Appendix D1 Physical Environment

Contents

D1.1. Air Quality

The Build Alternatives would introduce eight passenger high-speed trains. This action would increase diesel locomotive emissions of NOx, VOC and $PM_{2.5}$ in the Project study area. However, these increases would be small, lower than the General Conformity *de minimis* thresholds and, therefore, considered not significant. Local emissions associated with either Build Alternative would not be significant. The Build Alternatives would not generate any significant amounts of mobile source air toxic (MSAT) emissions. Regional MSAT emissions are expected to decrease as a result of the United States Environmental Protection Agency (USEPA) regulations for engines and fuels over the next several decades. As a result, the Build Alternatives are not expected to significantly impact air quality.

National Ambient Air Quality Standards (NAAQS)

Air quality is a general term used to describe pollutant levels in the atmosphere. Ambient air quality is affected by numerous sources and activities that introduce air pollutants into the atmosphere, such as man-made pollutants resulting from incomplete combustion of fuels including coal, oil, natural gas, and gasoline. With respect to transportation projects, the main sources affecting air pollution concentrations include traffic emissions, mode type, terrain, meteorological parameters, and ambient air quality.

Air quality in the United States is governed by the Federal Clean Air Act (CAA) and is administered by the USEPA. As required by the CAA and the 1990 Clean Air Act Amendments (CAAA), the USEPA has established NAAQS (40 CFR part 50) for six major air pollutants (see Table D1-1). These pollutants, known as criteria pollutants, are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), ozone (O_3), and sulfur dioxide (SO_2). The "primary" standards have been established to protect the public health including the health of "sensitive" populations such as asthmatics, children, and the elderly. The "secondary" standards, intended to protect the nation's welfare, account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

In addition to the criteria pollutants, USEPA also regulates air toxics. MSATs are compounds emitted from highway vehicles and non-road sources such as rail, marine, construction equipment. MSATs are known or suspected to cause cancer or other serious health and environmental effects. Most air toxics originate from human made sources, including on road mobile sources, non-road mobile sources (e.g., trains), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Table D1-1. National Ambient Air Quality Standards

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	1 year	53 ppb)	Annual Mean
Ozone (O_3)		primary and secondary	8-hour	0.070 ppm (2)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	9 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1-hour	75 ppb (3)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.
(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O_3 standards.
(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment

under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Source: https://www.epa.gov/criteria-air-pollutants/naaqs-table July 2, 2024

Air Quality of the Region

USEPA publishes a list of all geographic areas in compliance with the NAAQS, as well as those areas not in attainment of the NAAQS. The designation of an area is made on a pollutant-by-pollutant basis. Areas classified as "attainment areas" are in compliance with the applicable NAAQS. Areas once classified as nonattainment but have since demonstrated attainment of the NAAQS are classified as "maintenance areas." Areas not in compliance with the NAAQS are classified as "nonattainment areas." The build alternatives are in Will County. The attainment status of Will County for each pollutant is provided in Table D1-2. As shown, Will County is classified as an attainment area for all pollutants except ozone. Will County is part of the Chicago-Gary-Lake County, IL-IN 8-Hour Ozone Non-Attainment Area (2008 and 2015 standards). Will County, as part of the Chicago-Gary-Lake County, IL-IN $PM_{2.5}$ Non-Attainment Area, was previously not attaining to the $PM_{2.5}$ annual (1997) NAAQS but was redesignated to the maintenance status for this pollutant in October 2013; this standard has since been revoked.

CAAA requires Federal agencies to ensure that their actions conform to the appropriate State Implementation Plan (SIP). A SIP is a plan that provides for implementation, maintenance, and enforcement of NAAQS. Prior to approval or funding by a federal agency, a proposed project must demonstrate compliance with USEPA's Conformity Rule by determining that it would not cause or exacerbate an exceedance of a NAAQS. As a project being developed under the FRA, the build alternatives fall under the General Conformity Rule, which requires a conformity determination for each applicable pollutant in a nonattainment area.

The USEPA specified significant threshold values in 40 CFR 93, paragraph 153 as a minimum threshold for which conformity determination must be performed. This significance level is called a *de minimis* level. General Conformity *de minimis* levels applicable to the build alternatives are presented in Table D1-3.

Table D1-2. Project Study Area Federal Attainment Status

Pollutant	Will County, IL[1]	Classification	Comments
Carbon Monoxide (CO)	Attainment	—	—
Lead (Pb)	Attainment	—	—

Nitrogen Dioxide (NO_2)	Attainment	—	—
Particulate Matter (PM_{10})	Attainment	—	—
Particulate Matter ($PM_{2.5}$)	Attainment	—	1997 $PM_{2.5}$ annual standard was revoked[4]
Ozone (O_3)	Nonattainment	Moderate	8-hour 2015 Ozone standard
Sulfur Dioxide (SO_2)[2]	Attainment	—	—

[1]Within the Chicago-Gary-Lake County, IL-IN area

[2] Cook and Grundy Counties, part of the bigger project, share the same status

[3] Lemont, IL is designated maintenance for sulfur dioxide in both Will and Cook Counties. Lemont is located far away from this Project area

[4] 1997 $PM_{2.5}$ annual standard was revoked (40CFR §§50-51 and §93 2016) effective October 24, 2016. Areas designated to attainment under the primary annual standard will not be required to make transportation or general conformity determinations under this standard.

Source: https://www.epa.gov/green-book, July 2, 2024

Table D1-3. General Conformity *De Minimis* Levels for Will County[1]

Pollutant	De Minimis Level
Volatile Organic Compounds (VOCs)	100 tons per year
Nitrogen Oxides (NO_x)	100 tons per year

[1]Within the Chicago-Gary-Lake County, IL-IN area

Source: https://www.epa.gov/general-conformity/de-minimis-tables, July 9, 2024

The last three years of available monitored data from the area monitors are shown in Table D1-4. Only ozone and $PM_{2.5}$ concentrations are currently monitored in Will County, concentrations for other pollutants were obtained from Cook County.

Table D1-4. Will County Air Quality Monitored Data (2021-2023)

Pollutant	Time Period	Concentration	Unit*	Station		
		2021	2022	2023		
O_3 (8-hour)	First Highest	0.072	0.071	0.086	PPM	36400 S. Essex Rd., Braidwood
	Second Highest	0.071	0.071	0.082		
	Third Highest	0.068	0.065	0.080		
	Fourth Highest	0.065	0.064	0.080		
	# of Days Standard Exceeded	2	2	15		
CO	1-hour Maximum	2.2	1.8	3.2	PPM	Kingery Expressway & Torrence Avenue, Lansing
	8-hour Maximum	1.2	1.0	1.6		
	# of Days Standard Exceeded	0	0	0		
$PM_{2.5}$	Annual mean	7.1	7.5	7.3	µg/m³	36400 S. Essex Rd., Braidwood
	98th Percentile	24	18	11		
NO_2	Annual mean	14.8	14.5	15.5	PPB	1820 S. 51 Street, Cicero
	98th Percentile	57	55	55		
PM_{10}	Maximum 24-hour	130	139	155	µg/m³	50th Street and Glencoe, McCook
	# of Days Standard Exceeded	0	0	1		
SO_2	99th Percentile	10	11	11	PPB	7801 Lawndale, Chicago
	# of Days Standard Exceeded	0	0	0		
Pb	Rolling 3-month average	0.01	0.01	0.02	µg/m³	1241 19th St., Chicago

Source: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report, July 10, 2024

*PPM = parts per million; PPB = parts per billion; µg/m³ = micrograms per cubic meter

As the data shows, the ozone standard was exceeded in every year. While the standards for other pollutants were not exceeded in 2021 and 2022, the PM_{10} levels in 2023 were exceeded once – this was likely due to the effects of the Canadian wildfires in 2023.

