Mitigation*

As the program progresses, a more detailed vibration analysis would be required to determine:

- the soil characteristics and the efficiency at which the vibration propagates through the ground at various locations along the alignment,
- the most appropriate method of vibration mitigation, and
- the extent where mitigation would be required at specific locations.

In order to ensure that vibration is reduced to an acceptable level, the following mitigation measures should be considered and applied according to the results of the final design study:

5.8.8.3 *Maintenance*

Wheel and rail surfaces that are degraded over time due to wear generate vibration levels that are significantly higher than those produced by a well-maintained system. However, these conditions are not uncommon on rail systems. Up to 20 VdB of vibration reduction can be gained when comparing new or well-maintained rail systems to older systems showing wear. The following measures would help to minimize vibration impacts if done regularly:

- Rail grinding on a regular basis, especially on rails that tend to develop corrugations.
- Wheel truing to re-contour the wheel and remove wheel flats. This can result in a dramatic vibration reduction. However, significant improvements can be gained

from simply smoothing the running surface. Install wheel-flat detector systems to identify vehicles that are most in need of wheel truing.

- Implement vehicle reconditioning programs, particularly with components such as suspension systems, brakes, wheels, and slip-slide detectors.

Relocation of Special Trackwork and other Special Features

Crossovers, turnouts, and other special trackwork that cause an irregular rail surface should be considered for relocation to less vibration sensitive areas when feasible. The use of special "spring-loaded rail frogs" should be considered at turnouts and crossovers that cannot be relocated away from residential and commercial structures. The special frogs incorporate mechanisms that close the gaps between running rails. Frogs with spring-loaded mechanisms and frogs with movable points can significantly reduce vibration levels near crossovers.

Ballast Mats

Ballast mats are rubber or another type of elastomer pads that are placed under the ballast. The mat must be placed on a concrete pad to be effective. They will not be effective if placed on the soil or the sub-ballast. Ballast mats can provide up to 10 to 15 VdB of reduction at frequencies above 35 to 40 hertz, but are generally ineffective at frequencies below 35 hertz.

Resiliently Supported Ties

This is a system that consists of concrete ties supported by rubber pads. The rails are fastened directly to concrete ties using standard rail clips. This measure can provide a 10 VdB reduction at frequencies in the 15 to 40 hertz range.

High Resilience Fasteners

These are used in conjunction with a concrete slab base. The fastener must be very compliant (resilient) in the vertical direction. If standard resilient fasteners are used (vertical stiffness of 200,000-lbs/inch; stiffness refers to the compressibility of the resilient material), little or no improvement in the vibration level would be achieved. Special soft fasteners with a vertical stiffness in the 30,000-lbs/inch range would reduce vibration levels as much as 5 to 10 VdB at frequencies above 30 to 40 Hz.

Floating Slab Trackbed

This type of trackbed consists of a concrete base with 5-foot long floating concrete slabs supported above the base using resilient isolation elements such as rubber or similar elastomeric pads. The effectiveness of this method depends on the resonant frequency of the resilient pads and the mass of the concrete slab. These have been shown to be very effective at frequencies in the 5 to 20 hertz range. However, this method is very expensive and would normally be considered only in areas where irregular surfaces exist.

5.9.1 No-Build Alternative

No impacts

5.9.2 Build Alternatives

5.9.2.1 *Surface Water*

Tables 5.9-1 and 5.9-2 present the number of surface water crossings for each section and alternative, respectively, and the type of structure (i.e., culvert or bridge) that is currently being used to cross the surface water. These tables also identify the number of crossings that would require some level of improvements. Because Sections 4 and 5 have no surface water crossings and all of the alternatives include Sections 6 and 7, the only difference in surface water crossings between the alternatives is due to the difference between Sections 1 and 2. Alternatives A and B would have 203 surface water crossings while Alternatives C and D would have 191. Each of the surface water crossings has been evaluated on a cursory level to determine its ability to accommodate the proposed improvements. These improvements may include extending culverts, widening existing bridges, constructing new bridges that are adjacent and parallel to the existing bridges, and/or reconstruction of the existing structures. Based on this evaluation, Alternatives A and B would have 132 crossings requiring improvements while Alternatives C and D would have 127 crossings requiring improvements. Each of these crossings will be evaluated in more detail in Tier 2 to ensure that they can accommodate the additional track and are both structurally and hydraulically sufficient.

Table 5.9-1. Summary of Surface Water Crossings by Section

Section	Culverts	Bridges	Total	Require Improvement
1	18	7	25	8
2	4	9	13	3
3	83	31	114	82
4	0	0	0	0
5	0	0	0	0
6	49	14	63	42
7	0	1	1	0
Total	154	62	216	135

Table 5.9-2. Summary of Surface Water Crossings by Alternative

Alternative	Culverts	Bridges	Total	Require Improvement
A	150	53	203	132
B	150	53	203	132
C	136	55	191	127
D	136	55	191	127
No-Build	0	0	0	0

5.9.2.2 *Drainage Basins*

The Build Alternatives would traverse ten major drainage basins. There would be little difference in overall impacts to these drainage basins by the Build Alternatives. Specific impacts to surface water and water quality that could affect these drainage basins are discussed in Sections 5.9.1 and 5.9.3, respectively.

5.9.2.3 *Water Quality*

The building of bridges and placement of culverts can negatively impact stream hydraulics, bank stability, flow velocity, and streambed morphology. The improper placement of structures can accelerate levels of erosion and sedimentation leading to the alteration of downstream aquatic habitat.

Clearing and excavation of construction sites can result in impacts to water quality by increasing levels of sediment deposition, turbidity, heavy metals, organic chemicals, and debris, while also lowering dissolved oxygen levels. Long-term maintenance of railway vegetation could result in impacts to streams from runoff of herbicide sprayed on vegetation.

The greatest impact to streams would come from soil disturbance following construction due to erosion and siltation. BMPs must be utilized to protect water quality. Runoff from construction sites must be diverted from directly entering streams during and after construction.

Construction activities will comply with all spill prevention control and countermeasures requirements per the requirements of the United States Environmental Protection Agency's (USEPA's) regulations under the Clean Water Act (i.e., 40 CFR Part 112, Oil Pollution Prevention; Spill Prevention, Control, and Countermeasure Plan Requirements) and Illinois Emergency Management Agency (IEMA). Operations will comply with the spill prevention and countermeasures as required by local well head protection ordinances. These response and prevention activities include the training of personnel in spill response activities, stationing of spill control kits, the proper storage and handling of petroleum products, and notification requirements in the event of a spill.

5.9.2.4 *Special Status Streams*

IDNR Biologically Significant Streams

Streams considered biologically significant that would be impacted are listed by section and alternative in Tables 5.9-3 and 5.9-4. The tables show that all the impacts to biologically significant streams would be limited to Section 3, which is the longest section. Because all of the alternatives include Section 3, they would all would have the same impacts to biologically significant streams (i.e., six crossings and 1,136 feet).

Table 5.9-3. Special Status Stream Impacts by Section

Section	Biologically Significant Streams		Nationwide Rivers Inventory streams		Navigable Waters		Illinois Natural Areas Inventory Streams	
	# of Crossings	Length (ft)	# of Crossings	Length (ft)	# of Crossings	Length (ft)	# of Crossings	Length (ft)
1	0	0	0	0	0	0	0	0
2	0	0	0	0	1	54	0	0
3	6	1,136	3	554	5	679	6	946
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	1	82	0	0
7	0	0	0	0	1	144	0	0

Table 5.9-4. Special Status Stream Impacts by Alternative

Alternative	Biologically Significant Streams		Nationwide Rivers Inventory streams		Navigable Waters		Illinois Natural Areas Inventory Streams	
	# of Crossings	Length (ft)	# of Crossings	Length (ft)	# of Crossings	Length (ft)	# of Crossings	Length (ft)
A	6	1,136	3	554	8	959	6	946
B	6	1,136	3	554	8	959	6	946
C	6	1,136	3	554	7	905	6	946
D	6	1,136	3	554	7	905	6	946
No-Build	0	0	0	0	0	0	0	0

Nationwide Rivers Inventory

Impacts to NRI stream segments are listed by program section and alternative in Tables 5.9-3 and 5.9-4. The tables show that all the impacts to NRI streams would be limited to Section 3, which is the longest section. Because all of the alternatives include Section 3, they would all would have the same impacts to NRI streams (i.e., 43 crossings and 554 feet).

Navigable Waters

Navigable waters that would be impacted are listed by section and alternative in Tables 5.9-3 and 5.9-4. Alternatives A and B would have the most impacts with eight crossings and 959 feet while Alternatives C and D would have the least impacts with seven crossings and 905 feet.

Illinois Natural Areas Inventory Streams

INAI streams that would be impacted are listed by section and alternative in Tables 5.9-3 and 5.9-4. The tables show that all the impacts to INAI streams would be limited to Section 3, which is the longest section. Because all of the alternatives include Section 3, they would all have the same impacts to INAI streams (i.e., six crossings and 946 feet).

5.9.2.5 *Groundwater*

This analysis focuses on potential impacts of the Build Alternatives on municipal and private water supplies. There are no sole source aquifers as defined by section 1424(E) of the Safe Drinking Water Act in Illinois within the study corridor. No measurable change to the available groundwater supply is anticipated for any of the Build Alternatives; any impervious areas associated with the Build Alternatives would

represent a small reduction in recharge area that can be mitigated by stormwater retention/detention basins.

This program would not create any new potential routes for groundwater pollution or any new potential sources of groundwater pollution as defined in the Illinois Environmental Protection Act, 415 ILCS 5/3, et seq. Accordingly, the program is not subject to compliance with the minimum setback requirements for community water supply wells or other potable water supply wells as set forth in 415 ILCS 5/14, et seq.

The Build Alternatives cross the recharge or setback zone areas of the Community Water Supply (CWS) Wellhead Protection Areas for the communities of Normal and Lincoln (United Water Illinois). The right-of-way of the Build Alternatives also cross the setback zone for non-CWS wells at two locations in Section 1, two locations in Section 2, and three locations in Section 3. These crossings are summarized in Table 5.9-5.

Table 5.9-5. Well Crossings by Alternative

Alternative	Wellhead Protection Areas Crossed	Non-CWS Well Setback Zones Crossed
A	2	5
B	2	5
C	2	5
D	2	5
No-Build	0	0

Each alternative crosses groundwater resources designated as shallow sand and gravel aquifers. Alternatives A and B cross 117 miles, and Alternates C and D cross 110 miles of this resource.

The Build Alternatives also cross the watersheds of Lake Springfield, Lake Bloomington and Lake Evergreen, which serve as the CWS for the cities of Springfield, and Bloomington respectively. All alternatives cross the Zone 1 water protection areas associated with the 0.25-mile buffer zone for the communities of Granite City, Wilmington, East St. Louis and Streator.

No pollutants, such as PNAs and heavy metals, would migrate to groundwater sources. No groundwater impacts are anticipated as a result of the Build Alternative improvements. See Section 5.9.3 regarding spill prevention and control measures.

5.10 Floodplains

5.10.1 No-Build Alternative

No impacts.

5.10.2 Build Alternatives

Table 5.10-1 summarizes the floodplain impacts for each section while Table 5.10-2 shows the total floodplain impacts for each alternative. The number of crossings that are perpendicular to the floodplain are also indicated. Crossings not indicated as perpendicular to the floodplain are considered parallel encroachments.

Table 5.10-1. 100-Year Floodplain Impacts by Section

Section	Number of Floodplains Crossed	Number of Perpendicular Crossings	Total Floodplain Impact (Acres)
1	6	5	3.6
2	13	4	8.8
3	18	16	55.5
4	0	0	0
5	0	0	0
6	12	9	13.6
7	0	0	0

Table 5.10-2. 100-Year Floodplain Impacts by Alternative

Alternative	Number of Floodplains Crossed	Number of Perpendicular Crossings	Total Floodplain Impact (Acres)
A	36	30	72.7
B	36	30	72.7
C	43	29	77.9
D	43	29	77.9
No-Build	0	0	0

Alternatives A and B would both result in floodplain impacts totaling 72.7 acres. Alternatives C and D would both have a greater impact on floodplains, with floodplain impacts totaling 77.9 acres.

5.10.2.1 *Avoidance and Minimization of Impacts*

Floodplain impacts will be avoided to the extent possible, although the linear nature of this program limits the potential for avoiding all floodplains. During the design phase, there will be opportunities to avoid and/or minimize floodplain impacts by designing bridges to span 100-year flood zones or portions of them. In addition to bridging floodplains, disturbance (direct and indirect, temporary and permanent) may be minimized by other design features such as steeper side slopes and/or retention walls to reduce the disturbance footprint.

5.11 Wetlands

5.11.1 No-Build Alternative

No impacts.

5.11.2 Build Alternatives

National Wetland Inventory (NWI) mapping was used to analyze potential wetland impacts; GIS was used to overlay NWI mapping with the proposed construction limits to measure wetland impacts. Field investigations were not conducted to verify this information. Wetland delineations will be conducted during the Tier 2 environmental documentation. The wetland communities that would be impacted by the Build Alternatives are palustrine (i.e., freshwater) emergent (PEM), palustrine forested/scrub-shrub (PFO/PSS), palustrine unconsolidated bottom (PUB) (i.e., ponds), and riverine (i.e., rivers) based on the Cowardin classification system (Cowardin et al., 1979).

Wetland impacts calculated by wetland community type for each section are shown in Table 5.11-1. Wetland impacts for Alternatives A through D are shown in Table 5.11-2.

