SECTION 4

Environmental Consequences

This section describes the potential beneficial and adverse social, economic and environmental effects of Build Alternatives 203 and 402. The content and level of analysis in this section is consistent with the two-tiered environmental process used to advance the project. For Tier One, the build alternatives were developed at a conceptual level of detail sufficient to compare their environmental consequences. Existing and available data in conjunction with GIS were used to evaluate the potential impacts of the build alternatives in Tier One with detailed field studies to be conducted in Tier Two as agreed to by FHWA, IDOT, and resource agencies early in the process. (See Section 5.2.1 for a summary of the agency scoping meetings at which this topic was discussed.) The GIS database was improved following field verification for select resources (wetlands, parks, commercial, industrial properties, etc.) in areas near the proposed improvements for each alternative to determine more accurately impacts on socioeconomic and environmental resources. For some resource topics, impacts are described as "potential" (e.g., noise-sensitive receptors, threatened and endangered species), pending full field investigations in Tier Two of the process. Tier Two of the process will involve detailed environmental studies and engineering plans for individual projects within the context of the preferred alternative. The work ultimately will lead to the preparation of contract plans, full right-of-way acquisition, and construction.

Alternatives 203 and 402 were retained for further consideration in the Draft EIS because of their ability to satisfy the purpose of and need for the project while minimizing potential environmental and socioeconomic impacts. Also, Options A and D were retained for the south bypass connection. Other modal improvements (transit, bicycle and pedestrian facilities, TDM/TSM) are common to the roadway alternatives. The roadway footprints accommodate transit and bicycle facilities co-located with proposed roadway improvements. In these instances, impacts are reflected in the analysis contained in the Draft and Final EIS's. Transit and bicycle facilities outside planned roadway improvements are common to both Alternatives 203 and 402; therefore, impacts are the same and are not a deciding factor in terms of impacts.

Fundamentally, two comparisons were made in the Draft EIS, one between Alternative 203 and 402, and the other between Options A and D. Because the options could be combined with either alternative, this section describes environmental and social impacts separately for Alternatives 203 and 402 and the Options A and D. This format is observed for most resources; however, this method does not always apply. In some cases, the discussion of impacts is broader. Combining Alternative 203 or 402 with Option A or D constitutes a complete alternative and the full extent of their impact as shown in Table 4-32. After comparing the environmental and socioeconomic benefits and impacts along with travel performance and public input, Alternative 203 with Option D was identified as the Preferred Alternative. Impacts of the Preferred Alternative can be found in the Alternative 203 and Option D discussions throughout this section as well as in the Alternative 203 with Option D column in Table 4-32. It should be noted that because of a shift in the south bypass connection alignments to the south side of the Bensenville Yard since the publication of the Draft EIS, the

impacts have changed slightly for Options A and D. The modified impact numbers are represented in this section. The images on page 4-3 show the location of Alternatives 203 and 402 with the Options A and D.

The No-Action Alternative, consisting only of transportation improvements to existing roadway and transit facilities in the study area that are expected to be constructed by the design year (2030), was carried forward as a basis of comparison to the build alternatives in the Draft EIS. The No-Action Alternative is common to both build alternatives; therefore, the impacts would also be common. Thus, a discussion of the environmental and socioeconomic impacts for the No-Action Alternative would not provide a distinction between the build alternatives and is not included in this section.

The impacts described in this section are consistent with the resources presented in Section 2, except those for which no impact would occur: agriculture and air quality. In addition to analyzing direct impacts associated with the build alternatives, indirect and cumulative impacts were also analyzed. Mitigation measures designed to reduce or off-set environmental and social impacts are discussed at a conceptual level in Section 4.13. The section concludes with a summary of the project's potential environmental consequences.

4.1 Socioeconomic Impacts

4.1.1 Population, Households, and Employment

Using CMAP's 2030 RTP socioeconomic forecasts (CMAP, 2006), the project team developed population, household, and employment forecasts specific to the No-Action Alternative, Alternative 203, and Alternative 402.[1] Detail about how the forecasts were developed is documented in the EO-WB Finalist Build Alternatives and No Build Baseline Alternative 2030 Socioeconomic Data Forecasts: Estimation and Distribution Methodology (FHWA and IDOT, 2009) and is part of the project files. Because both south bypass connection options (A and D) are the same facility type and provide identical connections to the larger system, the socioeconomic forecasts do not differentiate between A and D.

Each build alternative would result in slightly different population, household, and employment forecasts in 2030. Table 4-1 details the change associated with each alternative. Comparing the no-action scenario to existing (2006) data, the forecasts show that the study area will experience a nominal increase in population and households over the next 20+ years, which is characteristic of a mature area.[2] A much higher growth rate for employment is forecasted, with a 14.1 percent increase over the next 20-year period.

Each build alternative would result in slightly different population, household, and employment forecasts in 2030. There is not a wide range of difference in the forecasted population or number of households between the two build alternatives—less than a one

[1] The forecasts, which were developed using CMAP's methodology, are based on accessibility and additional lane-miles available above and beyond the CMAP 2030 RTP. The population and employment redistribution only pertains to whether or not there is a connection, and does not take into account a specific alignment location. Because both South Bypass Connections Options (A and D) are the same facility type and provide identical connections to the larger system, the redistribution does not differentiate between Options A and D.

[2] It was preferable to compare to the baseline forecasts rather than the RTP forecasts; as the RTP assumed that the Elgin O'Hare Expressway and West Bypass would be in place by 2030 when developing the associated demographic forecasts.

Alternative 203

Alternative 402

percent difference in population and households, and less than a two percent difference in employment. This is because little vacant or undeveloped land use available, and most development or redevelopment will tend to be industrial (a predominant use through much of the study area) rather than residential.