Pollutants of Concern

Pollutants that can be traced principally to diesel locomotives and construction equipment are relevant to the evaluation of the Build Alternatives' impacts; these pollutants include CO, VOC, NOx, O_3, PM_{10}, and $PM_{2.5}$. Transportation sources account for a small percentage of regional emissions of SO_2 and Pb; thus, a detailed analysis is not required. The Build Alternatives' elements that could adversely affect air quality levels include diesel locomotive emissions and emissions from construction.

Volatile organic compounds and NOx emissions from these sources are a concern primarily because they are precursors in the formation of ozone and particulate matter. Ozone is formed through a series of reactions that occur in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels often are found many miles from the sources of the precursor pollutants. Therefore, the effects of VOC and NOx emissions generally are examined on a regional or "mesoscale" basis.

PM_{10} and $PM_{2.5}$ impacts are both regional and local. A major portion of particulate matter, especially PM_{10}, comes from disturbed vacant land, construction activity, and paved road dust. $PM_{2.5}$ also comes from these sources. Motor vehicle exhaust, particularly from diesel construction vehicles, is also a source of PM_{10} and $PM_{2.5}$. PM_{10}, and especially $PM_{2.5}$, also can be created by secondary formation from precursor elements such as SO_2, NO_X, VOCs and ammonia (NH_3). Secondary formation occurs because of a chemical reaction in the atmosphere generally downwind at some distance from the original emission source. Thus, it is appropriate to predict concentrations of PM_{10} and $PM_{2.5}$ on both a regional and a localized basis.

CO impacts are generally localized. Even under the worst meteorological conditions and most congested traffic conditions, high concentrations are limited to a relatively short distance (approximately 300 feet) of heavily traveled roadways or rail corridors. The build alternatives would not change automobile or truck traffic patterns within the Project study area other than to increase the frequency of gate down times at at-grade crossings. As a result, vehicular impacts are not analyzed for reasons described below. However, emissions from construction vehicles and diesel locomotives also can be major sources of CO. Consequently, it is appropriate to predict concentrations of CO on both a regional and a localized or "microscale" basis for the build alternatives within the Project study area.

MSAT impacts are both regional and local. On January 18, 2023, FHWA released Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. According to this document, MSAT emissions likely will be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 70 percent between 2020 and 2060. Local

conditions may differ from these national projections. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for growth in vehicle-miles traveled [VMT]) that MSAT emissions in the Project study area are likely to be lower in the future in nearly all cases. The build alternatives would not result in changes that would cause a significant increase in MSAT impacts of either build alternatives from that of the No-Build Alternative. As such, the build alternatives have not been linked with any special MSAT concerns.

Air Quality during Proposed Project Operation

Under the current schedules, 15 trains per day operate over this section of the rail, including 10 passenger trains and five UPRR freight trains (a combination of local and through trains). These trains and the trains under the build alternatives and No-Build Alternative are shown in Section 2.1 and Appendix C.

With the build alternatives, as part of the Chicago to St. Louis HSR Program, the number of passenger trains would increase from 10 to 18. With the build alternatives, the speed of 8 out of 10 daily passenger trains would be 110 mph in the Project study area. The speed of the other two trains would be 100 mph. The eight additional passenger trains would operate at 110 mph. Under existing conditions all 10 daily passenger trains operate at 79 mph. The higher speed trains would each have two locomotives instead of one.

The build alternatives would not result in change in the number of freight trains operating in this part of the Chicago to St. Louis corridor. Freight traffic is more dependent on markets and demand than capacity and is expected to grow. The number of freight trains is estimated to increase to 11 per day in the future with either the No-Build Alternative or the build alternatives. Freight trains currently operate and would continue to operate at 60 mph.

Potential Regional Impacts

While the build alternatives would increase diesel locomotive emissions because of increased speeds (and the number of locomotives to propel the trains) and the increased number of passenger trains, these emissions would be in part off-set by a decrease in travel times and smaller emissions from newer locomotives. The number of freight trains would increase over existing conditions under both future conditions, the No-Build Alternative or the build alternatives.

The Chicago to St. Louis HSR Program would pass through the Chicago-Gary-Lake County, IL-IN 8-Hour Ozone Non-Attainment Area from Union Station in Chicago to Kankakee Street in Godley, Illinois south of the build alternatives, a distance of 59.8 miles.

The regional emission change resulting from the increase in trains along the HSR Program corridor within the non-attainment area were quantified to ensure that build alternatives-related emission increases do not exceed the applicable General Conformity *de minimis* thresholds.

Table D1-5 presents the estimates of the regional emissions generated by the build alternatives. Emissions presented in Table D1-5 were estimated for 59.8 miles, the full length of the ozone non-attainment area within the Chicago to St. Louis HSR Program corridor. They represent an update of Table 5.7-1 in the 2012 Tier 1 FEIS (please see the 2012 Tier I EIS for additional information). They assume the train numbers for existing conditions, the No-Build Alternative, and the build alternatives. Emissions were estimated separately for the line-haul freight trains and for passenger/commuter trains using project information and appropriate USEPA emission factors. Based on these estimates, changes in emissions of pollutants of concern from the No-Build Alternative to the build alternatives are below the applicable thresholds and General Conformity rule does not apply.

Table D1-5. Emissions Generated by the Proposed Project Operations within the Chicago-Gary-Lake County, IL-IN Non-Attainment Area (tons/year)

Scenario	CO (tons/year)	NO_x (tons/year)	VOC (tons/year)	PM_{10} (tons/year)	$PM_{2.5}$ (tons/year)	CO_2 (million tons/year)
Existing Conditions	22.1	68.0	3.7	3.2	3.1	0.009
No-Build Alternative	49.4	38.6	1.7	5.8	5.6	0.020
Build Alternative	52.9	45.5	1.9	6.8	6.6	0.022
Change	3.5	6.9	0.29	1.04	1.01	0.002
De minimis Threshold	NA	100	100	NA	NA	NA
Threshold Exceeded?	NA	No	No	NA	NA	NA

Potential Local Impacts

The build alternatives are part of the Chicago to St. Louis HSR Program. The 2012 Tier 1 FEIS for the HSR Program found the potential for local air quality impacts to be insignificant. As such, the Build Alternatives' local air quality impacts also should be insignificant.

Along the Rail Right-of Way. The build alternatives would increase diesel emissions along the UPRR tracks. However, the speed increase (and therefore, the shorter residence time) and the use of newer locomotives with stricter emission limits would offset this increase at least for CO. Table D1-5 shows that emissions would increase with the build alternatives in the future compared to the No Build Alternative, but these increases would be small.

VOC and NOx are ozone precursors and would be of most concern on a regional and not on a local scale as ozone precursors in the non-attainment area. VOC impacts of the build alternatives are additionally addressed under potential MSAT impacts below.