Table 5.11-1. NWI Wetland Impacts by Section

Section	Riverine Acres/# of Wetlands	PUB Acres/# of Wetlands	PEM Acres/# of Wetlands	PFO/PSS Acres/# of Wetlands	Total Acres/# of Wetlands
1	0/0	0/0	1.1/2	0/0	1.1/2
2	2.7/7	0.3/2	2.4/3	0.3/3	5.6/15
3	3.2/5	0.6/2	2.6/6	13.9/10	20.3/23
4	0/0	0/0	1.3/1	0/0	1.3/1

Table 5.11-1. NWI Wetland Impacts by Section (continued)

Section	Riverine Acres/# of Wetlands	PUB Acres/# of Wetlands	PEM Acres/# of Wetlands	PFO/PSS Acres/# of Wetlands	Total Acres/# of Wetlands
5	0/0	0/0	1.2/1	0/0	1.2/1
6	0.2/1	0.7/4	3.8/3	4.6/12	9.3/20
7	6.1/1	0.6/2	0/0	3.1/3	9.8/6

Table 5.11-2. NWI Wetland Impact by Alternative

Alternative	Riverine Acres/# of Wetlands	PUB Acres/# of Wetlands	PEM Acres/# of Wetlands	PFO/PSS Acres/# of Wetlands	Total Acres/# of Wetlands
A	9.0/7	1.9/8	8.8/12	21.6/25	41.3/52
B	9.5/7	1.9/8	8.7/12	21.6/25	41.7/52
C	12.2/14	2.2/10	10.1/13	21.9/28	46.4/65
D	12.2/14	2.2/10	10.0/13	21.9/28	46.3/65
No-Build	0	0	0	0	0

Alternative B, which would impact 52 NWI wetlands totaling 41.7 acres, would have the least impact. Alternative C would impact 65 NWI wetlands totaling 46.4 acres and would have the greatest impact. The majority of the impacts would be to PFO/PSS wetland communities.

5.11.2.1 *Avoidance and Minimization of Impacts*

Wetland impacts will be avoided to the extent possible. However, because the Build Alternatives would involve construction of new tracks adjacent to existing tracks, the feasibility of realigning the route to avoid wetland impacts is limited. Where avoidance is not possible, disturbance (direct and indirect, temporary and permanent) will be minimized using the best technology available and best management practices.

Areas adjacent to existing tracks may have been previously filled or disturbed during railroad construction and maintenance, and wetland impacts could be minimized if new construction occurs within or contiguous to existing right-of-way. Construction will remain within previously disturbed areas as much as possible to minimize impacts. Minimization of impacts can also be accomplished by reducing the disturbance limits in the vicinity of existing wetlands through various design features, such as bridges, steeper side slopes, and/or retention walls to minimize the disturbance footprint.

Riverine wetlands, normally adjacent to larger streams, would likely be bridged, which will minimize impacts.

During the final design phase, a functional assessment will be conducted for each wetland that would be impacted. These assessments will identify higher quality wetlands and will determine if site-specific design techniques would be feasible to minimize impacts.

Prior to construction, site-specific erosion and sediment control plans will be developed to minimize impacts to each wetland affected. Impacts from silt and sediment will be minimized through adherence to erosion control measures specified in current IDOT guidance. Erosion control fencing or other techniques will be used to prevent sediment discharges from construction areas adjacent to wetlands. All ground disturbing activities, including access roads and staging areas, will be restricted from wetland areas.

5.11.2.2 *Compensatory Mitigation*

A conceptual wetland mitigation plan will be developed to compensate for unavoidable impacts. Coordination with the US Army Corps of Engineers, the US Fish and Wildlife Service, and the Illinois Department of Natural Resources will be required to determine specific mitigation requirements to adequately compensate for wetland losses. Mitigation may be provided by purchasing credits from an established wetland mitigation bank if an approved bank is available. If an approved bank is not available, the conversion of non-wetland areas into wetlands may be required. Mitigation requirements will be determined during the permitting process following completion of final design and right-of-way plans.

5.12 Utilities

5.12.1 No-Build Alternative

No impacts.

5.12.2 Build Alternatives

The Build Alternatives will require the relocation of utilities in the corridor. The estimated cost to relocate these utilities has been included in the program cost estimates.

5.13 Visual and Aesthetic Quality Impacts

Table 5.13-1 shows the relative impacts to each of the landscape units described in Section 4.13. The overall magnitude of impacts to visual resources for each component is described in the sections that follow.

Table 5.13-1. Visual Resource Impact Summary

Landscape Unit	No-Build Alternative	Alternative A	Alternative B	Alternative C	Alternative D
Chicago Area	○	◉	◉	◉	◉
Joliet Area	○	◉	◉	◉	◉
Will County	○	○	○	○	○
Grundy County	○	○	○	○	○
Livingston County	○	○	○	○	○
McLean County	○	○	○	○	○
Bloomington-Normal Area	○	○	○	○	○
Logan County	○	○	○	○	○
Sangamon County	○	○	○	○	○
Springfield Area	○	◉	◉	◉	◉
Macoupin County	○	○	○	○	○
Madison County	○	○	○	○	○
St. Louis Area	○	○	○	○	○

● Major
◉ Moderate
○ Minor/Negligible

5.13.1 No-Build Alternative

There would be no direct impacts to existing visual quality along the proposed Chicago to St. Louis HSR Corridor under the No-Build Alternative. Aesthetic consequences from development of the corridor and right-of-way would not occur and would therefore not impact existing residential areas, undeveloped forested areas, agricultural areas, natural areas, or historic sites.

5.13.2 Build Alternatives

5.13.2.1 *Alternative A*

Given that the majority of the Chicago to St. Louis HSR Corridor runs on or parallel to existing rail alignment and bridges, impacts to existing scenic quality and to visual receptors in Will, Grundy, Livingston, McLean, Logan, Sangamon, Macoupin, and Madison counties and the Bloomington-Normal and St. Louis Area landscape units would be negligible. Minor adverse impacts under Alternative A could be caused from proposed grade separations (new vertical elements), sound walls, and/or fences associated with the corridor in the residential, commercial, or unique landscapes within these landscape units. Visual intrusion of these structures can negatively affect property values and enjoyment of open space.

Adverse visual impacts from proposed elevated grade separations and flyovers (new vertical elements) under Alternative A would be highest in the Northeast Morainal landscape region (Chicago area and Joliet area landscape units) and in the Springfield area landscape unit because these areas have the most need and funding for proposed elevated grade separations and because more visual receptors exist in these areas. Alternative A has approximately nine proposed elevated grade separations in the Chicago area/Joliet area landscape units and approximately 12 in the Springfield area landscape unit. The locations and receptors most sensitive to these potential grade separations would be residential land use and unique landscapes, such as natural areas and historic sites.

In some locations, elevated grade separations and flyovers can intrude on views, although they may not block them completely. Tall HSR stations can create shadows that could have negative impacts on some areas under some conditions. The final design process would include coordination with local jurisdictions and take into consideration all applicable design guidelines as part of a collaborative process related to construction of HSR structures, including elevated grade separations, fencing, and stations. Structures would be designed to be attractive architectural elements or features, would incorporate local design elements, and would add visual interest to the streetscapes near them. Visual impact mitigation would be determined at the Tier 2 level at locations where the impact is notable.

Portions of existing greenways, natural areas, historic sites, and Historic Route 66 are located in proximity to the Chicago to St. Louis HSR Corridor. In most instances, the proposed corridor would run relatively perpendicular to existing and proposed facilities and, therefore, would not impact large portions of any one facility. The majority of the corridor runs on existing rail alignment, and impacts to surrounding scenery and to visual receptors would be negligible.

Most of the adverse visual impact associated with the Build Alternatives would occur during the construction phase. These short-term adverse impacts would be due to the presence of heavy equipment, construction materials, and non-vegetated areas that would be visible. Proper construction techniques would be utilized to help reduce short-term visual impacts and long-term lingering effects of construction.

Train lighting on the HSR corridor would be intermittent and directed along the guideway, which should not cause glare impact on nighttime views. Construction and operation of the HSR corridor would have temporary impacts related to sources of light and glare during construction, a minor increase the ambient light levels in nearby areas, and an increase in skyglow, which can adversely affect nighttime star viewing. Design-related measures, such as shielding and altering light direction, would be used where appropriate to avoid and minimize potential impacts, while providing adequate lighting for safety and security.

5.13.2.2 *Alternative B*

Impacts under Alternative B would be similar to those under Alternative A. Given that the majority of the corridor runs on or parallel to existing rail alignment and bridges, impacts to existing scenic quality and to visual receptors would be negligible. Adverse visual impacts under Alternative B would be highest in the Northeast Morainal landscape region (Chicago area and Joliet area landscape units) and in the Springfield area landscape unit because these areas have proposed elevated grade separations. Alternative B has approximately nine proposed elevated grade separations in the Chicago area/Joliet area landscape units and approximately nine in the Springfield area landscape unit. The locations most sensitive to these grade separations would be residential land use and unique landscapes. There would be slightly less impacts from proposed elevated grade separations under Alternative B than under Alternative A.

A short section of proposed new alignment along Section 5 in the Springfield area under Alternative B would introduce views from trains into private spaces and would introduce views of trains and a new rail line into residential, commercial, and industrial spaces. This would be a negative visual impact.

5.13.2.3 *Alternative C*

Impacts under Alternative C would be similar to those under Alternative A. Given that the majority of the HSR corridor runs on or parallel to existing rail alignment and bridges, impacts to existing scenic quality and to visual receptors would be negligible.

Adverse visual impacts under Alternative C would be highest in the Northeast Morainal landscape region (Chicago area and Joliet area landscape units) and in the Springfield area landscape unit because these areas have proposed elevated grade separations. Alternative C has approximately 24 proposed elevated grade separations in the Chicago area/Joliet area landscape units and approximately 12 in the Springfield area landscape unit. The locations most sensitive to these grade separations would be residential land use and unique landscapes. Alternative C would have the most impacts from proposed elevated grade separations of all the alternatives.

5.13.2.4 *Alternative D*

Impacts under Alternative D would be similar to those under Alternative A. Given that the majority of the HSR corridor runs on or parallel to existing rail alignment and bridges, impacts to existing scenic quality and to visual receptors would be negligible.

Adverse visual impacts under Alternative D would be highest in the Northeast Morainal landscape region (Chicago area and Joliet area landscape units) and in the Springfield area landscape unit because these areas have proposed elevated grade separations. Alternative D has approximately 24 proposed elevated grade separations in the Chicago area/Joliet area landscape units and approximately nine in the Springfield area landscape unit. The locations most sensitive to these grade separations would be residential land use and unique landscapes. There would be slightly more impacts from proposed elevated grade separations under Alternative D than under Alternative A.

A short section of proposed new alignment along Section 5 in the Springfield area under Alternative D would introduce views from trains into private spaces and would introduce views of trains and a new rail line into residential, commercial, and industrial spaces. This would be a negative visual impact.

5.14 Special Waste

5.14.1 No-Build Alternative

No impacts

5.14.2 Build Alternatives

A database of special waste sites was generated and further analyzed to determine which sites were most likely to represent a special waste concern for the Build Alternatives. The sites of interest included but were not limited to the following:

- Underground Storage Tanks (UST)
- Leaking Underground Storage Tanks
- Dry Cleaners
- RCRA TSDF
- Large Quantity Hazardous Waste Generators
- CERCLIS
- Brownfields
- Manufactured Gas Plants
- Landfills

The data was processed to identify any site located within 200 feet of the existing or proposed right-of-way. The sites within the database are generally plotted based on the geocoded location of the street address. It is not possible to determine if a site boundary is actually shared with the right-of-way due to the limitations of geocoded data and the lack of detailed right-of-way mapping. Additionally, some duplication of data is inherent due to the overlapping nature of multiple program relationships. Tables 5.14-1 and 5.14-2 list the number of special waste sites identified by section and alternative. A listing of the special waste sites is included in Appendix D. As indicated in Table 5.14-2,

Alternative D would impact the most sites (i.e., 276) while Alternative A would impact the least number of sites (i.e., 179).

Table 5.14-1. Special Waste Sites by Section

Section	Number of Special Waste Sites
1	41
2	122
3	91
4	5
5	21
6	18
7	24

Table 5.14-2. Special Waste Sites by Alternative

Alternative	Number of Special Waste Sites
A	179
B	195
C	260
D	276
No-Build	0

5.15 Section 4(f)/6(f) and Parklands

5.15.1 No-Build Alternative

No impacts.

5.15.2 Build Alternatives

This section identifies the potential for program activities to impact resources protected by Section 4(f) of the Department of Transportation Act of 1966 or Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965.

5.15.2.1 *Section 4(f) Impacts*

The FHWA Section 4(f) regulation at 23 CFR 774.17 identifies that a "use" of a Section 4(f) resource occurs:

- When land is permanently incorporated into a transportation facility;

- When there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes as determined by 23 CFR 774.13(d); or
- When there is a constructive use of a Section 4(f) property as determined by the criteria in §774.15.

For this analysis, potential impacts (i.e., uses) were considered when any portion of a Section 4(f) resource was to be acquired by the program. A list of potentially impacted Section 4(f) resources by section is provided in Table 5.15-1 while Table 5.15-2 presents the total number of these resources that would be impacted for each alternative. Following these tables, a detailed discussion is provided of each property by section. Historic resources listed or eligible for listing on the NRHP that would be adversely affected by the program are also considered potential uses under Section 4(f); a discussion of the potential impacts to these resources is provided in Section 5.5. During Tier 2 studies, detailed impacts at each location will be evaluated to determine if a "use" is anticipated and IDOT will coordinate with the official with jurisdiction to determine the significance of the use.