TABLE 4-1
Study Area Population, Household, and Employment Changes by Alternative

	Population	Households	Employment
2006 estimate[a]	509,900	198,850	569,500
No-Action Alternative: 2030 forecast	537,620[b] (+5.4%[c])	202,500[b] (+1.8%[c])	649,600[b] (+14.1%[c])
Alternative 203: 2030 forecast	540,790 (+0.6%[d])	207,400 (+2.4%[d])	712,100 (+9.6%[d])
Alternative 402: 2030 forecast	539,040 (+0.3%[d])	206,800 (+2.1%[d])	698,100 (+7.5%[d])

[a] *Source*: CMAP, 2006.
[b] Forecasts developed by CH2M HILL in coordination with CMAP.
[c] Percent increase from 2006 estimate.
[d] Percent increase over No-Action projection.

Under Alternative 203, the 2030 population in the study area would increase by 3,170, or 0.6 percent, over 2030 no-action population. The number of households would increase by 4,900, or 2.4 percent, and employment would increase by 62,500, or 9.6 percent.

Under Alternative 402, the 2030 population forecast is projected to increase by an additional 1,420 persons, or 0.3 percent, over the 2030 no-action population. Households are forecast to increase by 2.1 percent and employment in the study area by 7.5 percent.

4.1.2 Displacements

The proposed transportation improvements would displace residences and commercial and industrial structures in the study area (see Exhibit 4-1A through D and Exhibit 4-2). Impacts to residents and businesses by alternative and south bypass connection option are described below and summarized in Table 4-2. No multifamily residential structures would be displaced by the proposed improvements. Losses in tax revenue resulting from the displacement of residences and commercial and industrial structures by the build alternatives are described in subsection 4.1.5.

Alternatives 203 and 402 would displace the same 11 residences. One is located along the east side of Medinah Road between the Elgin O'Hare Expressway and Irving Park Road. Eight are concentrated on the north and south sides of the extended Elgin O'Hare Expressway between Arlington Heights Road and Prospect Avenue. Another is located in Itasca east of Prospect Avenue on the south side of the extended Elgin O'Hare Expressway. Alternatives 203 and 402 will displace a residence within a mobile home community along Touhy Avenue in Des Plaines. The few residential displacements and their locations will not eliminate any residential neighborhoods. They are distributed among several communities and do not disproportionately affect the residential nature of any one community.

All commercial and industrial structures affected by Alternative 402 are common to Alternative 203. Two commercial structures in Itasca with one business and 14 employees each would be affected. A vacant commercial structure and six industrial structures (with four businesses and 96 employees) on the east end of the extended Elgin O'Hare Expressway in

TABLE 4-2
Displacements per Build Alternative and South Bypass Connection Option

Alternative	Residential Displacements (residences/residents)[a]	Commercial Structure Displacements	Industrial Structure Displacements	Businesses Displaced	Employees Displaced
203	**11/33**	**4**	**10**	**12**	**292**
Medinah[b]	1/3	0	0	0	0
Itasca	9/27	2	0	2	28
Des Plaines	1/3	1	2	3	158
Bensenville	0	1	6	5	96
Elk Grove Village	0	0	2	2	10
402	**11/33**	**3**	**7**	**8**	**129**
Medinah[b]	1/3	0	0	0	0
Itasca	9/27	2	0	2	28
Des Plaines	1/3	0	0	0	0
Bensenville	0	1	6	5	96
Elk Grove Village	0	0	1	1	5
Option A	**7/21**	**0**	**30**	**47**	**708**
Bensenville	7/21	0	26	43	424
Franklin Park	0	0	2	2	76
Northlake	0	0	2	2	208
Option D	**0**	**8**	**18**	**23**	**985**
Bensenville	0	8	5	9	430
Franklin Park	0	0	12	12	521
Northlake	0	0	1	2	34

[a] The number of displaced residents is calculated by multiplying the number of displaced residences by the average household size. According to the 2000 U.S. Census, the average household size for communities where displacements would occur is three.
[b] Medinah is not an incorporated community but an area within unincorporated DuPage County.

Bensenville would be displaced. Another industrial structure with one business and five employees would be displaced along Elmhurst Road in Elk Grove Village. Alternative 203 affects an additional commercial structure and another three industrial structures. One industrial structure with one business and five employees in Elk Grove Village and two industrial structures in Des Plaines, each with one business and 108 employees, would be affected along the north leg of the O'Hare West Bypass. The additional commercial structure displaced by Alternative 203 has one business with 50 employees and is located in Des Plaines. The proposed interchange with I-90 would affect another commercial structure in Des Plaines with one business and 50 employees.

Table 4-2 summarizes the socioeconomic impacts of the south bypass connection option. Option A would displace seven residences, but Option D would not displace any residences. The seven displaced residences are located along the west side of County Line Road in Bensenville.

Option A would affect no commercial structures and 30 industrial structures containing 47 businesses. Those businesses are along Green Street, along the west side of County Line Road, and where the O'Hare West Bypass would connect with I-294. Two of the 26 industrial structures in Bensenville are within the Bensenville Yard on the north side of Green Street. Two more industrial structures with one business each and 108 employees are also located along Green Street, one is on the north side of Green Street west of County Line Road and the other is on the south side of Green Street west of County Line Road. Twenty-two industrial structures with 41 businesses would be displaced on the west side of County Line Road in Bensenville; 316 employees would be displaced. The impacts from the O'Hare West Bypass/I-294 interchange include two industrial buildings (containing two businesses and 76 employees) in Franklin Park and two industrial buildings (two businesses and 208 employees) in Northlake.