NOx impacts along the UPRR ROW were modeled to estimate the possible impact of the build alternatives on the closest sensitive land uses. A conservative dispersion modeling assumed three trains, two high-speed and one freight, within one hour, The analyses used AERMET, USEPA screening model to simulate locomotive emission impacts on receptors along the ROW. Background concentrations were estimated for the representative station at 1820 S. 51 Street, Cicero (see Table D1-4). The resultant total concentrations were estimated to be well below the one-hour standard.

Carbon monoxide emissions have decreased dramatically in the recent decades as a result of the aggressive USEPA regulations for vehicular emissions. These regulations brought the concentrations of CO down to below 20 percent of the CO eight-hour NAAQS, the most restrictive CO standard. CO emission increase as result of the build alternatives would be small. If emissions from the added trains are compared with the equivalent emissions from passenger cars, it would result in emissions of about 40 extra passenger cars. According to IL DOT CO Screen for Signalized Intersections COSIM version 4.0 (June 2013 – the latest at the time of analysis), traffic volumes below 5,000 cars would not create a potential for a CO violation.

Particulate matter local (hot-spot) analysis for the rail projects according to the USEPA Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (USEPA, last updated in October, 2021) is not applicable to the project since, with the revocation of the 1997 annual $PM_{2.5}$ standard, Will County is now in attainment for particulate matter.

At-Grade Crossings. According to the IDOT CO Screen for Signalized Intersections COSIM version 4.0 (Peters, 2013), intersection queues of over 300 to 600 vehicles may create a potential for CO exceedance at 20 ft from the edge of roadway. The screening criteria to require CO modeling is no less than 5,000 vehicles per hour or an average daily volume (ADT) of 62,500 at each intersection approach. The following grade crossings in the Project study area were screened for CO exceedance:

- Mississippi Road—Carries local traffic within Elwood and BNSF Logistics Park employee traffic
- Walter Strawn Drive—Serves BNSF Logistics Park truck traffic
- Hoff Road—Serves funeral processions and other traffic out of the Abraham Lincoln National Cemetery.

However, no sensitive uses such as residences or places where people gather exist or are planned within 300 feet of these crossings. A part of Archer Park is within 300 feet of the now closed Walter Strawn Drive intersection but there are currently no facilities on that land where people might congregate. Future park development is planned but no development plans have been established.

Three other grade crossings carry local traffic in rural areas north and south of Wilmington and within Wilmington (River Road, Stripmine Road, and Coal City Road).

Also, there are two private crossings. Given the settings and nature of the traffic using these five at-grade crossings, they are not likely to generate queues of over 300 to 600 vehicles during a 90-second gate closure.

Assuming 18 high-speed passenger train trips per day, passenger train passages would be responsible for crossing closures lasting about two percent of each 24-hour day. The increase in crossing closures would be even less significant compared to the No-Build Alternative.

Thus, the build alternatives would not result in any substantial impact on the air quality levels at grade crossings.

The No-Build Alternative also would see increases in gate closure times with six additional freight trains, but this increase is not a part of the build alternatives.

Potential MSAT Impacts

The build alternatives were determined in Section **Error! Reference source not found.** to generate minimal air quality impacts for CAAA criteria pollutants. Moreover, USEPA regulations for engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with USEPA's MOVES model forecasts a combined reduction of over 70 percent in the total annual emission rate for the priority MSATs from 2020 to 2026- while vehicle-miles of travel are projected to increase by 31 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emission increases from the build alternatives.

Construction Impacts

Construction air quality impacts are temporary in nature and localized to the area of construction. Construction of Build Alternative 1B is estimated to take 18 months, and 24 to 30 months for Build Alternative 2A. No other HSR Program projects in the Chicago-Gary-Lake County, IL-IN Ozone Non-Attainment area would be constructed at the same time.

Possible air quality impacts from construction may be caused by dust from earth-moving activities such as cut and fill operations, use of unpaved haul roads, exposed soil or aggregate piles, exposed material carried offsite, and by exhaust emissions generated by diesel-fueled equipment during construction. The build alternatives would replace a one-track bridge across Prairie Creek with a new double-tracked bridge with maintenance access facility, revise at-grade crossings, construct new maintenance access facilities, and build or extend culverts, install fencing and add track signaling.

D1.2. Energy

As documented in the 2012 Tier 1 FEIS (Table 4.3-1), energy consumption occurs with the four basic transportation modes used for travel in the Chicago to St. Louis HSR Program corridor – air, rail, bus, and automobile. In 2010, Amtrak trains account for about 1.7 percent of person-miles traveled in the corridor, while automobile traffic

accounts for approximately 95.8 percent. Airlines account for about 2.1 percent of travel and buses account for 0.4 percent of travel.

Rail is a more energy-efficient mode than the predominate automobile travel, accounting for 0.7 percent of energy consumption for 1.7 percent of the person-miles, where automobile travel accounts for 97.6 percent of energy consumption for 95.8 percent of the person-miles, as indicated in 2012 Tier 1 FEIS Table 4.3-1. Since rail capacity can be increased at a relatively small incremental cost, any substantial increase in rail ridership that would arise from implementation of the HSR Program would result in conservation of travel-related energy. With the HSR Program, the person-miles traveled by the more energy-efficient rail are expected to increase to 3.9 percent (2012 Tier 1 FEIS Table 5.3-1) of all corridor travel from the current 1.7 percent. In addition, new locomotives that would be used under the HSR Program that are designed to be more energy efficient than current locomotives. The build alternatives would contribute to this overall HSR Program energy saving benefit.

Passenger rail service under the No-Build Alternative would be a continuation of the existing five daily round trips between Chicago and St. Louis. Although increased rail ridership could result from the normal travel growth in the corridor, the percent of person-miles traveled in the HSR Program corridor by rail with accompanying energy savings would not occur without the service improvements that are a part of the build alternatives.

Construction of the build alternatives would require similar consumption of energy for processing and delivering materials, construction activities, and maintenance for the new rail constructed within the proposed Project limits. Energy consumption by vehicles in the Project study area could also increase during construction as a result of possible traffic delays or temporary day time closures.

The No-Build Alternative does not include double track construction and associated improvements. Thus, the additional energy consumption described for the build alternatives would not occur under the No-Build Alternative.

The build alternatives would increase the efficiency of the current transportation network by increasing rail use and thus provide a more balanced use of the overall transportation network. This would result in less vehicular energy consumption associated with travel under the Build Alternative. The post-construction operational energy savings will offset energy spent on construction and result in net savings in energy use. The payback period for energy spent on construction of either Build Alternative is estimated to be approximately 2 months when the HSR Program is complete and in operation.

D1.3. Floodplains and Regulatory Floodway

A floodplain is a low land adjacent to a river, lake, or ocean. Federal protection of floodplains is afforded by Executive Order 11988, "Floodplain Management," and by implementation of federal regulations under 44 CFR Part 9. Listed below are Federal

Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels within the Project Study Area. The Chapter 3 Map Set shows the designated flood zones associated with Grant Creek, Prairie Creek, Unnamed Tributary to Kankakee River, Forked Creek, and Kankakee River. These flood zones depict the assumed floodplains associated with the streams.