Table 5.15-1. Potential Section 4(f) Resource Uses by Section

Resource	County	Section	Official with Jurisdiction	Impact Area (acre)
Hoyne Park	Cook	1	Chicago Park District	0.3
Summit Park	Cook	1	Summit Park District	3.3
Centennial and I&M Canal Trail	Will	1	IDNR	3.8
Ping Tom Memorial Park	Cook	1 & 2	Chicago Park District	0.9
Hamilton Park	Cook	2	Chicago Park District	0.6
Lyle Park	Cook	2	Chicago Park District	0.3
Vogt Woods Park	Cook	2	Tinley Park Park District	0.4
Midlothian Meadows	Cook	2	Forest Preserve District of Cook County	1.7
St. Mihiel Reservation	Cook	2	Forest Preserve District of Cook County	5.0

Table 5.15-1. Potential Section 4(f) Resource Uses by Section (continued)

Resource	County	Section	Official with Jurisdiction	Impact Area (acre)
Pilcher Park	Will	2	Joliet Park District	2.9
Hickory Creek Forest Preserve	Will	2	Forest Preserve District of Will County	7.2
Midewin National Tallgrass Prairie	Will	3	U.S. Forest Service	0.6
Funks Grove Land and Water Reserve/ Funks Grove Nature Preserve/ Stubblefield Woodlots Nature Preserve	McLean	3	IDNR	2.9
Edward R. Madigan State Park/Railsplitter Park	Logan	3	IDNR	1.3
Interurban Trail (Chatham to Springfield)	Sangamon	6	IDOT	0.4

Table 5.15-2. Potential Number of Uses of Section 4(f) Resources by Section and Alternative

Section	Alternative A	Alternative B	Alternative C	Alternative D	No-Build
1	4	4	-	-	0
2	-	-	8	8	0
3	3	3	3	3	0
4	0	-	0	-	0
5	-	0	-	0	0
6	1	1	1	1	0
7	0	0	0	0	0
Total	**8**	**8**	**12**	**12**	**0**

Section 1

Hoyne Park

This 2.7-acre park in the McKinley Park Community, is located adjacent to the north side of the Section 1 alignment at Hoyne Avenue. The park, owned by the Chicago Park District, includes a baseball field, three basketball courts, a fieldhouse, grass play areas,

and a playground. Improvements to this elevated section of track would be related to modifications of the 35th Street/Archer Avenue station (Exhibit 5.15-1). This would require the acquisition of an approximately 40-foot wide strip (approximately 0.4 acres) of right-of-way from the park.

Summit Park

This 46-acre park in the Village of Summit, is located adjacent to the south side of the Section 1 alignment. The park, owned by the Summit Park District, includes a splash/spray park, a disc golf course, an exercise path, three baseball fields, a soccer field, two tennis courts, two basketball courts, a playground, a dog park, a picnic area, and miniature golf. Improvements in this area would include construction of a potential flyover at Indiana Harbor Belt Railroad and would require a strip of additional right-of-way ranging from 50-100 feet wide, totaling approximately 3.3 acres (Exhibit 5.15-2).

Centennial Trail/I&M Canal Trail

This 61-mile long pedestrian/bicycle trail follows the former towpath for the Centennial Trail/Illinois and Michigan Canal. A section of the trail parallels the Section 1 alignment between East 2nd Street in Lockport and Columbia Street in Joliet, a distance of 4.4 miles. Within Lockport, the trail is maintained by the Lockport Township Park District; the remainder is maintained by the Forest Preserve District of Will County. The southernmost section is located within the Joliet Steel Works Historic Site (see Section 4.5). Improvements in this section would include construction of a siding, including several areas where additional strips of right-of-way would be required, totaling approximately 3.8 acres (Exhibit 5.15-3).

Section 2

Ping Tom Memorial Park

This 12-acre site, located along the South Branch of the Chicago River in the Armour Square neighborhood, was originally a Chicago and Western Indiana Railroad yard. The park includes a playground, community gathering areas, and Chinese landscape design elements. Improvements in this area would include construction of a new bridge across the river to accommodate construction of an additional track. This would require the acquisition of a approximately 15-foot strip of right-of-way from the southern end of the park, totaling approximately 0.9 acres (Exhibit 5.15-4). This park would also be impacted by Section 1.

Hamilton Park

This 30-acre park in the Englewood neighborhood is located adjacent to the west side of Section 2, between 72nd and 74th Streets. The park, owned by the Chicago Park District, includes a swimming pool; baseball/softball diamonds; basketball, handball, and tennis courts; a playground; and a gymnasium. Improvements in this area would include construction of an additional track and would require a strip of additional right-of-way approximately 20 feet wide, totaling approximately 0.6 acres (Exhibit 5.15-5). Hamilton Park is also listed on the National Register of Historic Places.

Exhibit 5.15-1. Potential Impacts to Hoyne Park

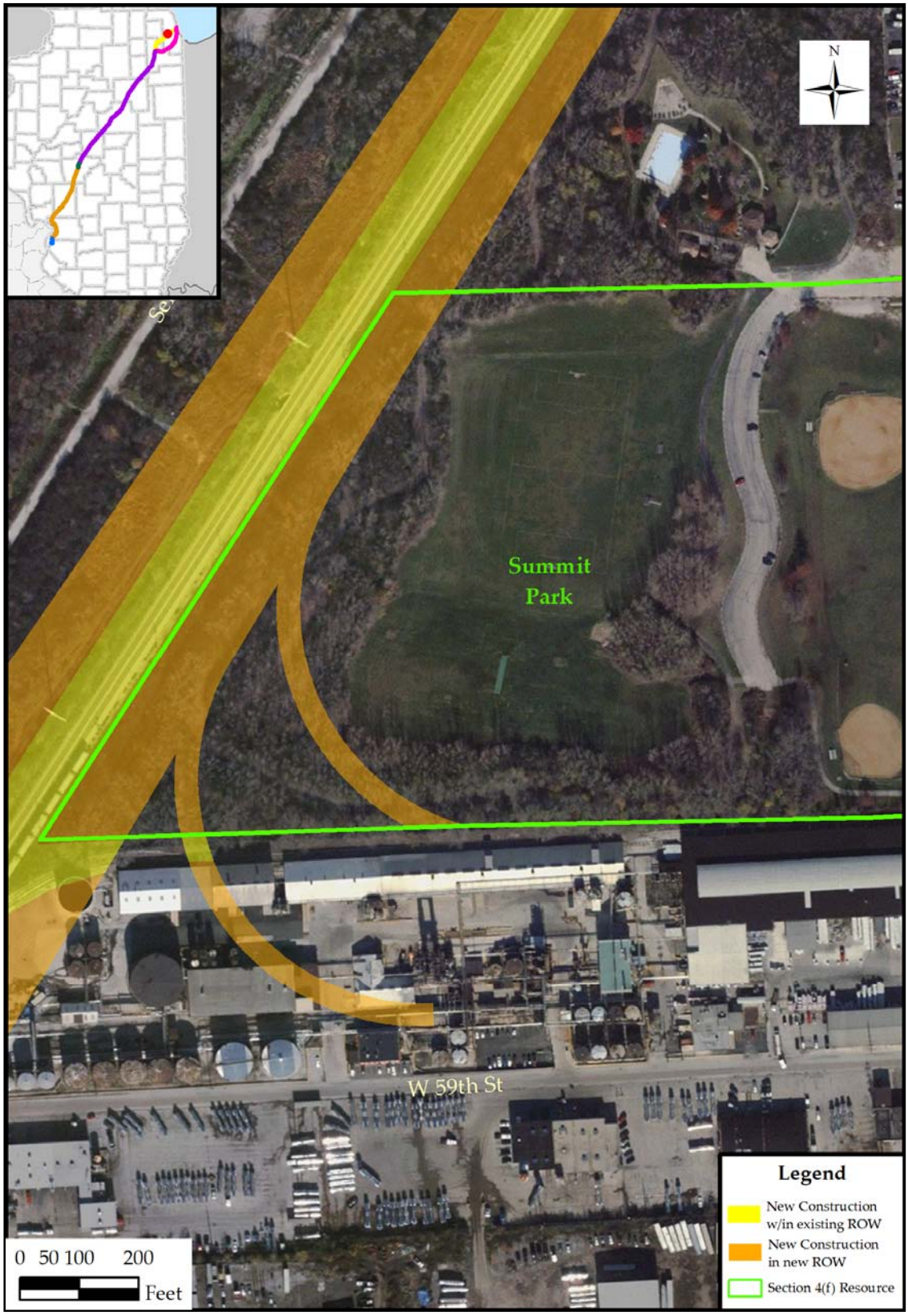


Exhibit 5.15-2. Potential Impacts to Summit Park

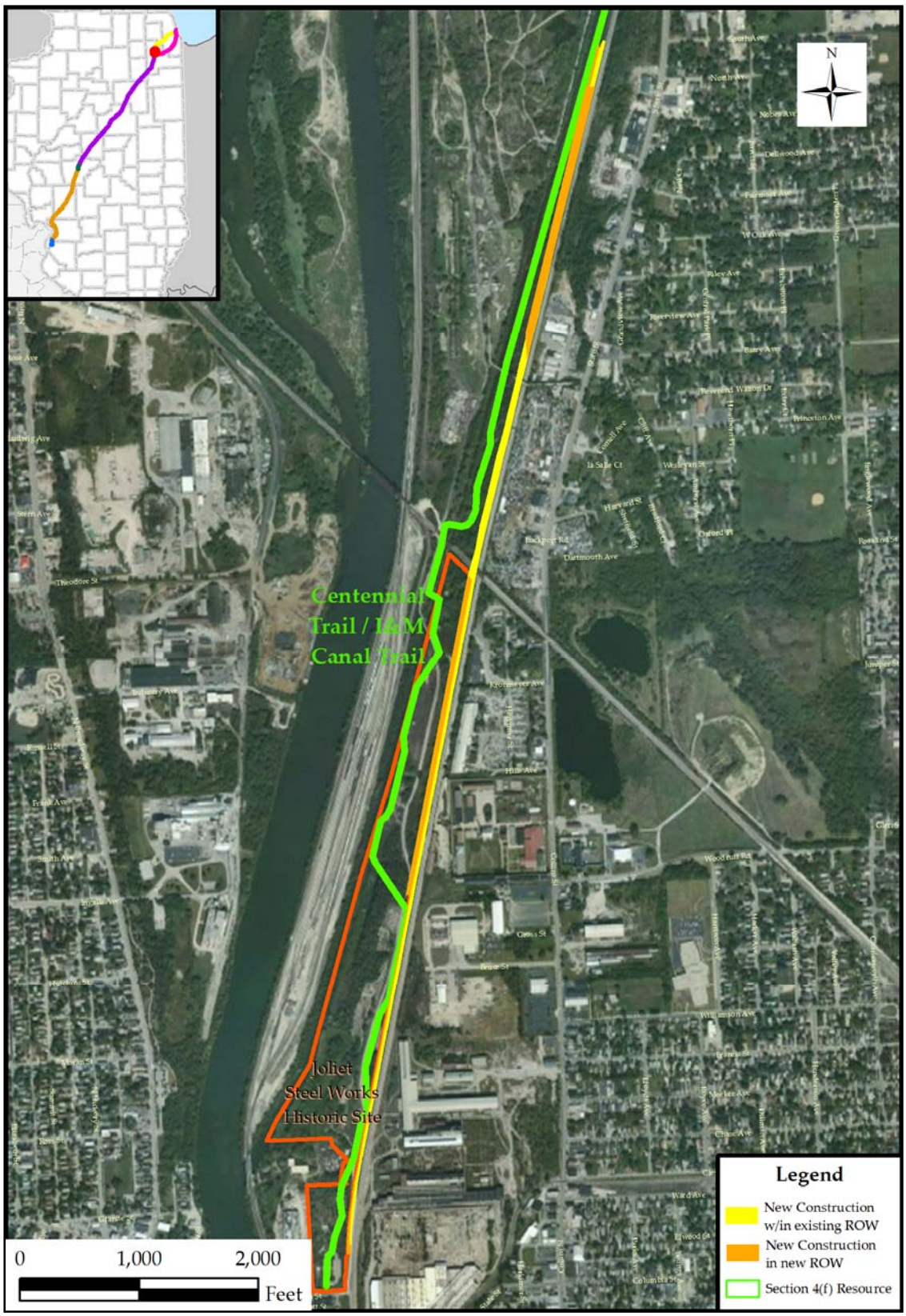


Exhibit 5.15-3. Potential Impacts to Centennial Trail / I&M Canal Trail

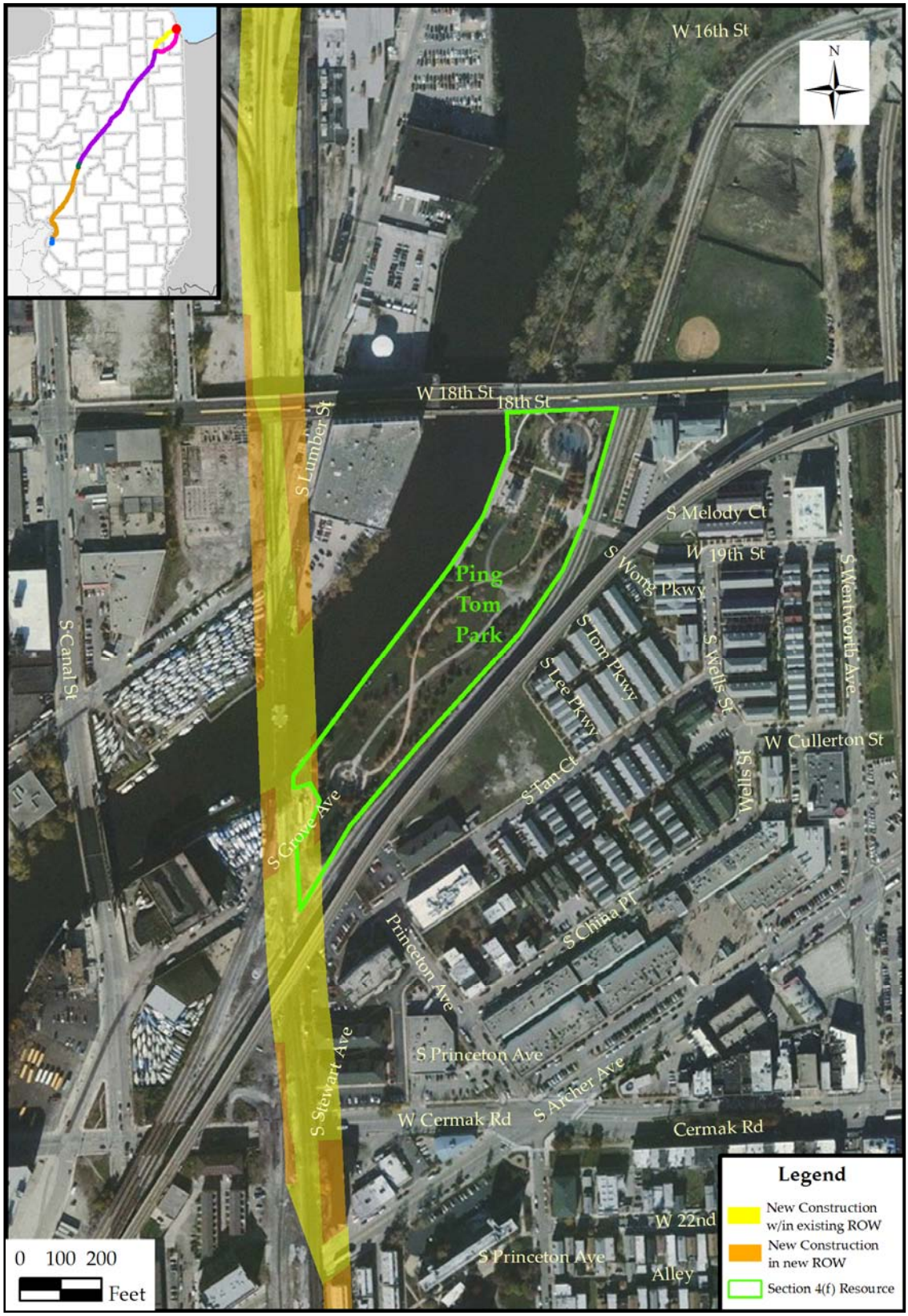


Exhibit 5.15-4. Potential Impacts to Ping Tom Park

Exhibit 5.15-5. Potential Impacts to Hamilton Park

Lyle Park

This linear park in the Auburn Gresham neighborhood is located in former Chicago & Western Indiana Railroad right-of-way, extending for three blocks, from 76th Street to 79th Street between S. Wallace Street and Metra. The southern boundary of the park is adjacent to the Section 2 alignment. The park includes open space and a small playground toward its northern end. Improvements in this area would include construction of an additional track and would require a strip of additional right-of-way (approximately 0.3 acres) from the southern end of the park (Exhibits 5.15-6).