Option D would affect two industrial structures within the Bensenville Yard, eight commercial and three industrial structures on the north side of Green Street (in Bensenville), 12 industrial structures on the east side of the railroad tracks (in Franklin Park), and one industrial structure on the southeast side of I-294 in Northlake. The eight commercial structures on the north side of Franklin Avenue contain six businesses with 175 employees; the three industrial structures have three businesses with a total of 255 employees. The 12 displaced industrial structures on the east side of the railroad tracks in Franklin Park contain 12 businesses with 521 employees. The industrial structure on the southeast of I-294 has two businesses with 34 employees.

Relocation assistance will be provided without discrimination and in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and IDOT's *Land Acquisition Procedures Manual*. For further information, see subsection 4.13.3.

4.1.3 Community and Land Use Impacts

Carefully planned roadway improvements can foster beneficial results, such as making communities more cohesive and supporting future growth and planning policies. Lack of planning for roadway improvements can bring undesirable effects to a community, including fracturing community cohesion. The discussion below describes the potential effects of each alternative on community cohesion and land use.

4.1.3.1 Consistency with Land Use Plans

Alternatives 203 and 402 traverse the core communities of Schaumburg, Roselle, Itasca, Wood Dale, Elk Grove Village, and Bensenville in generally the same geographic area. Their comprehensive plans were reviewed to assess whether the proposed improvements would be consistent with their long-range plans. Each community's plan is addressed below:

- **City of Wood Dale—**The City of Wood Dale does not have a communitywide comprehensive plan, but it is developing a Thorndale Corridor subarea plan that

incorporates applicable elements of this transportation study. The City has incorporated recommendations to upgrade and extend the Elgin O'Hare Expressway into this subarea plan. The plan notes that within its corporate boundaries, the Thorndale Corridor is primarily a location for business and industry. The plan proposes additional commercial, industrial, residential and mixed transit land use development with the eastern extension of the Elgin O'Hare Expressway. The plan states that it intends to capitalize on the eastern extension of the Elgin O'Hare Expressway and other improvements planned for the area's roads and expressways (City of Wood Dale, 2009).

- **Village of Roselle—** Within the Village of Roselle, the Elgin O'Hare Expressway is an existing facility. The Village's comprehensive plan delineates residential, commercial, industrial, and open space land uses near the expressway corridor (Village of Roselle, 1995). Its plan states that no plans have been made to develop additional land unless it provides a benefit to the Village or if the development can provide services to the property at no additional cost to present residents.

- **Village of Itasca—** The Village of Itasca's comprehensive plan identifies the eastern extension of the Elgin O'Hare Expressway in its document (Village of Itasca, 1994). Existing and future land uses adjacent to the project corridor are a mix of residential, industrial, and commercial uses. The Village has been an engaged stakeholder in the study, and acknowledges that Thorndale Avenue is an important corridor in the community that needs to provide efficient travel and access to the community and businesses.

- **Village of Schaumburg—** The Elgin O'Hare Expressway is within the Village of Schaumburg. The Village's plan delineates residential and industrial land uses adjacent to the expressway (Village of Schaumburg, 1996). The Village proposes continued residential and industrial uses through the area.

- **Village of Bensenville—** The Village of Bensenville's plan recognizes the possibility of the eastern extension of the Elgin O'Hare Expressway (Village of Bensenville, 2004). Its plan encourages development of new office/research and light industrial uses along Thorndale Avenue. The Village has developed another document containing short-term development strategies that can be implemented independent of activities related to the airport expansion or O'Hare West Bypass facilities. The *Alternative Redevelopment Strategies Final Report* indicates that the Village will reevaluate future land use policies if the eastern extension of the Elgin O'Hare Expressway becomes a reality (Village of Bensenville, 2009). The Village has been an active participant in this project's planning process and has provided comments concerning alternatives to be considered and the location of proposed improvements. It remains concerned, however, about infrastructure improvements that would adversely affect neighborhoods and the economic vitality of the community.

- **Elk Grove Village—** The Village last developed its comprehensive plan in the 1960s and considers it out-of-date. Elk Grove Village has been an active stakeholder in the project planning process. It indicates that current land uses (industrial) will continue if upgraded transportation facilities are constructed. Representatives have commented that alternatives that involve IL 83 would impose barrier effects costly to its business vitality and to emergency response times for fire, police, and ambulance services and

would disrupt community cohesion. Because the build alternatives do not involve IL 83, the Village acknowledges that they are reasonably compatible with its future plans.

- **DuPage County—**DuPage County's Comprehensive Plan (DuPage County, 2005) and its West O'Hare Corridor Economic Development Study (DuPage County, 2006) identify and plan for an eastern extension of the Elgin O'Hare Expressway and an O'Hare West Bypass of the O'Hare Airport. Northeastern DuPage County encompasses all major land use categories throughout the study area including residential, commercial, industrial, open spaces, transportation and utilities, and agricultural properties. The County's plans propose future uses that would be compatible with these roadway improvements.

Overall, community plans or strategies complement the concept of the proposed build alternatives, and there are no material distinctions in impacts to land use proposed by the core communities between Alternatives 203 and 402. Either communities have already included the proposed transportation project, or they will include the project in their plans if the project becomes a reality. In all cases, the design aspects of the final system of improvements will require consideration of several designs to fit the needs of the various communities. Besides the local planning issues, the proposal to construct the Elgin O'Hare Expressway has been part of the region's long-range plan since the late 1960s, and the proposal to construct an O'Hare West Bypass extending from I-294 to I-90 has been part of the regional plan since the 1990s. For that reason, the communities have had the opportunity to consider and plan for compatible land uses near the proposed facilities. Further, over the years (in particular, when the existing section of the Elgin O'Hare Expressway was being designed and built), some of the right-of-way along the Thorndale Avenue corridor was purchased in anticipation of a future upgraded roadway. This has enhanced the possibility that future land use and development would be compatible with a future upgraded roadway facility.