- Panels 17197C0270E and 17197C0290E in Will County, Illinois and Incorporated Areas – The existing rail and proposed double track cross Grant Creek at two locations and at a tributary. The crossing areas are indicated as Zone A, a Special Flood Hazard Area inundated by the 100-year flood, no base flood elevations determined.

- Panel 17197C0410E in Will County, Illinois and Incorporated Areas – The existing rail and proposed double track cross Prairie Creek and a tributary. The crossing areas are indicated as Zone A, a Special Flood Hazard Area inundated by the 100-year flood, no base flood elevations determined.

- Panel 17197C0409E in Will County, Illinois and Incorporated Areas – The existing rail and proposed double track cross an Unnamed Tributary to the Kankakee River. The crossing area is indicated as Zone A, a Special Flood Hazard Area inundated by the 100-year flood, no base flood elevations determined. The existing rail and proposed double track also cross Forked Creek. The crossing area is indicated as Zone AE, a High Risk Special Flood Hazard Area.

- Panel 17197C0417E in Will County, Illinois and Incorporated Areas – The existing rail and proposed double track cross the Kankakee River. The crossing area is indicated as Zone AE, a High Risk Special Flood Hazard Area.

- Panel 17197C0416E in Will County, Illinois and Incorporated Areas – Within this particular panel the existing rail and proposed double track are within Zone X unshaded areas – areas of minimal flood hazard, which are the areas outside the Special Flood Hazard Area and higher than the elevation of the 0.2 percent annual chance flood.

Potential Impacts

An increase of 0.10 feet flood height is considered an impact, if the existing structure is not a source of flood damage. Given that the replacement bridges and culverts would continue to span the floodplain and floodway, the changes in the capacity of the bridge openings to carry floodwaters are expected to be minimal, and changes in the capacity of the floodplain to store water are expected to be confined to the additional bridge piers, an increase in the flood height of more than 0.10 feet and an increase in flood limits is unlikely in the floodplains. In addition, the 100-year event would not cause overtopping of the railway.

At Grant Creek, the existing 10-foot by 9-foot box would be replaced by one 96-inch corrugated steel pipe and two 72-inch smooth steel pipes for both alternatives. An estimated 3.4 acre-feet volume of fill would be placed in the floodplain for Build Alternative 1B and an estimated 2.7 acre-feet volume of fill would be placed in the floodplain for Build Alternative 2A. The additional fill is primarily associated with the proposed grading on the west side of the existing track. Given that the replacement culverts would have an opening area 18 percent larger than the existing culvert, the capacity of the proposed culvert opening to carry floodwaters is expected to improve.

At Prairie Creek, the existing structure would be replaced in kind utilizing the existing abutments and pier for both alternatives. An estimated 1.6 acre-feet volume of fill would be placed in the floodplain for Build Alternative 1B and an estimated 0.2 acre-feet volume of fill would be placed in the floodplain for Build Alternative 2A. The additional fill is primarily associated with the proposed grading on the west side of the existing track. The flood height for volume of fill within Prairie Creek is not expected to increase. Given that the replacement bridge would have an opening area 6 percent larger than the existing bridge area, the change in the capacity of the bridge opening to carry floodwaters is expected to be minimal. In addition, the 100-year event would not cause overtopping of the railway.

At the Unnamed Tributary to Kankakee River, the existing single span 8-foot long reinforced concrete slab bridge would be replaced by a 60-inch diameter corrugated steel pipe and a 60-inch diameter smooth steel pipe for both alternatives. An estimated 5.2 acre-feet volume of fill would be placed in the floodplain for both alternatives. The additional fill is primarily associated with the proposed grading on the east and west side of the existing track. The flood height for volume of fill within the Unnamed Tributary to Kankakee River is expected to decrease as the proposed option was developed to prevent track overtopping during the 100-year event and given the proposed opening area provided by the proposed culverts is 29.4 square feet compared with 22.7 square feet offered by the existing bridge.

The Forked Creek bridge would be part of the No-Build Alternative. There would be no increase in the fill volume in the floodplain at Forked Creek for either build alternative as part of the proposed Project.

The Kankakee River Bridge would be part of the No-Build Alternative. There would be no additional fill associated with either build alternative.

D1.4. Noise and Vibration

The assessment of the potential for the build alternatives to cause operational noise and vibration impacts was prepared using procedures in the FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* guidance manual (FRA, 2012). The assessment included evaluating noise and vibration from train operations, which includes both rolling stock noise along the corridor and horn noise at at-grade crossings. It is important to note that the levels of noise and vibration generated by rail systems do not rise to the level of concern for health or safety; rather train noise and vibration levels

are evaluated on their potential to cause annoyance in adjacent communities. The build alternatives would have the same operational characteristics; therefore, separate noise and vibration analyses were not conducted, and the findings presented below relate to both alternatives.

Following FRA procedures, a conservative screening procedure was first used to identify noise and vibration sensitive receptors where rail noise and vibration impacts might occur. Receptors within the screening distance were then evaluated using a general assessment level of analysis. A detailed analysis was conducted at receptors where impacts were identified in the general assessment.

Noise Evaluation

Screening Noise Evaluation

The FRA screening procedure identifies a screening distance for both obstructed and unobstructed urban conditions and for quiet suburban/rural areas. Given the generally suburban nature of the Project Study Area, the quiet suburban/rural area screening distance of 500 feet was used to identify sensitive receptors. Sensitive receptors include single-family residences, multi-family residences, and a cemetery. Twelve receptor locations were selected to represent the land uses and are shown in the Chapter 3 Map Set.

Several public at-grade railroad crossings are in or within 0.25 mile of the Project Study Area. Most of these at-grade crossings are not within a 24-hour quiet zone, and train operators are required to use train horns on approach to the crossing. The two crossings in Elwood are designated as 24-hour quiet zones; therefore, horn noise was not included in the assessment for the Elwood area. FRA regulations for horn noise specify that operators shall not apply the horn more than ¼ mile from the crossing based on the operating speeds of 60 mph or greater. Four of the twelve receptors are within ¼ mile of at least one crossing and are included in the analysis of horn noise impacts.

General Noise Assessment

The dominant noise sources in the Project study area are the existing rolling stock train noise and the locomotive horns near at-grade crossings. Operation of the build alternatives would contribute additional passenger train noise, additional passenger train horn noise, an increase in passenger train speed, and shifts in track location. Freight traffic and associated freight noise levels are expected to increase regardless of the proposed Project; therefore, the increase in freight traffic is not considered part of the proposed Project noise contributions.

The impact assessment uses two approaches. The first compares existing train noise to future train noise with the build alternatives. This assessment includes the proposed Project, as well as freight train growth forecast with either the Build or No-Build Alternative (see Table C-3 in Appendix C for freight train projections). The FRA manual refers to this as an assessment of "cumulative" noise exposure. The second approach compares existing train noise with passenger train noise with the build alternatives. The FRA manual refers to this as an assessment of "project" noise exposure.

Table D1-6 and Table D1-7 present the general assessment results for the Project study area. Noise levels are measured in day-night average sound levels (L_{dn}), which is an average noise level over a 24-hour period with a 10 db increase penalty for night-time trains.

Generally, the increased passenger train speeds and the additional passenger train volume would increase passenger train rolling stock noise levels by an average of 3 weighted decibels (dB(A)). Freight train noise also would increase by an average of 3 dB(A).