Vogt Woods Park

This 29-acre park in the Village of Tinley Park, is located adjacent to the north side of the Section 2 alignment near 171st Street. The park, owned by the Tinley Park District, includes a picnic shelter, a baseball field, a soccer/football field, a playground, a large wooded area, and a recreation building. Improvements in this area would include

construction of an additional track along the length of the park (Exhibit 5.15-7). The majority of this construction would occur within the existing right-of-way; however, approximately 0.4 acres of additional right-of-way would be required from the southwest corner of the park.

Midlothian Meadows

This 455-acre park in located in Oak Forest, adjacent to the southeast side of the Section 2 alignment, is part of the Forest Preserve District of Cook County. The park includes four large picnic shelters and a bike path. Improvements in this area would include construction of an additional track along the entire northwest boundary. A portion of this activity would require the acquisition of an approximately 45-foot wide, 1,500-foot long strip of right-of-way from the park, totaling approximately 1.7 acres (Exhibit 5.15-8).

St. Mihiel Reservation

This 3,800-acre park located in Oak Forest, adjacent to the southeast side of the Section 2 alignment, is part of the Forest Preserve District of Cook County. The park includes a parking area, hiking trails, and three ponds. Improvements in this area would include construction of an additional track, requiring a strip of new right-of-way ranging from 20 to 50 feet wide, along the entire 2-mile long northwest boundary, totaling 5.0 acres (Exhibit 5.15-9).

Pilcher Park

This 640-acre park located in the City of Joliet, adjacent to the north side of the Section 2 alignment, is owned by the Joliet Park District. The park includes playground areas, picnic grounds, hiking trails, bicycle trails, and cross country ski trails. Improvements in this area would include construction of an additional track, requiring a strip of new right-of-way approximately 25 feet wide and 4,700 feet long, totaling 2.9 acres (Exhibit 5.15-10).