4.1.3.2 Airspace Compatibility

The FAA regulates airspace and clearance requirements near airport operations. Clearance requirements control the height of structures or objects in aircraft operating areas. The FAA encouraged early review of the proposed transportation improvements and their possible conflicts with controlled air space. Early review is voluntary and was considered preliminary, with the object of assisting IDOT with future design parameters. Because of the project's proximity to the airport, early coordination was initiated to determine if there were issues of concern regarding airspace. Although the FAA typically conducts airspace reviews (using Form 7460 and required information) for projects much further into design, it agreed that a preliminary 7460 review would be beneficial to facilitate later the stages of design. The FAA conducted the review and offered the following comments in its response dated March 6, 2009 (included in Appendix G), to be considered as the design/planning process proceeds:

- Four locations were identified as having instrument flight rule (IFR) impacts, which concern departing aircraft initial climb surfaces. Points 9R-PT5 and 9R-PT6 are located near proposed Runway 9R, where Elgin O'Hare Expressway connects to the O'Hare West Terminal. FAA noted that if those points were reduced by the amount of penetration (two to seven feet), there would be no IFR impacts. Failure to do so could result in a reduction of aircraft departure weights allowed by the carriers. Point 4R"G"-PT3 is located along the O'Hare West Bypass South Connection Option G, which was eliminated from further study during the initial alternatives evaluation process. Point

14R-PT3 is located near runway 14R, which will be decommissioned in the near future as part of the OMP.

- The FAA also provided a table of critical points for Part 77 height restrictions. The points show where potential penetrations to Part 77 Approach Surfaces could occur. See FAA memorandum dated March 6, 2009, in Appendix G for the full list.
- Highway light poles must be affixed with visual delineation/safety light for aircraft safety.
- As the project proceeds to design, a formal 7460 Review will be required before actual construction may commence.

Per the March 6, 2009 memorandum, FAA cited no major concerns resulting from the location of the build alternatives, bypass, north connection, or the south bypass connection options. All conflicts described above relate to future highway lighting considerations. The issues identified can all be adjusted in during the detailed design. As planning and design proceed, FAA will review the updated design plans from the standpoint of an airspace use.

4.1.3.3 Consistency with Land Use Patterns

The study area benefits from extensive transportation infrastructure (including proximity to I-90, I-290, and I-294; multiple rail yards, lines, and intermodal facilities; and the O'Hare Airport). Therefore, commercial and industrial land uses are concentrated within the study area. Much of the development just west of the airport took place in the 1950s and 1960s, as regional growth pushed development out to areas where land was available. The presence of O'Hare Airport was a further influence for new or relocating industries that relied on easy access to air and railroad facilities. Industrial development in the study area generally is concentrated in Elk Grove Village and Bensenville, and is adjacent to much of the Thorndale corridor and the Elgin O'Hare Expressway (west of I-290). Within the study area there is little available developable land (five percent of area), so change to land uses would represent either infill or redevelopment of underused properties. Table 4-3 summarizes the land use impacts of the build alternatives.

The common sections of Alternatives 203 and 402 (the Elgin O'Hare Expressway part and the south section of the O'Hare West Bypass) are aligned through areas that are primarily industrial or airport properties. Through the shared roadway sections, neither alternative crosses community centers or residential neighborhoods. There would be changes to property access along the improved routes. Frontage roads would be provided at critical locations along Elgin O'Hare Expressway alignment on both the north and south sides of the upgraded facility to provide local property access. Access to and from the freeway facility would be channeled to specific interchange locations, as identified in Section 3. Freeway overpasses would be provided in several locations along the expressway to provide continuity for travel on crossing roadways, to accommodate bicycle and pedestrian travel, and community linkages. For Alternative 203, the north section of the O'Hare West Bypass is located primarily on O'Hare Airport property, where access is restricted and land use is airport-related. No property access changes would result from the improvements and adjacent land-use would remain unchanged.

Alternative 402 would cause only minor changes to property access along the north leg of the improvement, between the Elgin O'Hare facility and I-90. Property access generally would be

modified by consolidating ingress and egress in areas of concentrated development and at intersections. Major roadway intersections would remain at grade, except at the interchange with I-90. Intersections would be upgraded to accommodate high-volume turning movements. To maintain efficient traffic movement and operation at intersections, access to nearby properties may be controlled, possibly by limiting the number of ingress and egress points or by limiting turning movements to right-in and right-out. The partial interchange at I-90 would be upgraded to a full interchange.

Where properties are already developed adjacent to the proposed improvement (which is the case for most areas adjacent to proposed project), design details could protect those areas from access issues and barrier effects resulting from an access controlled facility.

TABLE 4-3
Land Use Impacts per Build Alternative and South Bypass Connection Option

	Compatibility with Land Use Patterns	Consistency with Land Use Plans and Policies
Alternative 203	The Elgin O'Hare Expressway segment is routed through an area where land use anticipates a future high-type transportation facility. Industrial and commercial uses will benefit from an upgraded facility and improved access. Much of the O'Hare West Bypass (middle section) would be on O'Hare Airport property reserved for a roadway corridor. No land use changes would occur on airport property. The roadway segments not on airport property would be within the Bensenville Yard. It is not expected that changes to land use would occur as a result of placement of the roadway in the vicinity of that property.	The six-core communities' plans or stated policies support and reflect eventual presence of the improved transportation facilities.
Alternative 402	The Elgin O'Hare Expressway segment is routed through an area where land use anticipates a future high-type transportation facility. Industrial and commercial uses will benefit from an upgraded facility and improved access. Much of the O'Hare West Bypass (south section) would be on O'Hare Airport property reserved for a roadway corridor. No land use changes would occur on airport property. The roadway segments not on airport property would be within the Bensenville Yard. It is not expected that changes to land use would occur as a result of placement of the roadway near that property. O'Hare West Bypass (north section) would be an upgraded arterial facility on Elmhurst/York Road. Industrial and commercial uses would benefit from upgraded roadway facility.	The six-core communities' plans or stated policies support and reflect eventual presence of these improved transportation facilities.