Table D1-6 indicates that 10 of the 12 receptors would be impacted with the build alternatives, this included four moderate impacts and six severe impacts. None of the severe impacts would occur if the freight traffic remained at existing levels. Table D1-7 indicates that when considering only passenger trains, three of the 12 analyzed receptors would be impacted. All impacts under this scenario are moderate impacts. The main cause of these impacts is high existing noise levels, which greatly limits the increase in noise without impact allowed under FRA criteria.

Table D1-6. General Noise Assessment Results

Receptor Number	Distance. to Existing Track (feet)	Receptor Type	Noise Metric	Existing Noise Level [dB(A)]	Build Alternative Noise Level [dB(A)]	Cumulative Criteria Allowed Noise Increase [dB(A)]	Impact Level
R17B	135	SFR[1]	L_{dn}	75	78	1	Severe
R17C	146	SFR	L_{eq}	74	77	1	Severe
R17D	297	SFR	L_{dn}	71	74	1	Severe
R17E	415	SFR	L_{dn}	69	72	1	Severe
R19	63	MFR[2]	L_{dn}	78	81	0	Severe
R20	212	SFR	L_{dn}	62	63	2	No Impact
R21	44	SFR	L_{dn}	72	73	1	Moderate
R21A	55	SFR	L_{dn}	71	73	1	Moderate
R21B	358	Cemetery	L_{eq}	59	59	5	No Impact
R23A	75	MFR	L_{dn}	69	70	1	Moderate
R23B	68	SFR	L_{dn}	69	71	1	Moderate
R23C	70	SFR	L_{dn}	69	72	1	Severe

[1] Single Family Residential

[2] Multi-Family Residential

Table D1-7. General Noise Assessment Results (Build Alternative Passenger Trains Only)

Receptor Number	Distance to Existing Track (feet)	Receptor Type	Noise Metric	Existing Noise Level [dB(A)]	Build Alternative Passenger Train Noise Level [dB(A)]	Project Criteria Allowed Build Alternative Passenger Train Noise [dB(A)]	Impact Level
R17B	135	SFR[1]	L_{dn}	75	69	65.0	Moderate
R17C	146	SFR	L_{eq}	65	68	65.0	Moderate
R17D	297	SFR	L_{dn}	71	63	65.0	No Impact
R17E	415	SFR	L_{dn}	69	61	63.6	No Impact
R19	63	MFR[2]	L_{dn}	78	72	65.0	Moderate
R20	212	SFR	L_{dn}	62	50	58.9	No Impact
R21	44	SFR	L_{dn}	72	60	65.0	No Impact
R21A	55	SFR	L_{dn}	71	62	65.0	No Impact
R21B	358	Cemetery	L_{eq}	59	47	62.2	No Impact
R23A	75	MFR	L_{dn}	69	56	63.6	No Impact
R23B	68	SFR	L_{dn}	69	57	63.6	No Impact
R23C	70	SFR	L_{dn}	69	60	63.6	No Impact

[1] Single Family Residential

[2] Multi-Family Residential

Detailed Noise Assessment

A detailed noise assessment was conducted for those receptors determined to be impacted as part of the general noise assessment. The results are shown in Table D1-8 and Table D1-9. The detailed assessment resulted in the same number of impacts as the general assessment. The only change was in the level of impact for the cumulative analysis; two severe impacts in the general assessment were found to be moderate impacts in the detailed assessment (R17D and R17E), and one moderate impact in the general assessment was found to be a severe impact in the detailed assessment (R21A).

Table D1-8. Detailed Noise Assessment Results

Receptor Number	Distance to Existing Track (feet)	Receptor Type	Noise Metric	Existing Noise Level [dB(A)]	Build Alternatives Noise Level [dB(A)]	Cumulative Criteria Allowed Project Noise [dB(A)]	Impact Level
R17B	135	SFR[1]	L_{dn}	71	75	1	Severe
R17C	146	SFR	L_{dn}	70	74	1	Severe
R17D	297	SFR	L_{dn}	65	68	1	Moderate
R17E	415	SFR	L_{dn}	63	66	2	Moderate
R19	63	MFR[2]	L_{dn}	76	80	0	Severe
R21	44	SFR	L_{dn}	72	73	1	Moderate
R21A	55	SFR	L_{dn}	70	75	1	Severe
R23A	75	MFR	L_{dn}	68	70	1	Moderate
R23B	68	SFR	L_{dn}	69	71	1	Moderate
R23C	70	SFR	L_{dn}	68	72	1	Severe

[1] Single Family Residential
[2] Multi-Family Residential

Table D1-9. Detailed Noise Assessment Results (Build Alternatives Passenger Trains Only)

Receptor Number	Distance to Existing Track (feet)	Receptor Type	Noise Metric	Existing Noise Level [dB(A)]	Build Alternatives Passenger Train Noise Level [dB(A)]	Project Criteria Allowed Build Alternative Passenger Train Noise [dB(A)]	Impact Level
R17B	135	SFR[1]	L_{dn}	71	65	65.0	Moderate
R17C	146	SFR	L_{dn}	70	64	64.4	Moderate
R19	63	MFR[2]	L_{dn}	76	70	65.0	Moderate

[1] Single Family Residential
[2] Multi-Family Residential

Noise Abatement Considerations

Mitigation of noise impacts from passenger rail improvement projects may involve treatments of three components of the noise problem: (1) the noise source, (2) the propagation path from the source to receiver or (3) noise levels at the receiver. Generally, FRA has authority to treat the source and some elements of the propagation path but has no authority to modify characteristics of the receiver. Factors to consider when deciding which, if any, mitigation measures to implement would include: (1) the significance and severity of expected impacts, (2) the numbers of receptors potentially affected, (3) the potential effectiveness of a given mitigation option to reduce noise and vibration levels, and (4) the cost involved to implement or construct the mitigation option.

Quiet zones are a type of noise source mitigation. Within quiet zones, railroads do not need to routinely sound their horns when approaching at-grade crossings. The lead agency in designating a quiet zone is the local public authority responsible for traffic control and law enforcement on the roads crossing the tracks. This is typically the local traffic department or public works department. In the case of the proposed Project, train horn noise is the dominant noise source for the receptors in and around the city of Wilmington, and implementing a quiet zone would ensure the build alternative do not increase noise levels. Wayside noise levels would decrease from existing levels. The City of Wilmington would be responsible for designating a quiet zone.

Specific reductions in potential future noise levels with a quiet zone in Wilmington are shown in Table D1-10. The implementation of a quiet zone would lower build alternatives noise levels in the city of Wilmington between 7 dB(A) and 8 dB(A). This would result in build alternatives noise levels between 3 dB(A) and 4 dB(A) lower than existing noise levels. A 3 dB(A) to a 4 dB(A) decrease in noise levels is generally considered a perceptible decrease in noise. This benefit would be relatively uniform throughout the city of Wilmington.