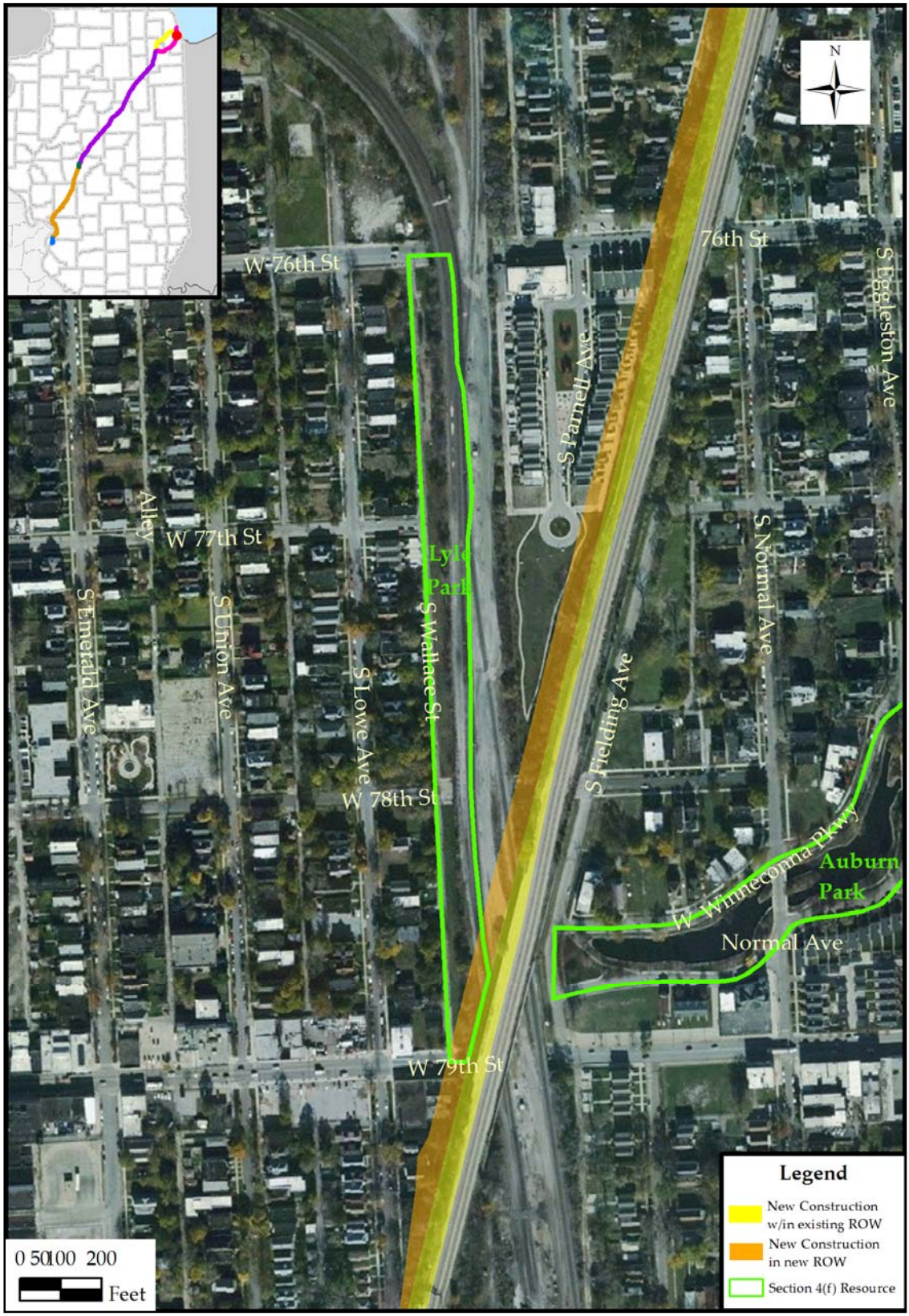


Exhibit 5.15-6. Potential Impacts to Lyle Park

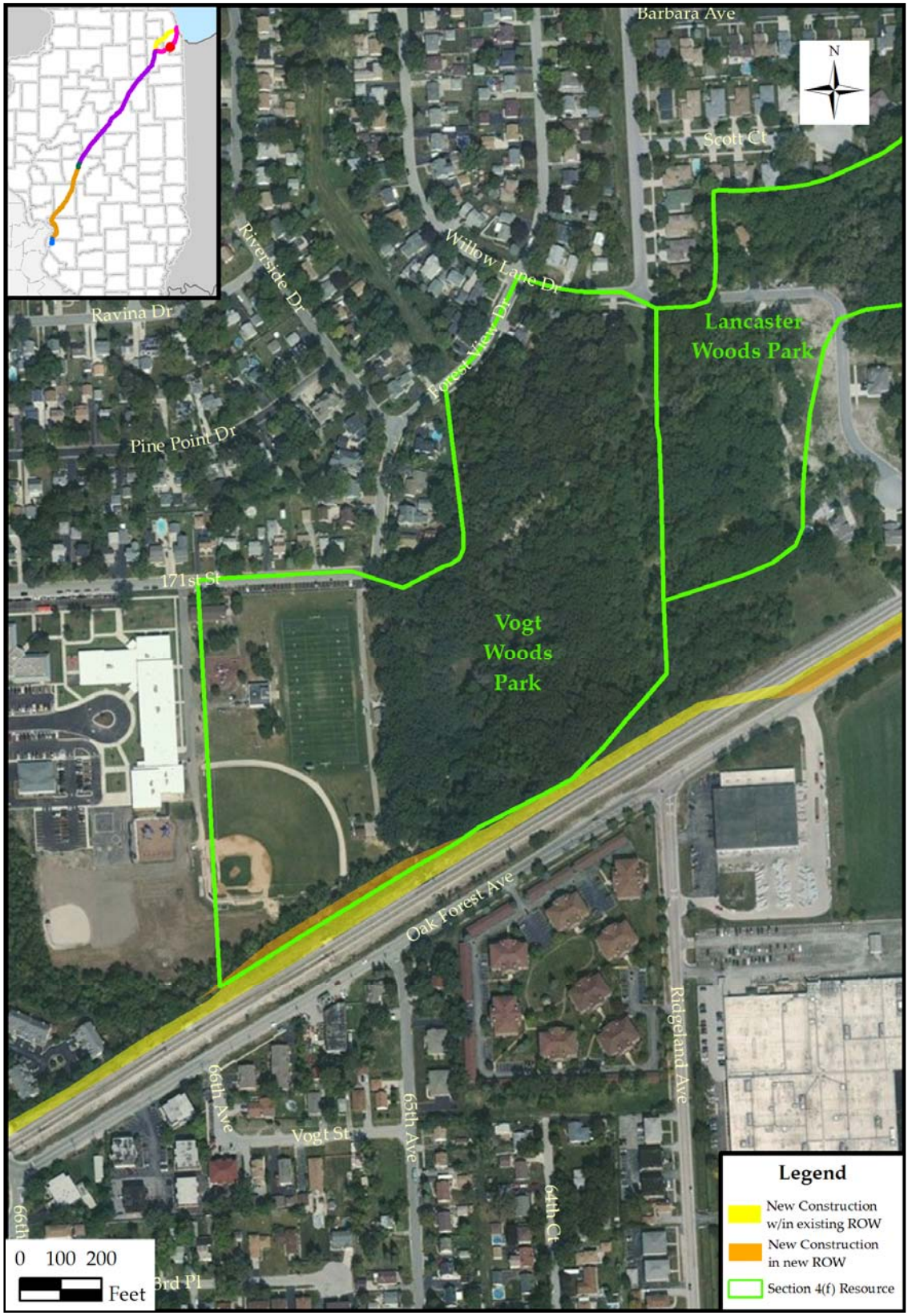


Exhibit 5.15-7. Potential Impacts to Vogt Park

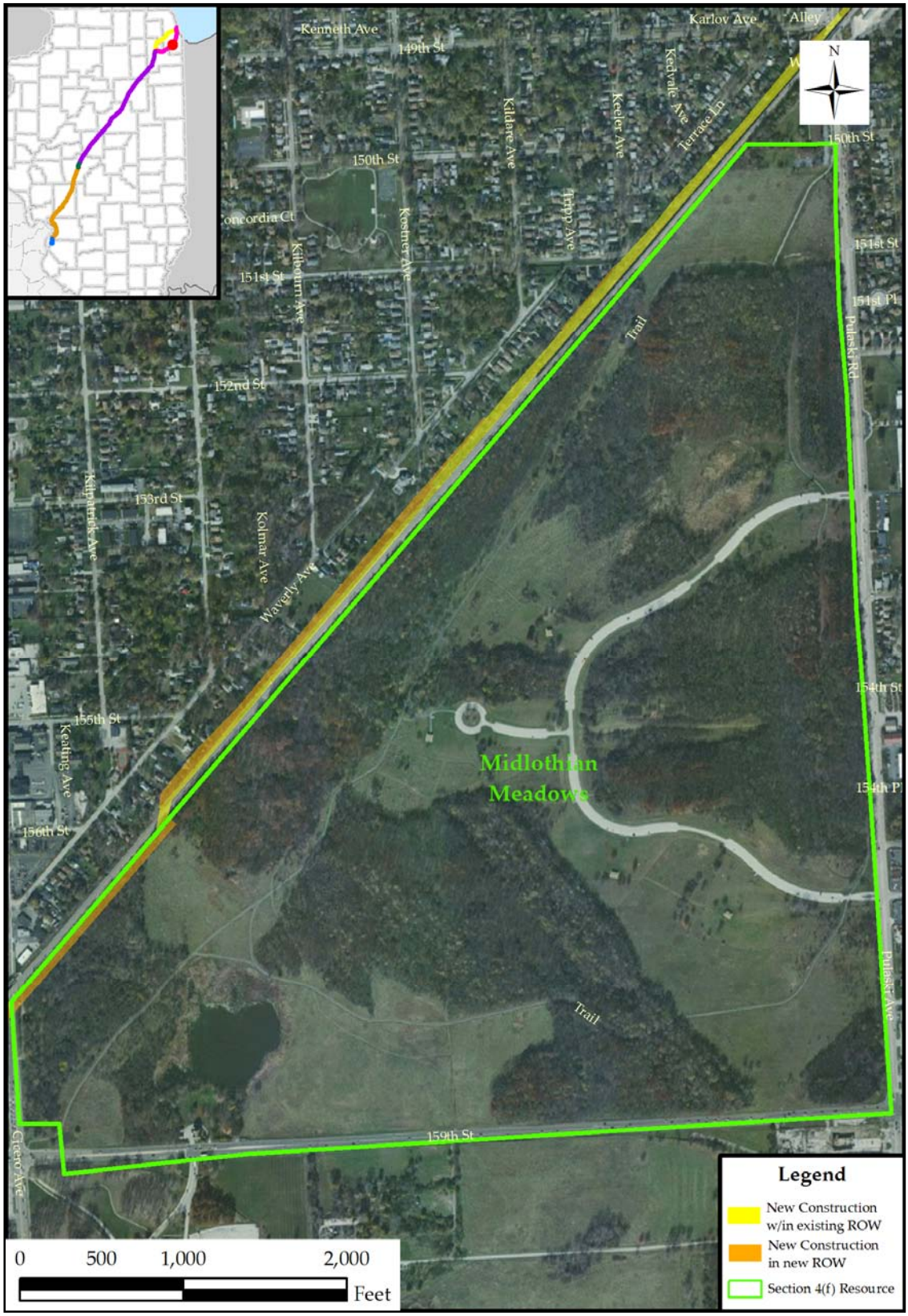


Exhibit 5.15-8. Potential Impacts to Midlothian Meadows

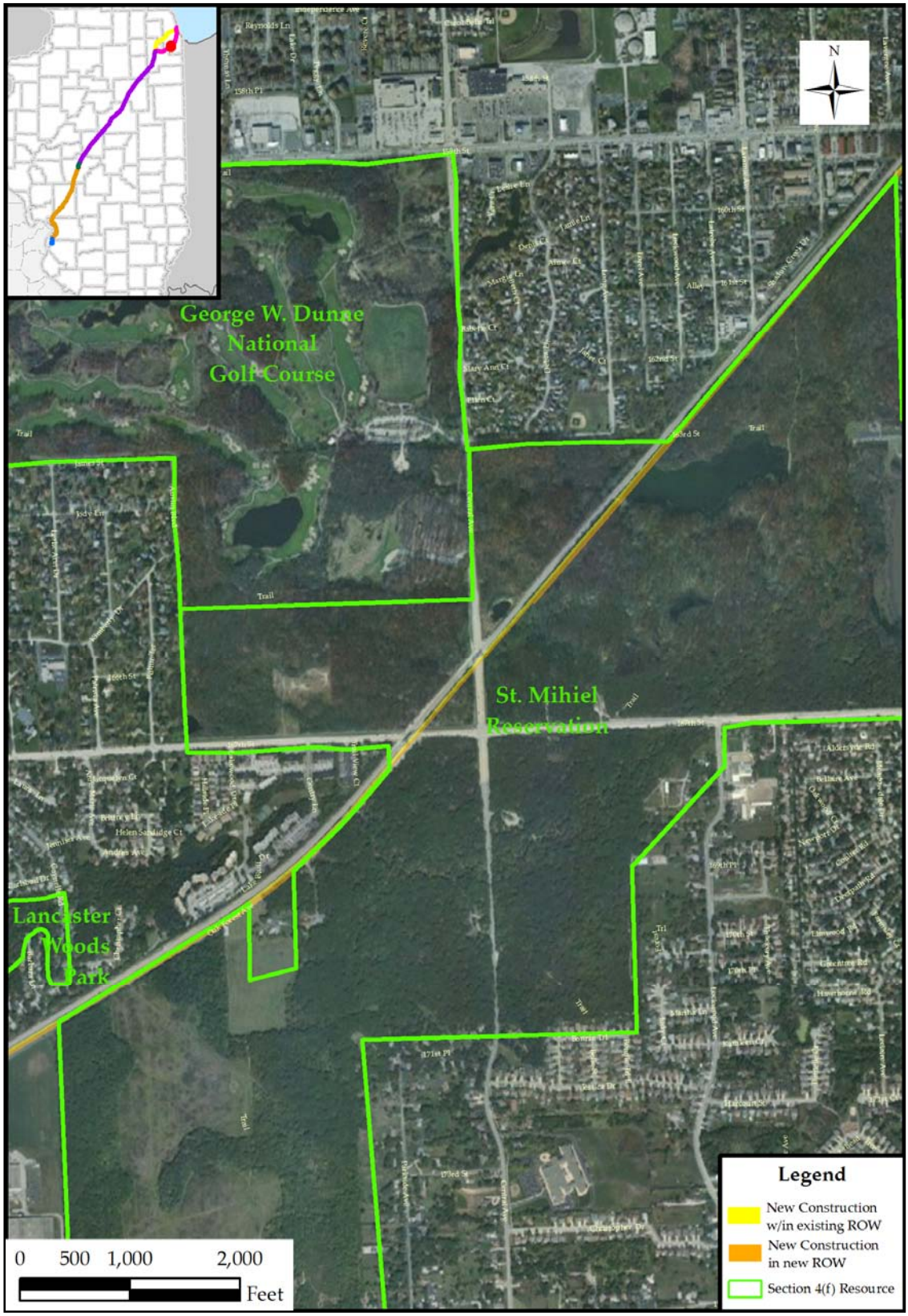


Exhibit 5.15-9. Potential Impacts to St. Mihiel Reservation

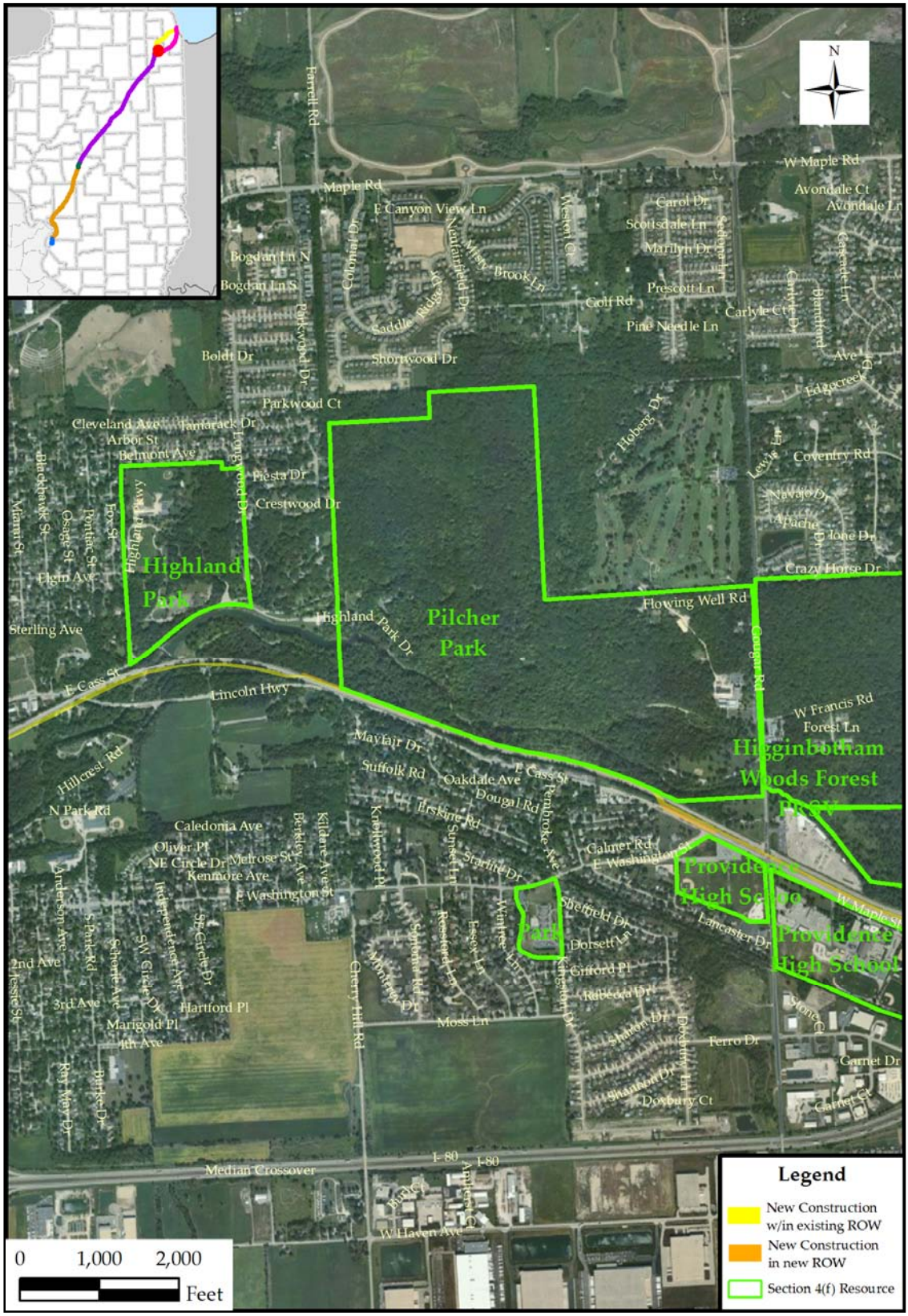


Exhibit 5.15-10. Potential Impacts to Pilcher Park

Hickory Creek Preserve

This 1,542 acre park located in overlapping portions of Frankfort, New Lenox, and Mokena, is owned by the Forest Preserve District of Will County. The park includes picnic areas, hiking, and a bike path, which provides a connection to the Old Plank Road Trail to the south. Improvements in this area would include construction of an additional track, requiring a strip of new right-of-way approximately 70 feet wide and 4,300 feet long, totaling approximately 7.2 acres (Exhibit 5.15-11).

Section 3

Midewin National Tallgrass Prairie

This 20,000-acre property was established in 1996 on the site of the former Joliet Arsenal. Most of the property is now owned by the U.S. Forest Service. Cleanup efforts by the U.S. Army have allowed 7,200 acres of the property to be opened to the public for recreation. The property has 22 miles of trails for non-motorized recreation and allows hunting in limited areas. As shown in Exhibit 5.15-12, the existing Union Pacific rail line bisects the property, running north-south, for approximately 3.8 miles. The existing railroad right-of-way through the property is approximately 75 feet wide and includes a single track throughout.

Improvements would include the construction of a second track throughout the limits of the property. Through a majority of the property, construction would occur within the existing right-of-way. At the southern end of the property, a strip of additional right-of-way, approximately 4 feet wide and approximately 0.7 miles long on the east side of the existing right-of-way, would be required to accommodate the second track. This would require acquisition of approximately 0.6 acres of land from the property. Coordination with the U.S. Forest Service will be required during Tier 2 studies to confirm that this area meets the requirements of a wildlife or waterfowl refuge under Section 4(f).

Funks Grove Land and Water Reserve/ Funks Grove Nature Preserve/ Stubblefield Woodlots Nature Preserve

This 1,000+ acre natural area provides an example of the virgin forests once isolated on the prairies of the Midwest. Today it hosts over 5 miles of hiking trails and the Sugar Grove Nature Center. This IDNR-owned site has also been designated a National Natural Landmark by the National Park Service. Improvements in this area would include construction of an additional track along the entire southeast boundary, including the acquisition of narrow strips of right-of-way of varying widths, totaling 2.9 acres (Exhibit 5.15-13).

Edward R. Madigan State Park/Railsplitter Park

A 974-acre park just south of Lincoln, the park includes picnic, fishing, canoeing, and hiking facilities. As shown in Exhibit 5.15-14, the existing railroad right-of-way splits the property running northeast-southwest, for approximately 3,700 feet. The existing railroad right-of-way through the property ranges from 90-100 feet wide and includes a single track throughout. The alignment borders the park up to its northern boundary at