TABLE 4-3
Land Use Impacts per Build Alternative and South Bypass Connection Option

	Compatibility with Land Use Patterns	Consistency with Land Use Plans and Policies
Option A	Adjacent lands are industrial to the east and commercial/light industrial/residential/park to the west. This alignment, which is on the eastern fringes of the community, avoids major disruption or compatibility issues, but it would require the use of extensive design features to soften the effects especially to the neighboring residential area. Improved access to this area would potentially benefit new investment in industrial and commercial uses.	While not explicitly stated in its plan documents, the Village of Bensenville has expressed opposition to South Bypass Connection Option A. The Village stated its concerns for Option A at the March 11, 2009, Public Meeting, as well as at one-on-one meetings conducted with the Village following the public meeting. The Village's position is that Option A would site a new freeway corridor adjacent to residential areas and displace remaining commercial and industrial properties along County Line Road.
Option D	Adjacent industrial lands would benefit from improved access (aside from those directly impacted).	While not stated in its plan documents, the Village of Franklin Park has expressed support for a south bypass connection. On September 8, 2009, the Village passed a resolution in favor of Option D.

Although both build alternatives are compatible with the core communities' comprehensive plans and adjacent land uses, coordination and review by communities directly affected by the improvements would be required at each successive design phase.

Both Options A and D involve construction of a tunnel under the western Bensenville Yard, and then extending east on the south edge of the facility. This alignment location is compatible with existing uses at the rail yard and avoids displacement of any existing track. It would require the relocation of the (no longer used) roundhouse and machine shop. Table 4-3 summarizes the land use impacts for the south bypass connection options.

Option A on County Line Road runs through an industrial area. The buildings on the east side of County Line Road (which generally would not be affected) are large industrial facilities, whereas those on the west side of the roadway (which would be affected) tend to be small industrial/commercial facilities. Uses just west of the proposed improvements tend to be residential and park uses.

Option D, which extends south along the east side of the UP rail tracks, is aligned through an existing and antiquated industrial area before connecting at I-294.

4.1.4 Environmental Justice

This subsection describes the potential for disproportionate impacts to low-income and minority populations that could occur with the build alternatives. The assessment included a technical analysis to determine potential effects and the use of public involvement activities that included all residents and population groups in the study process. It did not exclude anyone based on income, race, color, religion, national origin, sex, age, or handicap.

For each alternative, the influence area is defined by the census tracts bordering the proposed improvements. A disproportionate impact to these populations exists when they bear more than their "fair share." An analysis of these populations showed that, compared to the general population, there would be no disproportionate impact to low-income populations (in accordance with the U.S. Department of Health and Human Services Poverty Guidelines) or minority populations within the influence area of the alternatives.

Demographic and income characteristics were compiled for the census blocks and block groups, respectively, for the 2000 census within each alternative corridor and combined to represent the residential nature of each alternative and south bypass connection option. This information, along with similar information for DuPage and Cook counties and the State of Illinois, is presented in Tables 4-4 and 4-5 for comparison purposes. Information for individual block groups and blocks within which displacements would occur were reviewed to determine whether there are locations along the proposed improvements with a high percentage of minority populations or families with income levels below the U.S. Department of Health and Human Services Poverty Guidelines.

TABLE 4-4
Comparison of Build Alternative and South Bypass Connection Option Demographic Characteristics to Those of DuPage County, Cook County, and the State of Illinois

Race	Alt. 203	Alt. 402	Option A	Option D	DuPage County	Cook County	State of Illinois
White	12,303 (73.3%)	10,245 (77.1%)	185 (75.2%)	55 (74.3%)	759,924 (84.0%)	3,025,760 (56.3%)	9,125,471 (73.5%)
Black or African American	498 (3.0%)	438 (3.3%)	0 (0.0%)	0 (0.0%)	27,600 (3.1%)	1,405,361 (26.1%)	1,876,875 (15.1%)
American Indian and Alaska native	60 (0.4%)	53 (0.4%)	0 (0.0%)	0 (0.0%)	1,520 (0.2%)	15,496 (0.3%)	31,006 (0.2%)
Asian	1,920 (11.4%)	1,133 (8.5%)	30 (12.2%)	11 (14.9%)	71,252 (7.9%)	260,170 (4.8%)	423,603 (3.4%)
Native Hawaiian and other Pacific islander	13 (0.1%)	10 (0.1%)	0 (0.0%)	0 (0.0%)	217 (0.0%)	2,561 (0.0%)	4,610 (0.0%)
Other race	1,462 (8.7%)	1,063 (8.0%)	21 (8.5%)	8 (10.8%)	28,166 (3.1%)	531,170 (9.9%)	722,712 (5.8%)
Two or more races	518 (3.1%)	343 (2.6%)	10 (4.1%)	0 (0.0%)	15,482 (1.7%)	136,223 (2.5%)	235,016 (1.9%)
Total population	**16,774**	**13,285**	**246**	**74**	**904,161**	**5,376,741**	**12,419,293**
Percent minority	**26.7%**	**22.9%**	**24.8%**	**25.7%**	**16.0%**	**43.7%**	**26.5%**
Hispanic population (any race)	24.8%	21.4%	18.7%	18.9%	9.0%	19.9%	12.3%
Average household size	2.5	2.4	2.3	2.2	2.7	2.7	2.6

Source: U.S. Bureau of the Census, 2000.