Table D1-10. Build Alternatives Noise Levels with Abatement Options

Receptor Number	Distance. to Existing Track (feet)	Receptor Type	Noise Metric	Existing Noise Level [dB(A)]	Build Alternative Noise Level [dB(A)]	Build Alternative Noise Level with Quiet Zone [dB(A)]	Build Alternative Noise Level with Noise Barrier [dB(A)]
R17B	135	SFR[1]	Ldn	71	75	67	70
R17C	146	SFR	Ldn	70	74	66	69
R17D	297	SFR	Ldn	65	68	61	63
R17E	415	SFR	Ldn	63	66	59	61
R19	63	MFR[2]	Ldn	76	80	73	75
R21	44	SFR	Ldn	72	73	NA	68
R21A	55	SFR	Ldn	70	75	NA	70
R23A	75	MFR	Ldn	68	70	NA	65
R23B	68	SFR	Ldn	69	71	NA	66
R23C	70	SFR	Ldn	68	72	NA	67

[1] Single Family Residential
[2] Multi-Family Residential
NA = Implementing a quiet zone at these locations is not applicable because an existing quiet zone is in place and accounted for in the study.

To establish a quiet zone, the increased risk caused by the absence of a horn must be mitigated by adopting Supplemental Safety Measures (SSM) at each at-grade crossing. The at-grade crossing improvements, including four-quadrant gates at the three public grade crossings and gates at the private grade crossings, included in the Joliet to Dwight Track Improvement Project (assessed in a 2014 CE) and in the build alternatives would comprise SSMs necessary for the City of Wilmington to designate a quiet zone. If the City of Wilmington wishes to designate a quiet zone after completion of the Joliet to Dwight Track Improvement Project's or Build Alternatives' grade crossing improvements, FRA would work with the City of Wilmington, the UPRR, and Amtrak to designate the quiet zone.

Quiet zones are not a valid option to reduce noise impacts in the village of Elwood because a quiet zone is already in place. Noise barriers would be the most practical form of abatement for the receptors in the village. Noise barriers would only be necessary when analyzing impacts on a cumulative basis.

Other potential noise mitigation source treatments and path treatments include:

- Source Treatments
  - 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 wheel noise include: resilient or damped wheels, spin-slide control systems, and maintenance.
  - 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 also can provide shielding and absorption of noise generated by the vehicle components.
  - Rail Treatments. Rail surfaces that are degraded over time because of 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.
- Path Treatments
  - Noise Buffers – Acquisition of land or purchasing easements for noise buffer zones, although in the case of the build alternatives, this would require displacement of impacted homes and is not a reasonable mitigation approach.
  - Noise Walls – Noise walls are effective in mitigating noise when they break the line of sight between the source and the receiver. Estimated wall heights for the impacted receptors range from 13 feet to 15 feet to provide a readily perceptible reduction. Total noise wall length to mitigate the rail noise impact in the village of Elwood would be approximately 6,500 feet. Total noise wall length to mitigate the rail noise impact in or near the City of Wilmington would be approximately 10,000 feet.

As shown in Table D1-10, the construction of noise barriers would result in a 5 dB(A) reduction of future build alternatives noise levels at the representative receptors. Future noise levels with noise barriers present would be 1 dB(A) to 4 dB(A) less than existing noise levels at each of the representative receptors. Generally, anything less than a 3 dB(A) change is considered a less than perceptible change in noise. A 5 dB(A) change is considered a perceptible change. The benefit of the noise barriers would drop as the distance from the track increases and drop at residences closer to the ends of the wall. In addition, walls could result in potential sight-distance and safety issues at at-grade

crossings. Horn blowing provides a safety benefit in the form of a warning to drivers wanting to cross the railroad tracks. Using noise barriers to lower wayside horn noise would affect this safety benefit. Before implementation of noise barrier walls, FRA guidelines recommend that the community's agreement should be obtained. Some communities would rather not have a wall because of adverse visual effects.

Vibration Evaluation

Screening Vibration Evaluation

The screening assessment for potential vibration effects was based on wayside land use coupled with an appropriately conservative screening distance obtained from the FRA guidance manual. The screening distance for residential land uses with infrequent events along a corridor with speeds between 100 mph and 200 mph is 100 feet. Sensitive receptors identified within the screening distance were evaluated for potential vibration impacts.

General Vibration Evaluation

Based on the vibration screening evaluation, six sensitive receptors exist within the vibration screening distance (100 feet). The FRA general assessment procedures for vibration were used to predict the vibration level at the six identified receptor locations. Table D1-11 presents the general assessment analysis for vibration.

Table D1-11. Ground-borne Vibration General Assessment Results

Receptor No.	Distance to Nearest Proposed Track (feet)	Existing Vibration Level (VdB)	Build Alternative Vibration Level (VdB)	Increase in Vibration (VdB)	FRA Criteria (VdB)[1]	Impact Determination
R19	43	74	77	3	80	No Impact
R21	44	76	79	3	80	No Impact
R21A	35	75	80	5	80	Impact
R23A	75	72	75	3	80	No Impact
R23B	68	73	76	3	80	No Impact
R23C	50	73	78	5	80	No Impact

[1] Criteria for infrequent events, fewer than 30 vibration events of the same kind per day.

The general ground-borne vibration analysis indicates that vibration impacts would occur with the build alternatives at one representative receptor because predicted vibration levels would exceed the FRA vibration criteria and because vibration levels would increase by 5 velocity decibels (VdB) over the existing vibration levels. The vibration impact is generally associated with the passenger rail speed increase from 79 mph to 110 mph and the installation of a second track closer to this receptor. The impacted representative receptor represents a single residence within the 100 foot screening distance.

A vibration velocity level of 75 VdB represents the approximate dividing line between barely perceptible and distinctly perceptible. Current rail vibration levels at the representative receptors are within 3 VdB of 75VdB. A vibration velocity level of 85 VdB tends to be acceptable at sensitive receptors only if there are an infrequent number of events per day, such as the case of the build alternatives, but unacceptable at institutional uses such as schools and churches. (FRA, 2012.) Only residential uses could be affected with the build alternatives and none reach the level of 85 VdB.

Because a potential vibration impact was predicted by the general vibration assessment, and that the predicted vibration levels are within 5 VdB of the impact criterion, the need for a detailed vibration assessment was considered. A general assessment typically produces expected vibration levels higher than those determined by a detailed assessment. Typically, a detailed assessment will include tests to determine the vibration propagation properties of the soil between the source and receptor as a means of determining existing vibration and predicting future vibration levels. The detailed assessment also can identify practical vibration control measures that would be effective at the dominant vibration frequencies. Such measures could include special trackwork design measures, such as ballast mats or resiliently support ties. FRA criteria suggest that a detailed vibration assessment is appropriate at particularly sensitive buildings (such as a concert hall), when a potential vibration impact exists for many residential buildings, or when a high-speed rail alignment will be close to university research buildings where vibration-sensitive optical instrumentation is used.

As indicated above, only one residential receptor would experience a vibration impact from the build alternatives. Therefore, it was concluded that a detailed vibration assessment is not warranted.

D1.5. Agriculture

As stated in the Bureau of Design and Environment (BDE) manual, Illinois State Farmland Preservation Act compliance and a completed Federal AD1006 Form for Evaluation of Farmland Conversion Impacts are required for projects requiring ROW exceeding 3 acres per mile of agricultural land outside of corporate limits. Although more than 5 years have passed since the original AD1006 form was submitted, the proposed right-of-way and easement design has not changed to exceed the threshold reviewed.