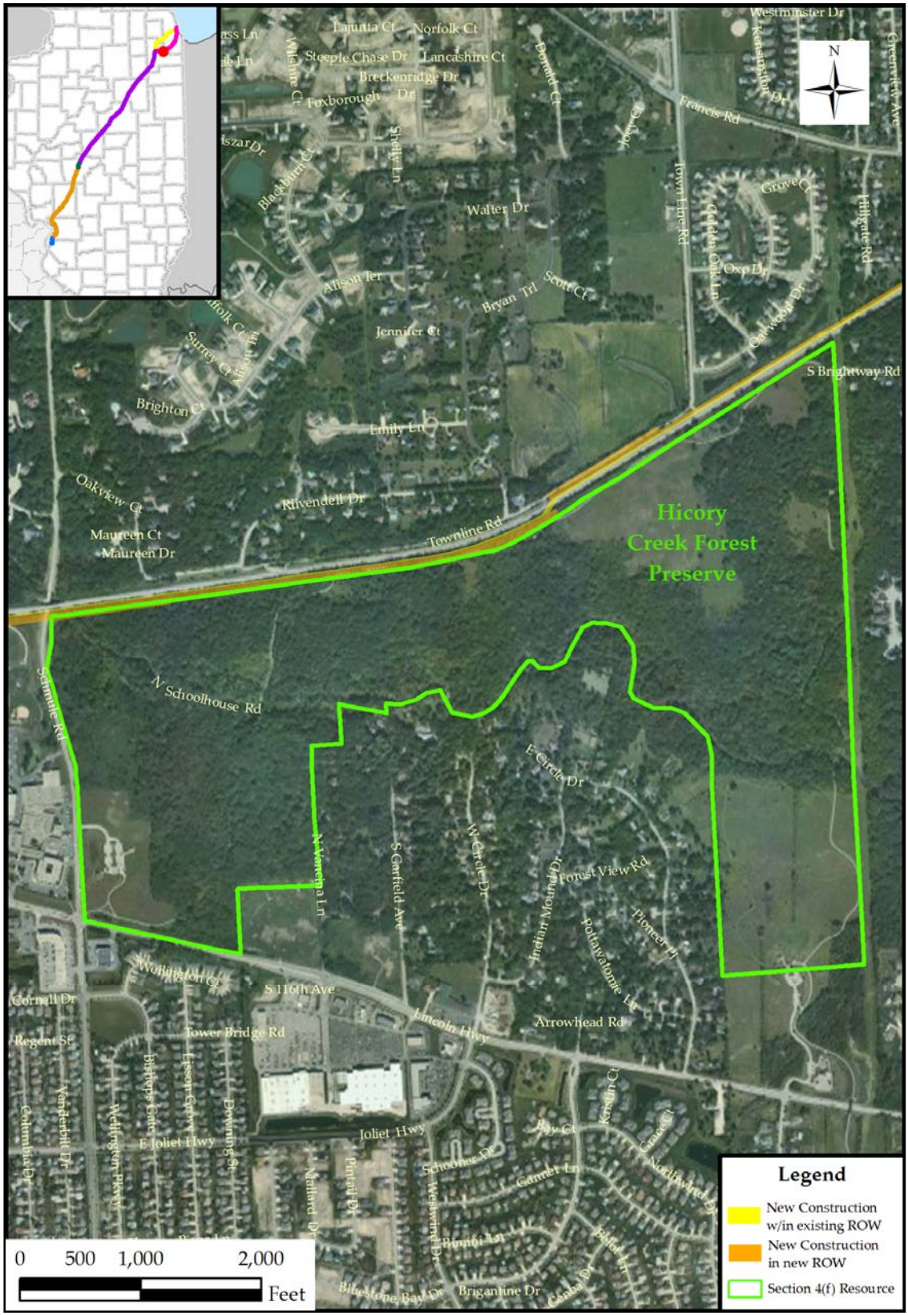


Exhibit 5.15-11. Potential Impacts to Hickory Creek Forest Preserve

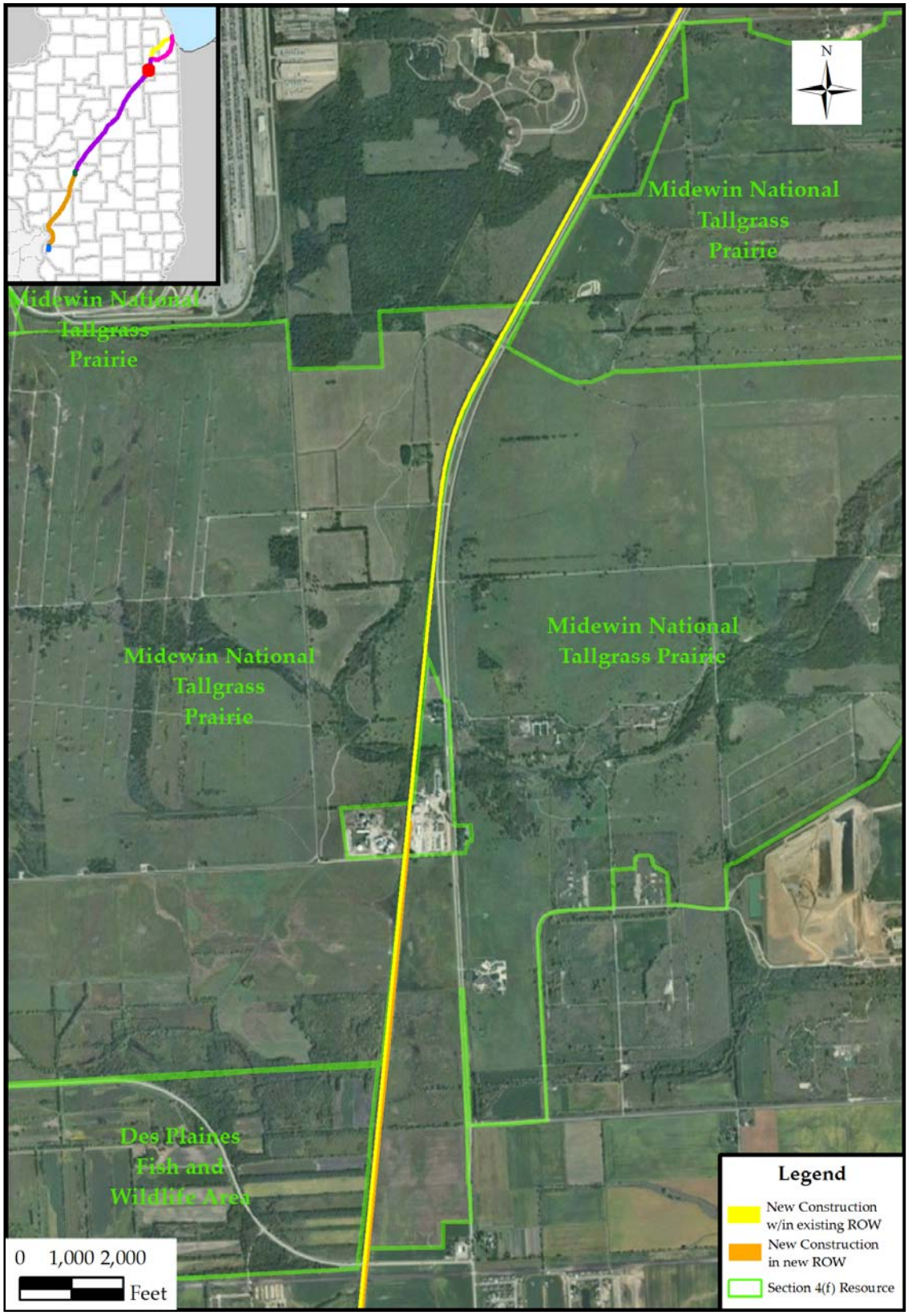


Exhibit 5.15-12. Potential Impacts to Midewin National Tallgrass Prairie

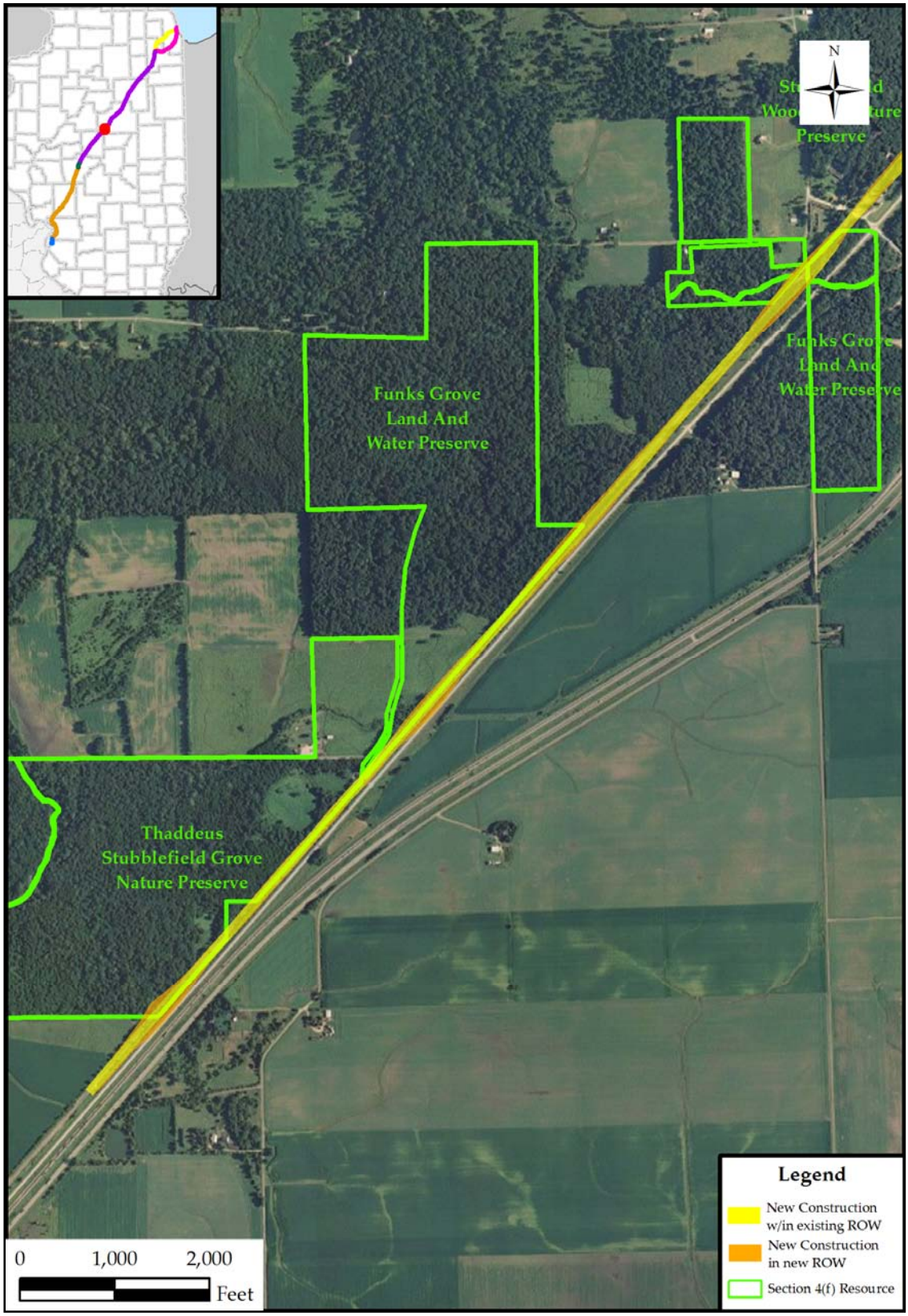


Exhibit 5.15-13. Potential Impacts to Funks Grove/Stubblefield Nature Preserve

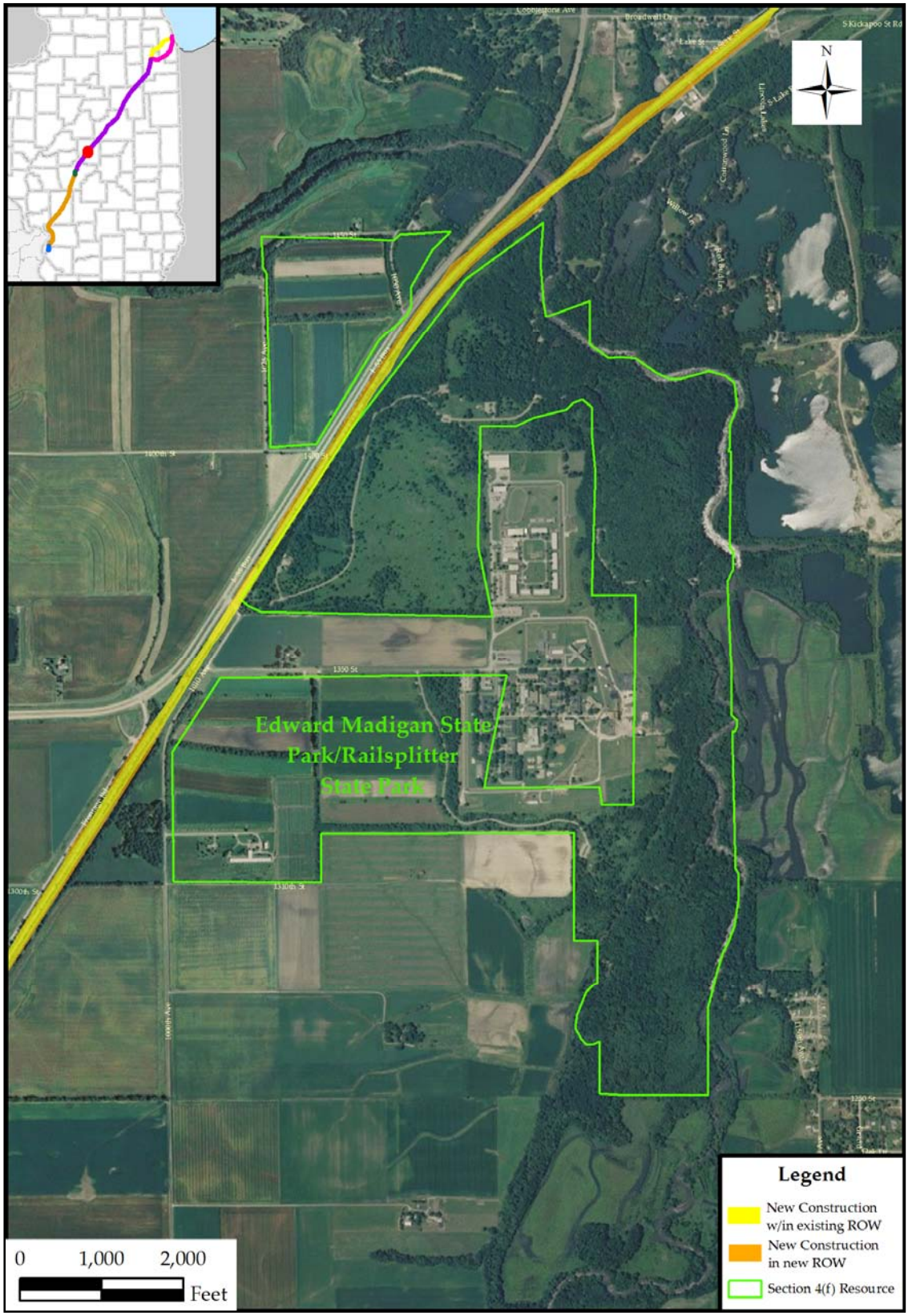


Exhibit 5.15-14. Potential Impacts to Edward Madigan State/ Railsplitter State Park

Salt Creek. Improvements would include the construction of a second track, adjacent to the length of the property, approximately 1.2 miles. Through a portion of this area, additional right-of-way would be required from the park, totaling approximately 1.3 acres of property. Due to the need to construct a new railroad bridge over Salt Creek, additional temporary right-of-way would be required in the approach to Salt Creek.

Section 6

Interurban Trail

This 8-mile paved trail parallels the proposed alignment from Walnut Street in Chatham to just north of I-72 on the southern edge of Springfield. Approximately 4.8 miles of the 10-foot wide path is located immediately west of the rail line and crosses Lake Springfield on a separate bridge. Improvements throughout this section, shown on Exhibit 5.15-15, include the construction of a second track, with the majority occurring within the existing right-of-way or additional right-of-way to the east. There is one section near I-72, where a narrow strip of new right-of-way, approximately 10 feet wide and 1,700 feet long (0.4 acres), would be acquired adjacent to the Trail.