Alternative 203 lies within 318 census tract blocks. Minority residents account for 26.7 percent of the Alternative 203 area (see Exhibit 4-3A). This percentage is similar to the statewide average, lower than the Cook County average, but higher than DuPage County. Alternative 402 lies within 279 blocks. Minority residents account for 22.9 percent of the

TABLE 4-5
Comparison of Build Alternative and South Bypass Connection Option Income Characteristics to Those of DuPage County, Cook County, and the State of Illinois

	Alt. 203	Alt. 402	Option A	Option D	DuPage County	Cook County	State of Illinois
Total population	**57,784**	**49,169**	**13,857**	**10,562**	**904,161**	**5,376,741**	**12,419,293**
1999 median family income	$64,418	$65,902	$59,610	$57,786	$79,314	$53,784	$55,545
Average family size	4.0	4.0	4.6	4.6	3.3	3.4	3.2
Poverty status	5.7%	5.0%	7.2%	7.8%	3.6%	13.5%	10.7%

Source: U.S. Bureau of the Census, 2000.

Alternative 402 area. This is higher than DuPage County but lower than Cook County and the State of Illinois percentages.

Census blocks with higher percentages of minority residents than the state average are located throughout the study area. Census blocks within DuPage County with minority percentages higher than the County are spread across the study area as well. Census blocks within Cook County with minority percentages higher than the County are located mostly along the I-90 corridor where Alternative 203 improvements extend farther (west and east) than Alternative 402 improvements. The Asian population makes up the highest percentage of minorities under both alternatives. Census blocks consisting of a higher percentage of Asian population than the county and state averages are distributed at locations along the western portion of the Elgin O'Hare Expressway, the area southwest of O'Hare Airport, and north and west of the I-90 interchange at Elmhurst. The notable difference between Alternatives 203 and 402 are the additional census blocks with higher than average percentages of Asian residents along Alternative 203, where it extends farther west along I-90 than Alternative 402. Census block data were further analyzed in areas where displacements would occur. Displacements from Alternatives 203 and 402 occur in 18 and 22 census blocks, respectively, three of which have higher minority percentages than the state or county they are located and are common to both alternatives.

The U.S. Department of Health and Human Services defined the 2009 poverty guideline for a family of four (the average family size for census tract block groups in the study area) at $22,050. Alternatives 203 and 402 lie within 33 and 27 census tract block groups, respectively (see Exhibit 4-4). The median family income for families in Alternative 203 census trace block groups is $64,418 and the median family income of the Alternative 402 area is $65,902, both of which are much higher than the poverty threshold and exceed the median family income levels of Cook County and the State of Illinois (although they are lower than DuPage County) (see Table 4-5). No block group where displacements would occur has a median family income below the 2009 poverty guideline. One block group has a median family income slightly below the 2009 poverty guideline for the average family size of that block group and is common to both alternatives. However, the residential portion of the block group does not intersect with and is not proximate to the Alternative 203 footprint.

Based on the evaluation of the demographic and income characteristics in the study area, neither alternative has the potential to exert high or disproportionate adverse impacts on minority or low-income populations. Census block groups and blocks with minority populations are distributed across the study area; therefore, it cannot be concluded that improvements causing access changes or displacements are confined to a minority population in a particular location. Conversely, improvements causing displacements and access changes are proposed in locations without minority or low income populations. Local access would be maintained in nearly all locations by means of frontage roads (e.g., Thorndale Avenue). Thus, local trips would not require indirect or circuitous travel. Though employees would be displaced as a result of business impacts, the potential for relocation in the proximate area is high and therefore, is not expected to adversely affect any employees living and working in this area. Therefore, it cannot be concluded that minority or low income populations will bear more than their fair share of impacts.

Options A and D are located within 56 and 52 census tract blocks, respectively. Of the census blocks within the options, eight blocks within Option A and four within Option D are populated; all populated census blocks are located within DuPage County along Green Street or along the west side of County Line Road. The percentage of minority residents for both options is approximately 25 percent—higher than in DuPage County but below the State of Illinois or Cook County (see Table 4-4 and Exhibit 4-3A). As with the alternatives, the highest percentage of the minority population is Asian. Under Option A, displacements would occur in three populated census blocks, only one of which has a minority population. All displacements under Option D would occur in nonpopulated census blocks. The percentage of residents of Hispanic origin in these census tract blocks is also higher than DuPage County or state percentages. Two census blocks have Hispanic populations higher than DuPage County or state percentages, one of which would experience displacements.

Options A and D are located within 10 and eight census tract block groups, respectively (see Exhibit 4-4). Median family incomes of the Option A and D areas are $59,610 and $57,786, much higher than the poverty threshold and exceeds the median family income levels of Cook County and the State of Illinois (although it is lower than DuPage County). No individual block group along these options has a median family income below the 2009 poverty guidelines.

Based on the evaluation of the demographic and income characteristics in the study area, neither option has the potential to exert high or disproportionate adverse impacts on minority or low-income populations. No low-income population is located along the south bypass connection options. The residential population within the census blocks along the proposed options is very low (only 14 percent of census blocks along Option A and eight percent along Option D are populated). The percentage of minority residents is very similar for both options and slightly higher than the DuPage County average but lower than the State average. The percentages of Hispanic residents along both options are higher than for both DuPage County and the state. However, displacements would occur (under Option A) in only one census block with a higher percentage of Hispanic residents than the county or state averages. Further, access changes and improvements are spread across the proposed connection options and would be experienced by minority and nonminority populations alike. Local access would be maintained in most all locations by means of frontage roads (e.g., County Line Road). Thus, local trips would not require indirect or circuitous travel. Though

employees would be displaced as a result of business impacts, the potential for relocation in the proximate area is high and, therefore, not expected to adversely affect employees living and working in the area. Therefore, it cannot be concluded that minority populations will bear more than their fair share of impacts.