The Project study area traverses small rural communities of Elwood and Wilmington, agricultural land, and nature preserves in unincorporated Will County. Refer to Appendix A for the areas zoned as agricultural within the Project study area. Agricultural land occurs in Elwood on the east side of the UPRR tracks and as part of MNTP, which is zoned as agricultural and managed by the United States Department of Agriculture (USDA). Although MNTP is zoned as agriculture, not all portions of the property are in agricultural production. MNTP offers leases to farmers for agricultural production for portions of the overall property. There are no farm grade crossings within the Project study area. An agribusiness is on the east and west sides of the Damien Mills Road at-grade crossing in the midst of MNTP.

The agricultural setting and impact of the build alternatives on farmland conversion were evaluated in accordance with the requirements of the USDA Natural Resource Conservation Service (NRCS). NRCS defines Prime Farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and also is available for these uses. Important Farmlands are defined by NRCS as those that are nearly Prime Farmland that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as Prime Farmland if conditions are favorable (IDOA, 2001). Most of the soils within the Project study area are considered Prime Farmland soils.

Potential Impacts

Build Alternative

The build alternatives would affect less than 3 acres per mile.

For projects with agricultural impacts over 3 acres per linear mile, the Farmland Conversion Impact Rating, or AD 1006 form would be submitted to the Illinois Department of Agriculture (IDOA) to assess various characteristics such as the creation of severed, uneconomic, or landlocked parcels. Each characteristic is assigned a point value for a maximum of 300 points. During an early phase of the project, an AD 1006 form was submitted to IDOA for an impacts analysis that resulted in no need for future coordination.

Because farmland required for the build alternatives are adjacent to the existing railroad alignment and roadway, there would be no severed farms, severed management zones, uneconomic remnants, landlocked parcels, or adverse travel created.

According to the Illinois Land Evaluation and Site Assessment (LESA) manual, a "severed farm parcel" is created when a tract of farmland is traversed by a corridor project and results in dividing one larger tract of land into two smaller parcels. Although access is still maintained to the disjoined parcels, the owner/operator would be inconvenienced by the necessity of farming two smaller parcels of land rather than one larger tract of land. "Severance management zones" are areas within or adjacent to severed parcels used to measure the disruption to normal farming operations. An agribusiness is on the east and west sides of Damien Mills Road in the midst of MNTP. The build alternatives do not include the closure of Damien Mills Road or the railroad spur line. Hence, the build alternatives would not result in a severed farm parcel or severance management zones because of its location along the existing UPRR tracks.

"Uneconomic remnants" are parcels of farmland that are severed from larger tracts of farmland and are too small to be economically or practically farmed by the existing owner or operator. Uneconomic remnants are generally 3 acres in size or less but may vary depending on the opinion of the owner or operator. The build alternatives would not result in an uneconomic remnant. No severed parcels 3 acres in size or less would be created because the proposed ROW and easements for the build alternatives are adjoining to an existing linear UPRR corridor, hence, they would not isolate any large tracts of farmland.

"Landlocked parcels" are defined as land that is isolated by a proposed corridor ROW so that the parcel becomes inaccessible to the current owner or operator by public road, existing easement, or proposed access roads. The build alternatives would not result in a landlocked parcel. No landlocked parcels would be created because the proposed ROW and easements for the build alternatives are directly adjoining an existing linear UPRR corridor, hence, it would not isolate any large parcel of land.

The IDOA has no objections to the implementation of the build alternatives because the proposed work would occur adjacent to an existing corridor and agricultural impacts have been mitigated to the greatest extent possible. Further, the IDOA considers the proposal to be consistent with IDOT's Agricultural Land Preservation Policy and in compliance with the state's Farmland Preservation Act. See Appendix A for the Illinois Department of Agriculture letter dated April 23, 2015 and the USDA NRCS Form AD-1006.

D1.6. Surface Water Resources

Streams in Illinois are assessed and classified in the following ways:

- IEPA Use Assessments

  IEPA collects biological, water, physical habitat, and fish-tissue information samples from various monitoring programs, including the Ambient Water Quality Monitoring Network (AWQMN) sampling stations as part of an ongoing assessment of water quality. Comparison of collected water quality data to the Illinois water quality standards is used to identify potential water quality concerns. Illinois water quality standards include acceptable limits for general use, public and food processing water supply, and indigenous aquatic life. Based on the comparison, IEPA annually assesses the use support for aquatic life, fish consumption, swimming, secondary contact, and drinking water supply. The use support classifications are as follows:

  – Full Support. Water quality meets the needs of all designated uses protected by the applicable water quality standards.

  – Non-support. Water quality is impaired and not capable of supporting the designated use to any degree.

  To facilitate reporting these results, IEPA also refers to fully supporting status (for a use) as a *Good* resource quality; non-supporting status is called *Fair* or *Poor* resource quality, depending on the degree to which the use is not attained. Uses determined to be non- supporting are called impaired, and waters that have at least one use assessed as non-supporting are also called impaired. For each impaired use in each assessment unit, the IEPA attempts to identify potential causes and sources of the impairment.

  Aquatic life use assessments in streams are typically based on the interpretation of biological information, physicochemical water data and physical-habitat information

from the Intensive Basin Survey, AWQMN, or Facility-Related Stream Survey programs. The primary biological measures used to determine stream health are the fish Index of Biotic Integrity (fIBI), the new macroinvertebrate Index of Biotic Integrity (mIBI), and the Macroinvertebrate Biotic Index (MBI) (IEPA, 2016).

- IEPA 303d Listed Streams

  Section 303d of the CWA requires states to develop and submit a list of impaired waters to the USEPA for review and approval. This is known as the 303d list. A stream is included on the 303d list if it does not meet applicable water quality standards or fully support its designated use or uses. A "high," "medium" or "low" priority to address the impairment is assessed for each of the water resources on the 303d list.

- Biological Stream Characterization

  Biological data can be used to evaluate the overall health of a stream, as biota respond to the physical and chemical characteristics of the system they inhabit. IDNR developed a rating system to measure the biological diversity and integrity of streams. Diversity and integrity ratings characterize each stream using fish, mussel, macroinvertebrate and endangered species data. The IDNR rating system ranges from A (highest) to E (lowest).

- Wild and Scenic River

  National Wild and Scenic Rivers are designated for protected water resources in the U.S. The goal of this designation is to preserve the river in its free-flowing condition. The Nationwide Rivers Inventory (NRI) is a listing of more than 3,400 free-flowing river segments in the U.S. that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. Rivers included on this list have the potential to be characterized as National Wild and Scenic Rivers. Under a 1979 Presidential directive and related Council on Environmental Quality procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI segments (http://www.nps.gov/ncrc/programs/rtca/nri/; accessed 09/11/09).

- Navigable Waterways

  Navigable waterways are generally all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce. Section 19 or Section 10/404 permits are required for construction activities in these waters. A list of navigable waterways is provided by the USACE. The Project Study Area is in the Chicago District.

Table D1-12 presents water resource information and data for water resources in the Project Study Area.

Prairie Creek

Prairie Creek is in the Project Study Area at approximately MP 49.5, in the MNTP. Prairie Creek originates in the Village of Frankfort east of US Route 45 and flows for 27.0 miles to its confluence with the Kankakee River. Prairie Creek has a total drainage area of 51.5 square miles. The creek is channelized in sections but retains much of its sinuosity and is buffered by a timbered riparian zone throughout the majority of its reach.