5.15.2.2 *Section 6(f) Impacts*

As described in Section 4.5, property acquired or developed with LWCF funds may not be converted to non-outdoor recreation use without approval of the National Park Service (NPS). Actions that trigger a conversion include:

- Property interests are conveyed for private use or non-public outdoor recreation uses.
- Non-outdoor recreation uses (public or private) are made of the project area, or a portion thereof, including those occurring on pre-existing rights-of-way and easements, or by a lessor.
- Unallowable indoor facilities are developed within the project area without NPS approval, such as unauthorized public facilities and sheltering of an outdoor facility.
- Public outdoor recreation use of property acquired or developed with LWCF assistance is terminated.

As noted in Section 4.5, two recreation sites, the Centennial Trail/I&M Canal Trail and Beaver Dam State Park, were identified as receiving LWCF grants and are, therefore, potentially eligible for protection under Section 6(f). Beaver Dam State Park would not be impacted by the program. As described in Section 5.15.1, the Centennial Trail/I&M Canal Trail may be impacted permanently by the program. Coordination with IDNR and NPS will be required during the Tier 2 study to whether these impacts constitute a conversion of protected uses under Section 6(f) of the LWCF.

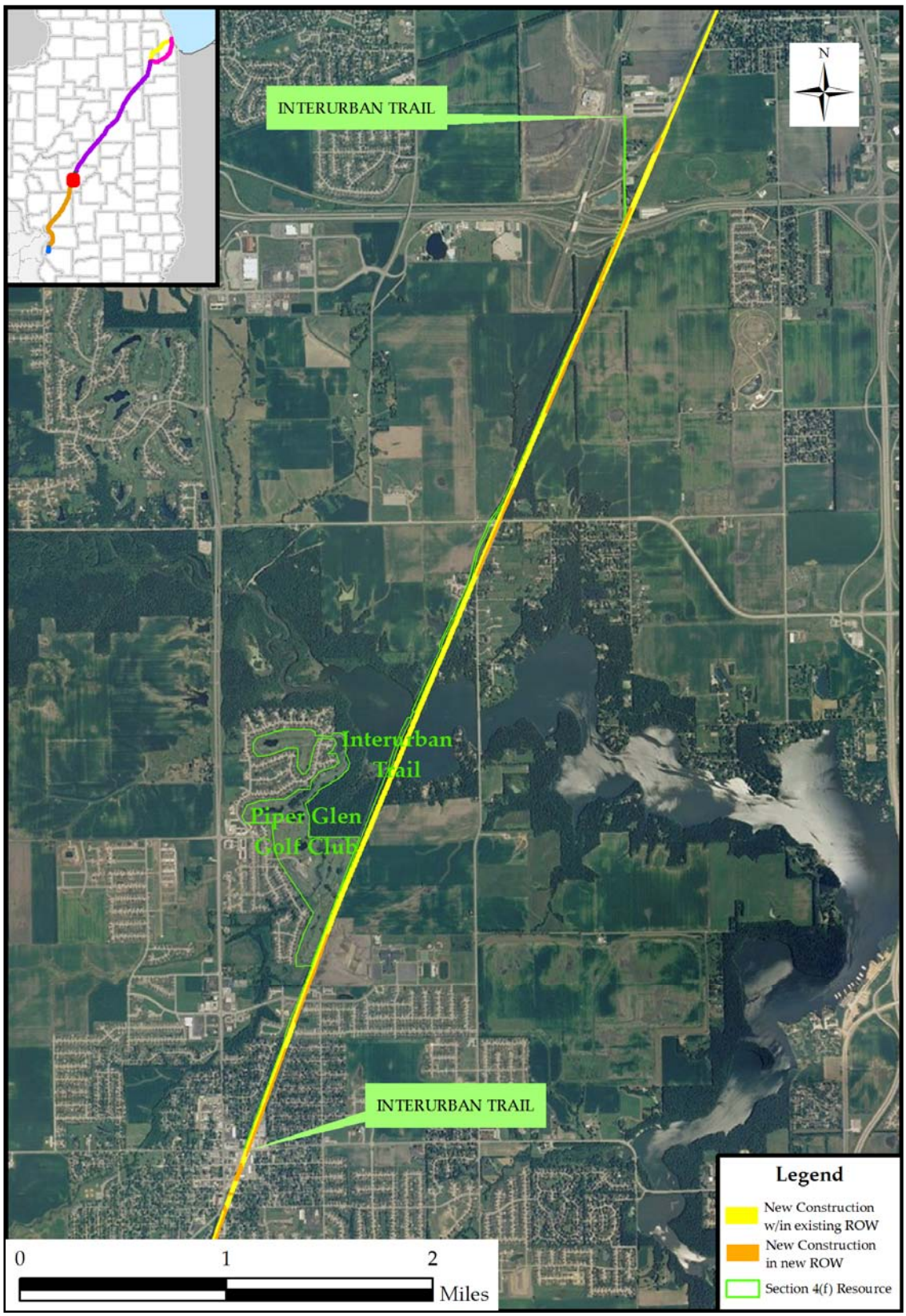


Exhibit 5.15-15. Potential Impacts to Interurban Trail

5.16 Safety and Security

5.16.1 No-Build Alternative

Under the No-Build Alternative, no changes to rail operations safety and security and crossing safety are planned beyond the improvements included in the 2004 Record of Decision.

5.16.2 Build Alternatives

5.16.2.1 *Rail Operations Safety and Security*

Train Operations

FRA's Track Safety Standards (49 CFR 213) are based on classifications of track that determine maximum operating speed limits, inspection frequencies, and standards of maintenance, among other issues. Higher track classes require more stringent maintenance standards to support higher allowable maximum operating speed.

The proposed maximum speed for the Chicago-St. Louis HSR passenger service is 110 mph, or FRA Class 6. The proposed improvements, described in Section 3.16.6 would bring the rail infrastructure in the selected corridor into compliance with FRA standards for Class 6. The Service Development Plan, summarized in Section 6, includes all maintenance and monitoring activities required for Class 6 operations.

Passenger Areas

At this time, all existing stations are proposed to remain in service. Tier 2 will consider the need to upgrade or potentially relocate stations in the corridor. That evaluation will also consider the potential need for safety improvements at each station.

Yard/Service Areas

Amtrak would continue to utilize existing yard and maintenance facilities in the Chicago area to store and maintain trains and equipment. No physical improvements to these facilities are proposed at this time. If needed improvements are identified during Tier 2, the potential impact of those improvements will be evaluated at that time.

Amtrak has identified the need for a new maintenance facility in the St. Louis area to support the expanded passenger service. A location for this facility has not yet been identified. The location of this site will be determined during Tier 2, with evaluation of impacts to be completed at that time.

The Tier 2 will also include a safety and security evaluation for yard/service areas to identify any improvements (physical or operational) required to minimize risks to passengers, the general public, and infrastructure.

5.16.2.2 *Crossing Safety*

Rail-Rail Crossings

Each of the rail-rail crossings has been evaluated for its ability to accommodate the proposed service. The crossings identified in Table 5.16-1 have been identified for upgrade as part of this program. For existing grade-separated crossings, improvements are required to accommodate the additional proposed tracks. The at-grade crossings identified in the table are proposed for grade-separations.

All upgrades would be completed in compliance with relevant safety standards. For the existing grade-separated crossings, this would not have a substantive effect on safety. Crossings proposed for grade-separation would realize a substantial improvement in safety as the potential conflict between trains on adjacent tracks is eliminated.

Table 5.16-1. Rail-Rail Crossings to be Modified

Section	Milepost	HSR Alignment Railroad	Crossing Railroad	Existing Grade
1	5.10	CN	Baltimore & Ohio Railroad	At-Grade
1	6.60	CN	Grand Trunk Railroad	At-Grade
1	7.90	CN	Chicago Belt Railroad	At-Grade
1	13.20	CN	Indiana Harbor Belt Railroad	At-Grade
1	35.45	CN	Elgin Joliet & Eastern Railroad	Under
2	16.28	NIRC	Baltimore and Ohio Railroad	Over
2	16.33	NIRC	Grand Trunk Western Railroad	Over
2	33.09	NIRC	Baltimore and Ohio Railroad	Over
2	38.96	NIRC	Elgin, Joliet & Eastern Railroad	At-Grade
6	187.40	UP	Norfolk Southern	At-Grade
7	281.16	UP	Metrolink	Over
7	0.00	UP	Gulf Mobile & Ohio Railroad	Over
7	0.00	UP	Illinois Central Railroad	Over

Highway-Rail Crossings

Most crossings in the corridor would require some type of improvement to accommodate the upgraded service. Where additional tracks are to be added, crossing surfaces, gates, and other equipment must be modified.

Based on the 2004 Record of Decision, all at-grade highway-rail crossings in Sections 3 through 7 would be upgraded to provide four-quadrant gates where they are not already present. This program would include the installation of four-quadrant gates at all remaining at-grade crossings. See Appendix E for a complete listing of crossings and proposed crossing protection.

Section 3.16.6.3 evaluated every highway-rail crossing for its suitability for grade-separation. These locations were identified based on setting (urban or rural) and their predicted exposure factor, a function of train and vehicular volumes. Section 3.16.6.3 identifies 101 crossings in the study corridor for potential grade separation, which will be evaluated further in Tier 2.

All proposed grade-separated highway-rail crossings would include sidewalks to facilitate safe pedestrian access.

Fencing that would direct pedestrians to bridges/underpasses will be proposed for some locations in urbanized areas as part of the program. Coordination between IDOT and the affected communities would take place during Tier 2 to determine the location, style, and height of the proposed fencing. Community cohesiveness and aesthetics would be balanced with increased safety in a cooperative fashion.

5.17 Permits

There will be permit requirements for construction of the Build Alternative associated with the crossing and filling of water resources and wetlands. Section 404 permits will be needed from the U.S. Army Corps of Engineers for wetlands where filling occurs. In addition, a Section 401 water quality certification will have to be obtained from the Illinois Environmental Protection Agency.

Permits from the Illinois Department of Natural Resources, Office of Water Resources, will be required for construction activity in and around streams and floodplains.

It is anticipated that the Build Alternatives for this program will result in the disturbance of one or more acres of total land area. Therefore, it will be subject to the requirement of a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges from the construction sites. The NPDES program requires a Notice of Intent, the development of a Stormwater Pollution Prevention Plan (SWPPP), and the submission of a Notice of Termination when final stabilization of the construction site has been achieved. The SWPPP would identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges from the construction site and would describe and ensure the implementation of practices which would be used to reduce the pollutants in discharges associated with construction site activities and assure compliance with the terms of the permit. Permit coverage for the program will be obtained either under the Illinois Environmental Protection Agency General Permit for Stormwater Discharges from Construction Site Activities (NPDES Permit No. ILR10), or under an individual NPDES permit.

If endangered species are identified during program implementation, all activity in the immediate area would cease. Coordination with the U.S. Fish and Wildlife Service would be initiated as required by Section 7 of the Endangered Species Act of 1973, and appropriate state or federal permits would be sought.

Local agencies follow federal, regional, and state permitting requirements and procedures.

5.18 Construction Impacts

5.18.1 No-Build Alternative

No impacts.

5.18.2 Build Alternatives

In general, construction activities for HSR corridor improvements will impact rail traffic by reducing operating speeds through the construction zones that will add to rail travel time and, in turn, increase cost. This will occur in the case of siding tracks, double-tracks, and addition of tracks for alternative connections. There will also need to be schedule adjustments of existing operations to create windows of opportunity for construction activities including temporary shutdown of rail operations on selected track sections for limited times. Any necessary track work would need to be constructed prior to relocation of rail traffic. This work would be completed in stages.

Permission from the railroad owners will be required for any construction that will take place within the railroad right-of-way. Schedule adjustments will be required when construction activities will either directly impact the mainline track, such as when the new turnouts are being placed for the passing sections and new sidings, or when there is a potential safety risk, such as during the construction of a flyover.

Vehicular traffic will be temporarily impacted at locations where grade crossings will be separated, modified, or improved. The grade crossing improvements will, at a minimum, require traffic to slow down as it passes through the construction zone while new warning devices and other improvements are installed. In some cases, temporary diversion of traffic to adjacent crossings might be required.

Construction of grade separations would be staged to minimize street closures. This would be accomplished primarily by closing the outside lanes during retaining wall and bridge abutment construction while maintaining traffic on the inside lanes. The adjacent parallel streets would be used for detour traffic during street closures. Another option is to construct a temporary detour around the construction site. This would reduce the amount of adverse travel but add to the total program cost.

Where impacts to vehicular traffic exists, emergency services, schools, businesses, and other activities requiring vehicular access will be affected by potential delays or detours.

However, all of the construction related impacts on vehicular traffic will be temporary and are considered minor.

All station and platform modifications will be phased and constructed prior to relocation of passenger traffic.

5.19 Indirect and Cumulative Impacts

5.19.1 No-Build Alternative

No impacts.

5.19.2 Build Alternatives

- ***Indirect Impacts***

Indirect impacts are defined as the effects of the proposed project that occur at a different time or location from the direct impacts of the project. Typically, indirect impacts are associated with a project's potential to induce development. For transportation projects, this usually involves the creation of new or significantly improved access to areas that are relatively undeveloped. The new/improved access then has the potential to induce commercial, residential, and/or business development. The potential future impacts to natural, cultural, and socioeconomic resources that may be associated with the induced development are then considered indirect impacts. For this Tier 1 level of analysis, a general qualitative assessment was conducted for the HSR Program in order to determined if and where potential indirect impacts could occur. For this program, the assessment of indirect impacts focused on the program's potential to induce development in the vicinity of the train stations. Based on this initial assessment, it is anticipated that the program would result in negligible indirect impacts for the following reasons:

- The program would utilize existing rail corridors and train stations and, therefore, would not result in the development of new access or train stations in areas that previously did not have any passenger rail service.
- It is anticipated that the increased ridership would have a minimal effect on inducing development around the existing train stations, which are already located in developed/urbanized areas. Any induced growth that may occur would be limited to the built-up areas in the immediate vicinity of the train stations and would likely include small restaurants and/or retail shops that would be attracted by the increase in transit passengers and potential customers. Any potential growth that may occur would be controlled by the local, state, and federal agencies that would be responsible for approving such development and permitting the impacts to any regulated resources that may be impacted.