4.1.5 Economic Impacts

The build alternatives have a varied impact upon the study area in terms of beneficial and adverse impacts to businesses, employment, and taxes.

4.1.5.1 Beneficial Impacts Resulting from Improved Access

The build alternatives address purpose and need issues identified early in the environmental process:

- Improve local and regional travel
- Improve travel efficiency (e.g., better access)

The proposed transportation improvements are expected to improve access and opportunities to industrial and commercial properties, which would enhance the possibility of redeveloping underused property. Both build alternatives would improve access and shorten travel times to industrial areas within the study area. More than 40 percent of the study area is more than 10 minutes driving time from interstate facilities, which is considered a competitive disadvantage to many industrial and commercial properties in the area.

Both build alternatives would provide improved access and travel benefits throughout the study area. The proposed build alternatives would assist in shifting nonlocal travel from arterial roadways to higher capacity roads, and to some degree shift automobile travel trips to transit, thus reducing travel on local roadways. Construction of a freeway would relieve local roadways of through traffic that use roads throughout the study area. It would provide the appropriate facility for the nonlocal trips.

For the common elements of the build alternatives, the proposed improvements would enhance access to the study area with an upgraded and extended Elgin O'Hare Expressway that would provide a freeway with nine interchanges (four existing, five new) throughout its length. The improvements would maintain full access at all major crossings on existing Thorndale Avenue. Minor crossings would be maintained under the proposed Elgin O'Hare Expressway facility to maintain community and business connectivity across the freeway and provide access to industrial areas at key interchange locations.

Improved access would strengthen the competitive position of a thriving industrial area, which could lead to additional investment in redeveloping older or obsolete structures and modernizing the industrial parks. Improvements to the O'Hare West Bypass (both north and south sections) would enhance access[3] to the west side of O'Hare Airport and industrial businesses in the area with a facility that provides the following benefits:

- An upgraded interchange at Elmhurst Road and I-90 (both alternatives)

[3] All interchange modifications or new interchanges will be approved by the FHWA during review of access justification reports, which would be completed in subsequent design phases.

- An interchange at Touhy Avenue/IL 72, and at Pratt Street/Devon Avenue, providing access to the north (Alternative 203)
- An interchange at IL 19 (both alternatives)
- An interchange to Franklin Avenue from the south (both south bypass connection options)
- Improved access from Franklin Avenue/Green Street to Irving Park Road on a new Taft Road bridge over the Bensenville Yard

4.1.5.2 Beneficial Economic Impacts

Dollars invested in transportation flow through all sectors of the economy. Such investments spur increased jobs, income, profit and tax revenue, and provide an economic stimulus far exceeding the original investment. This transportation investment not only will benefit the local economy by providing needed infrastructure; it also will benefit the economy and increase economic output through a multiplier effect. The project will employ construction workers and their suppliers. It will stimulate employment in other sectors of the economy to support those workers, such as medical facilities, laundries, restaurants, and other service industries throughout the area. These multiplier effects were estimated using IMPLAN PRO.[4] The model estimates economic impacts by tracing spending and consumption in various economic sectors. By their nature, total economic impacts are greater than initial project costs where the magnitude of the increase is termed the *multiplier effect*.

The estimate of economic impacts from each alternative's construction activities on the regional economy[5] was measured in terms of value added and employment. The following construction cost estimates were used (2009 dollars):

- Alternative 203[6]: $3.0 billion for construction and $660 million for right-of-way[7]
- Alternative 402: $2.3 billion for construction and $473 million for right-of-way

It was assumed the construction costs would be evenly spread over a three-year period.[8]

Table 4-6 details the results of the analysis. Economic impact of Alternative 203, with construction costs of $1.0 billion per year, would result in creation of 9,200 jobs per year in the region (during the three years of construction) in the highway construction industry, and a total of 21,600 jobs per year (during the three years of construction), including those in other services and industries (benefits accrue to all industries throughout the regional economy). Total value added per year would be an estimated $1.6 billion, translating to $4.8 billion over the three-year period. For perspective, the value added resulting from the project is roughly one percent of the value added in the region (the Chicago MSA plus

[4] IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data for geographic areas from a variety of sources.

[5] For this analysis, the region included the Chicago MSA (Cook, DuPage, Kane, Lake, McHenry, and Will counties) and Kenosha County, Wisconsin.

[6] Construction costs for Alternatives 203 and 402 include Option D. Option D was used as a representative south bypass connection option and presents the "worst case," as its construction costs are higher than those for Option A.

[7] Right-of-way costs typically are treated as transfer payments and therefore do not contribute to an increase in economic activity in terms of jobs and value added.

[8] Three years is the anticipated construction time for this project.

Kenosha County, Wisconsin), which is $479 billion. Value added is the net measure of the economic contribution of an industry to the regional economy less the intermediate goods and services used.

Alternative 402, with construction costs of $770 million per year, would result in creation of 7,000 jobs per year in the highway construction industry, and a total of 16,600 jobs annually in the region. Total value added per year would be an estimated $1.3 billion, translating to $3.9 billion over the three-year period.