Prairie Creek (stream segment FA-01) has not been assessed by the IEPA. The IDNR has not assessed Prairie Creek for its biological significance, diversity, or integrity where the UPRR crosses the creek. Prairie Creek is not a Class I stream or a navigable waterway. It is not listed on the National Rivers Inventory. Prairie Creek is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.

Grant Creek

Grant Creek is in the Project Study Area at approximately MP 47.2, within the MNTP. Grant Creek originates in the MNTP west of South Chicago Road and flows for 11.0 miles to its confluence with the Des Plaines River. Grant Creek has a total drainage area of 15.9 square miles. The creek is channelized in sections but retains much of its sinuosity and is buffered by a timbered riparian zone west of the UPRR.

Table D1-12. Water Resource Information and Data for Water Resources in the Build Alternatives.

		Stream Crossing						
Location		Un. Trib. to Jackson Creek	Un. Trib. to Grant Creek	Un. Trib. to Grant Creek	Grant Creek	Prairie Creek	Un. Trib. to the Kankakee River	Un. Trib. to the Kankakee River
Waters Delineation ID		Waters 17	Waters 18	Waters 19	NA	NA	Waters 1	Waters 2
IEPA Designation		NA	NA	NA	IL_GA-01	IL_FA-01	NA	NA
Track Crossing Location (MP)		44.8*	46.7-46.8*	46.7-46.8*	47.2	49.5	50.1-51.8	51.57
County		Will						
IEPA Basin		2				10		
IEPA Basin[1]		Des Plaines River				Kankakee River		
Total Drainage Area, sq. miles[2]		Unknown	Unknown	Unknown	15.9*	51.5*	Unknown	Unknown
Total Length, miles[2]		Unknown	Unknown	Unknown	11.0*	27.0*	Unknown	Unknown
2014 IEPA	Aquatic Life	X	X	X	N	X	X	X
	Aesthetic Quality	X	X	X	X	X	X	X

	Fish Consumption	X	X	X	X	X	X	X
	Primary Contact	X	X	X	X	X	X	X
	Public and Food Processing Water Supplies	X	X	X	X	X	X	X
	Secondary Contact	X	X	X	X	X	X	X
IEPA 303d Listed (Priority) [1]		No	No	No	No	No	No	No
BSC Diversity/Integrity[3]		X	X	X	X	X	X	X
Biologically Significant		No	No	No	No	No	No	No
National Rivers Inventory[4]		No	No	No	No	No	No	No
Navigable Waterway[5]		No	No	No	No	No	No	No
Illinois Natural Area Inventory		No	No	No	No	No	No	No
Wild and Scenic River		No	No	No	No	No	No	No

* Miles in Illinois
F=Full Support, N=Non-Support, X=Not Assessed
Biologically Signification Stream: A is for diversity and B is for Integrity.
Sources:

[1] Illinois Environmental Protection Agency. 2016. Illinois Integrated Water Quality Report and Section 303(d) List.

[2] Healy, R.W. 1979. River Mileages and Drainage Areas for Illinois Streams - Volume 2, Illinois River Basin. USGS Water Resources Investigations 79-11.

[3] Illinois Department of Natural Resources. 2008. Integrating Multiple Taxa in a Biological Stream Rating System.

[4] United States Department of Interior. 1982. National Wild and Scenic River System Components. Http://www.rivers.gov/guidelines.html

[5] Navigable Waters of The United States within the Chicago District regulated under Section 10 of the Rivers and Harbors Act of 1899 and as designated by Illinois Administrative Code. Title 17: Conservation, Chapter I: Department of Natural Resources, Subchapter 11: Water Resources, Section 3704 Appendix A: Public Bodies of Water

Grant Creek (stream segment GA-01) has been assessed by IEPA as not supporting for aquatic life and has not been assessed for any other use. No causes or sources of impairment are known for Grant Creek. The IDNR has not assessed Grant Creek for its biological significance, diversity, or integrity where the UPRR crosses the creek. Grant Creek is not a navigable waterway. It is not listed on the National Rivers Inventory. Grant Creek is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.

Unnamed Tributary to the Kankakee River (Waters 1)

The unnamed tributary to the Kankakee River (Waters 1) flows along the western edge of the UPRR tracks from approximately MP 49.95 to MP 51.8. The tributary enters the Project Study Area at approximately MP 49.95 from the eastside of the UPRR tracks and flows south to its confluence with an unnamed tributary to the Kankakee River (Waters 2). The unnamed tributary to the Kankakee River is intermittent and is channelized along the UPRR tracks.

The unnamed tributary to the Kankakee River has not been assessed by the IEPA for any use. The tributary has not been assessed by the IDNR for its biological significance, integrity, or diversity. It is not listed on the National Rivers Inventory. It is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.

Unnamed Tributary to the Kankakee River (Waters 2)

An unnamed tributary to the Kankakee River (Waters 2) is in the Project Study Area at approximately MP 51.57, north of the City of Wilmington. The unnamed tributary originates east of its UPRR track crossing at MP 51.57 and flows west to its confluence with the Kankakee River. The unnamed tributary to the Kankakee River is intermittent and has been channelized for agricultural purposes.

The unnamed tributary to the Kankakee River has not been assessed by the IEPA for any use. The tributary has not been assessed by the IDNR for its biological significance, integrity, or diversity. It is not listed on the National Rivers Inventory. It is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.

Unnamed Tributary to Jackson Creek (Waters 17)

The unnamed tributary to Jackson Creek (Waters 17) flows north along the east side of UPRR ROW at MP 44.8 but does not cross the UPRR. The unnamed tributary to Jackson Creek flows north to its confluence with Jackson Creek outside the Project Study Area. The unnamed tributary to Jackson Creek is intermittent and appears to retain most of its sinuosity.

The unnamed tributary to Jackson Creek has not been assessed by the IEPA for any use. The tributary has not been assessed by the IDNR for its biological significance, integrity, or diversity. It is not listed on the National Rivers Inventory. It is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.

Unnamed Tributary to Grant Creek (Waters 18)

An unnamed tributary to Grant Creek (Waters 18) is in the Project Study Area at approximately MP 46.7, south of the Village of Elwood. The unnamed tributary to Grant Creek originates in a residential area within the Village of Elwood, flows south along the west side of the UPRR tracks, south of Hoff Road, and crosses the UPRR tracks at MP

46.7. The unnamed tributary to Grant Creek flows into an unnamed tributary to Grant Creek (Waters 19) at approximately MP 46.7, on the east side of Illinois Route 53.

The unnamed tributary to Grant Creek has not been assessed by the IEPA for any use. The unnamed tributary to Grant Creek has not been assessed by the IDNR for its biological significance, integrity, or diversity. It is not listed on the National Rivers Inventory. It is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.

Unnamed Tributary to Grant Creek (Waters 19)

The unnamed tributary to Grant Creek (Waters 19) flows along the east side of Illinois Route 53, south of the Village of Elwood. The unnamed tributary to Grant Creek does not cross the UPRR tracks and flows south to its confluence with Grant Creek.

The unnamed tributary to Grant Creek has not been assessed by the IEPA for any use. The unnamed tributary to Grant Creek has not been assessed by the IDNR for its biological significance, integrity, or diversity. It is not listed on the National Rivers Inventory. It is not a National Wild and Scenic River nor is it under study to be added to the list of National Wild and Scenic Rivers.