The evaluation of potential indirect impacts as part of the 2003 FEIS for the Chicago-St. Louis High-Speed Rail Program resulted in a similar conclusion stating that "Implementation of the Preferred Alternative is not expected to substantially alter development patterns in the corridor and near stations."

If deemed necessary, a more detailed analysis of indirect impacts could be conducted at the Tier 2 level.

5.19.2.1 *Cumulative Impacts*

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.7). Because this is a Tier 1 level of analysis and due to the extent of the program length (i.e., 284 miles), this cumulative impacts assessment did not involve a detailed and qualitative analysis of specific past, present, and future projects along the entire corridor but a more qualitative assessment of the program's overall potential for cumulative impacts. With regard to train service along the existing corridor, the primary issue would be the potential cumulative impacts associated with noise when considering the anticipated increase of freight trains in addition to the increase in HSR passenger trains. When conducting the noise analysis for this program, both freight and HSR passenger trains were included (see Section 5.8). As a result, the noise analysis addresses cumulative impacts.

With regard to natural, cultural, agricultural, and socioeconomic resources, it is anticipated that the program would result in negligible cumulative impacts for the following reasons:

- Because the HSR Program would involve primarily the addition of a second track that would parallel the existing track, the majority of the impacts would be within the existing right-of-way and in previously disturbed areas.
- Any new impacts outside of the existing track's footprint and right-of-way would be relatively narrow, linear, and distributed over a long distance (i.e., 284 miles). As a result, the impacts to any given resource (e.g., natural, cultural, agricultural, or socioeconomic) within any given area (e.g., ecosystem, watershed, community) is expected to be relatively small and would have a negligible cumulative effect when added to any other project impacts in those areas.
- The vast majority of the study corridor has been, currently is, and will continue to be farmland. The remaining study corridor is mostly comprised of highly developed urban areas that would not contribute to cumulative impacts. The only areas that may be experiencing land use changes that could contribute to cumulative impacts would be the suburban areas associated with the major metropolitan areas such as Chicago, Springfield, and St. Louis.

The most notable known projects that would result in cumulative impacts along the study corridor when added to this program are the high-speed rail improvements from Dwight to St. Louis associated with the 2004 ROD and the high-speed rail improvements from Joliet to Dwight associated with the 2011 EA. The 2004 ROD improvements are in various stages of development and include the provisions for three daily round trips along the existing Chicago to St. Louis Amtrak route, with 110 mph high-speed rail service south of Dwight, 12 miles of double track, 22 miles of freight sidings, station

improvements, one grade-separated crossing, and enhanced warning devices at 174 crossings. Because most of these improvements will occur within the existing right-of-way and/or within previously disturbed areas, the cumulative effect of adding these impacts to the impacts associated with this project are anticipated to be minimal.

The proposed 2011 EA improvements from Joliet to Dwight include upgrading approximately 36 miles of existing track and associated crossings to accommodate 110 mph high-speed rail passenger trains, the addition of six miles of double track, approximately two miles of new side track, and about 12 new turnouts. Because most of these improvements will occur within the existing right-of-way and/or within previously disturbed areas, the cumulative effect of adding these impacts to the impacts associated with this program are anticipated to be minimal.

Although minimal, the cumulative negative impacts associated with these projects would primarily be limited to prime farmland, vegetation/habitat, wetlands, and streams that are located along the existing railroad corridor. With regard to air quality, these projects are expected to provide an overall cumulative benefit. The high-speed rail facility is expected to provide service to motorists who would otherwise travel between Chicago and St. Louis by automobile. This shift in travel mode is expected to reduce overall vehicle emissions. These projects would also result in a cumulative benefit of removing automobiles from congested roadways and improving safety by shifting automobile travelers to a safer mode of transportation.

If deemed necessary, a more detailed analysis of cumulative impacts could be conducted at the Tier 2 level.

5.20 The Relationship between Local Short-Term Uses and Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

National Environmental Policy Act (NEPA) regulations [40CFR 1502.16] require a discussion of the "relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity" as part of an EIS. NEPA requires the evaluation of a project to determine whether long-term benefits are worth the short-term adverse effects.

In the preparation of this DEIS, all significant short- and long-term environmental relationships created by program alternatives have been quantified in light of the avoidance, minimization, and compensation of unavoidable impacts on resources. In addition to wetlands, wildlife, air quality, water, farmland, and historical/archaeological factors, quantified resources include options of societal land use and development. Those commitments are represented by secondary and cumulative developments anticipated as a consequence of implementation of the program.

The long-term enhancement and benefits of the HSR corridor transportation system improvements will occur at the expense of short-term, temporary construction impacts

on nearby residents, businesses, and motorists. Those short-term effects will include, but are not limited to, traffic congestion and delays, aesthetic degradations resulting from construction equipment, energy consumption during construction, restricted access to residences, and localized noise, air and water pollution. Based on standard environmental specifications made part of construction contracts as directed by this DEIS, they will not have a lasting impact on the environment.

Short-term gains to the local economy will occur during construction resulting from hiring local firms and labor, and local services and supplies. In the long-term, any of the build alternatives would increase the railroad's system capacity and passenger services and improve safety, traffic congestion and delays from Chicago to St. Louis.

While the program would require a commitment of resources in the short-term railroad construction, it would conform to national and regional planning and would result in long-term benefits by accommodating anticipated train and vehicular traffic volumes, reducing air emissions through an efficient flow of rail and vehicular traffic, and limiting encroachment into sensitive environmental resources by utilizing existing right-of-way to the extent possible.

5.21 Irreversible and Irretrievable Commitments of Resources

To fulfill NEPA requirements of a consolidated discussion of environmental consequences to focus on any irreversible and irretrievable commitments of resources, the following includes the worst case for the program Build Alternatives.

The irreversible commitment of resources is the use of non-renewable resources including fossil fuels, manufactured structural materials, and land converted to long term business and industrial use. A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. The proposed site and facilities and the energy required to build and operate the facilities represent irreversible commitments of resources. An irretrievable commitment refers to the use or consumption of resources that is neither renewable nor recoverable for later use by future generations. Irretrievable commitments of resources cause the lost production or use of renewable resources such as timber, rangeland, or wildlife habitat.

Although it is technically feasible to remove a railroad embankment and restore the landscape, one must assume that the utility of the program right-of-way will warrant its indefinite maintenance and operation to serve the transportation need. Construction associated with the Build Alternatives will necessarily involve the clearing of terrestrial vegetation and placing fill within the right-of-way. As the right-of-way is allowed to revegetate, hedgerow and grassland habitats will reestablish themselves. Other potential habitats will be irretrievably lost in those areas where the rail embankment is widened to provide additional track. Impacts to high quality remnant prairie communities will be irreversible. The loss of woody vegetation, particularly mature trees and large shrubs, will be irreversible in a reasonable time-frame as the revegetation

process requires from 15 to 25 years for the development and growth of mature hedgerow woody species and from 15 to 150 years for forested communities to reach a level as areas that will be removed during construction. Also, the restored habitat is often less diverse than similar natural communities.

Some land for additional right-of-way would also be irretrievably and irreversibly committed for conversion to railroad. The loss of agricultural crops, urban, disturbed land, and non-prairie grassland communities will be retrievable as these areas are readily replaceable.

The Build Alternatives would result in the irreversible and irretrievable commitment of construction materials, such as steel, concrete, ballast rock, and wood. Though largely irretrievable, these resources are not in short supply and many of the materials could be recycled for other projects when they no longer meet the design needs of the passenger or freight rail service. In addition, energy resources (fuel) and financial resources would be committed to the program for construction, operation, and maintenance.

Wetlands lost due to the program will be mitigated. Aquatic habitat that has been temporarily impacted from the expansion of existing bridge structures will be restored in a relatively short-term. The Build Alternatives will not result in irreversible or irretrievable commitments of resources for farmlands, natural areas, threatened or endangered species, or water resources.

5.22 Summary of Impacts and Costs

Table 5.22-1 summarizes the impacts and costs for each of the Build Alternatives. The No-Build Alternative would not result in any impacts.

Table 5.22-1. Summary of Impacts and Costs

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Buildings Displaced	134	189	213	268
New Right-of-Way	336-352 ac	372-373 ac	394-410 ac	430-431 ac
Prime Farmland Soils	1,645 ac	1,643 ac	1,655 ac	1,652 ac
Historic Sites	7	6	6	5
Archaeological Sites	0	0	0	0
Forest	183.0 ac	181.3 ac	200.0 ac	198.3 ac
Prairie Remnants	232 ac	232 ac	232 ac	232 ac
Protected Natural Areas	16.3 ac	16.3 ac	16.6 ac	16.6 ac
Critical Habitat – Hine's Emerald Dragonfly	3.7 ac	3.7 ac	0	0
Noise Sensitive Receptors	218	685	342	809
Vibration Sensitive Receptors	272	305	252	285

Table 5.22-1. Summary of Impacts and Costs (continued)

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Surface Water	203	203	191	191
Special Status Streams:				
Biologically Sensitive Streams #/ft	6/1,136	6/1,136	6/1,136	6/1,136
Illinois Natural Areas Inventory Streams #/ft	6/946	6/946	6/946	6/946
Nationwide Rivers Inventory Streams #/ft	3/554	3/554	3/554	3/554
Navigable Waterways #/ft	8/959	8/959	7/095	7/905
Wellhead Protection Areas	2	2	2	2
Floodplains #/acres	36/72.7	36/72.7	43/77.9	43/77.9
Wetlands #/acres	52/41.3	52/41.7	65/46.4	65/46.3
Special Waste Sites	179	195	260	276
Section 4(f) Properties	8	8	12	12
Costs (millions)	$4,693-$4,978	$4,895-$4,939	$4,163-$4,448	4,365-$4,409

5.23 Potential Mitigation Measures

The following table summarizes potential mitigation measures for the program. Mitigation will be further identified and commitments will be finalized in Tier 2 studies.

Table 5.23-1. Potential Mitigation Measures

Impact	Mitigation
Land Use	Long Term - IDOT will implement the provisions of the State of Illinois Relocation Assistance Plan in accordance with the Uniform Relocation Act as mitigation measures where ROW acquisitions and land use changes occur.
Cultural	Mitigation measures will be determined based on the more detailed impact determinations from Tier 2 studies.
Natural Resources	Short Term - Avoidance, minimization, and best management practices implementation will reduce adverse impacts. Long Term – Coordination will continue through the Tier 2 level with the Illinois Nature Preserves Commission regarding the avoidance, minimization, and mitigation of any impacts to prairies. Coordination will continue through the Tier 2 level with the USFWS and INDR regarding the avoidance, minimization, and mitigation of any impacts to state and federal threatened and endangered species in the study corridor.

Table 5.23-1. Potential Mitigation Actions (continued)

Impact	Mitigation
Construction	Air Quality: Short Term - State and local regulations regarding dust control and other air quality emission reduction controls will be followed during construction. Noise and Vibration: Short Term: • Perform all construction in a manner to minimize noise and vibration; • Use newer equipment with improved noise muffling, and periodic inspection; • Perform independent noise and vibration monitoring to demonstrate compliance with the noise limits, and modify/reschedule activities if maximum limits are exceeded at residential land uses; • Avoid hauling and unloading operations through residential neighborhoods to the greatest extent possible; • Construction lay-down or staging areas should be selected in industrially zoned districts; • Turn off idling equipment; • Minimize construction activities during evening, nighttime, weekend, and holiday periods; • Comply with all local noise and vibration ordinances and obtain all necessary permits and variances; • When possible, limit the use of construction equipment that creates high vibration levels, such as vibratory rollers and hammers, operating within 130 feet of building structures; • Require vibration monitoring during vibration-intensive activities; • Restrict the hours of vibration-intensive equipment or activities such as vibratory rollers so that impacts to residents are minimal. Water Quality/Erosion Control: Short Term - BMPs will be utilized to protect water quality. Runoff from construction sites must be diverted from directly entering streams during and after construction. Any impervious areas resulting in a small reduction in recharge area will be mitigated using stormwater retention/detention basins.
Floodplains	Mitigation measures will be determined based on the more detailed impact determinations from Tier 2 studies.

Table 5.23-1. Potential Mitigation Actions (continued)

Impact	Mitigation
Wetlands	Long Term - A conceptual wetland mitigation plan will be developed to compensate for unavoidable impacts. Coordination with the USACE, the USFWS, and the IDNR will be required to determine specific mitigation requirements to adequately compensate for wetland losses pending final design to quantify actual wetland impacts.
Noise and Vibration	Long Term • Wheel treatments; • Rail treatments; • Vehicle treatments; • Building insulation; • Noise barriers; • Maintenance- – Rail grinding on a regular basis, especially on rails that tend to develop corrugations; – Wheel truing to re-contour the wheel and remove wheel flats. This can result in a dramatic vibration reduction. However, significant improvements can be gained from simply smoothing the running surface. Install wheel-flat detector systems to identify vehicles that are most in need of wheel truing; – Implement vehicle reconditioning programs, particularly with components such as suspension systems, brakes, wheels, and slip-slide detectors; • Relocation of Special Trackwork; • Ballast Mats; • Resiliently Supported Ties; • High Resilience Fasteners; • Floating Slab Trackbed.
Visual and Aesthetic Quality	Long Term - Views from trains into private spaces would be a positive visual impact and views of trains and new rail lines would be considered a minor adverse visual impact. IDOT will determine potential ways to help reduce minor impacts, such as planting vegetation screens or providing aesthetically pleasing features as part of the HSR design.
Special Waste	Mitigation measures will be determined based on the more detailed impact determinations from Tier 2 studies.
Special Lands	Mitigation measures will be determined based on the more detailed impact determinations from Tier 2 studies.