TABLE 4-6
Economic Impacts from Construction [a]

	Alternative 203	Alternative 402
Construction costs total	$3.0 B	$2.3 B
Construction costs per year	$1.0 B	$770 M
Total value added per year	$1.6 B	$1.3 B
Total value added	$4.8 B	$3.9 B
Jobs directly[b] created per year	9,200	7,000
Total jobs[c] created per year	21,600	16,600

[a] The economic benefits from construction (value added and jobs created) are for the region (the Chicago MSA plus Kenosha County, Wisconsin).
[b] These are jobs related to construction of the transportation improvement.
[c] These include jobs in all sectors of the economy that are created as a result of the initial investment.

4.1.5.3 Employment Loss

The build alternatives would affect commercial and industrial structures within the proposed footprint, as discussed in subsection 4.1.2, causing the displacement of businesses and their employees. Employee estimates for displaced businesses range from two to 174 workers per business; no major employers will be displaced as a result of the proposed improvements. Communities affected will incur a reduction of 1.90 percent or less in their employee bases (see Table 4-7).

TABLE 4-7
Employee Loss per Community by Build Alternative and South Bypass Connection Option

Alternative	Employees per Community[a]	Employees Displaced	Employment Loss (%)
203			
Des Plaines	60,359	158	0.26
Itasca	31,374	28	0.09
Bensenville	29,903	96	0.32
Elk Grove Village	61,121	10	0.02
Total	**182,757**	**292**	**0.16**
402			
Itasca	31,374	28	0.09
Bensenville	29,903	96	0.32
Elk Grove Village	61,121	5	0.01
Total	**122,398**	**129**	**0.11**
Option A			
Bensenville	29,903	424	1.42
Franklin Park	27,474	76	0.28
Northlake	10,934	208	1.90

TABLE 4-7
Employee Loss per Community by Build Alternative and South Bypass Connection Option

Alternative	Employees per Community[a]	Employees Displaced	Employment Loss (%)
Total	**101,196**	**708**	**0.70**
Option D			
Bensenville	29,903	430	1.44
Franklin Park	27,474	521	1.90
Northlake	10,934	34	0.31
Total	**68,311**	**985**	**1.44**

[a] *Source:* CMAP, 2006.

The economic impacts of the employee displacements include the loss of earned wages, further employment loss in the region, and loss of added value to the affected industry. The economic impact to the region from displaced businesses and employees was estimated using the IMPLAN model (see Table 4-8). Because it is beyond the scope of this project to investigate whether or not the potentially displaced businesses would relocate in the area, the analysis is conservative and reflects the "worst case" in that it assumes none of the businesses and their employees will relocate in the region.

TABLE 4-8
Worst Case Economic Impacts from Employee Displacement by Build Alternative and South Bypass Connection Option (2009 $)

	Alternative 203	Alternative 402	Option A	Option D
Employees directly displaced	292	129	708	985
Total employees displaced	692	277	2,481	3,670
Direct employee compensation lost	$13.7 M	$4.7 M	$47.1 M	$83.2 M
Total value added lost	$54.0 M	$20.1 M	$223.4 M	$350.7 M

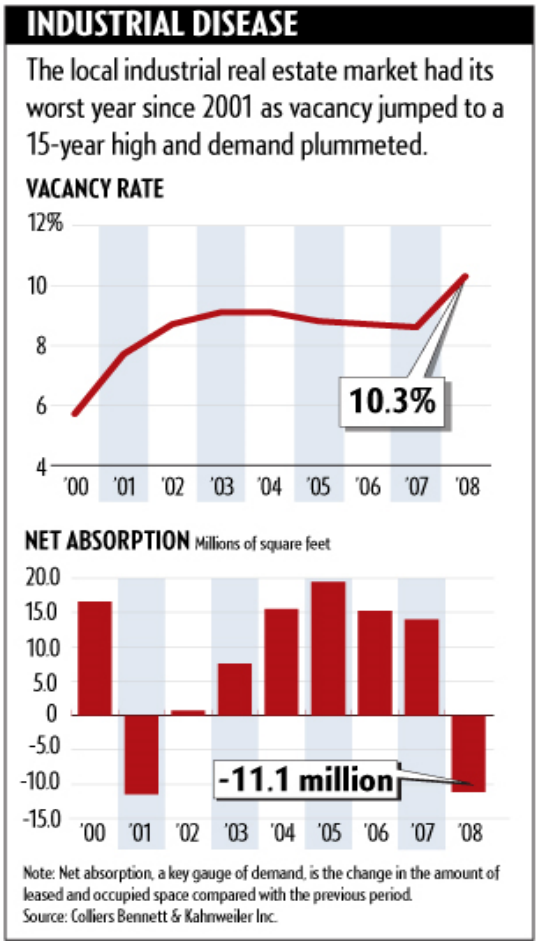
Source: IMPLAN, 2009.

Alternative 203 would directly affect 292 employees by displacing 12 businesses. IMPLAN predicts their employment could ultimately affect 692 jobs in the region. The direct loss in employee compensation is $13.7 million, or $46,900 per employee. Alternative 402 would directly affect 129 employees by displacing eight businesses. Their displacement ultimately affects the employment of 277 workers in the region. The direct loss in employee compensation is $4.7 million, or $36,000 per employee. The loss in total value added is $20.1 million.

Table 4-8 lists the results from the IMPLAN analyses for Options A and D. The direct loss of 708 employees under Option A ultimately affects the employment of 2,481 workers in the region. The direct loss in employee compensation is $47.1 million, which averages $66,600 per employee. The loss in total value added is $223.4 million. The displacement of businesses by Option D results in the loss of 985 employees. Their displacement ultimately affects the employment of 3,670 workers in the region. The direct loss in employee compensation is $83.2 million, which averages $84,500 per employee. The loss in total value added is $350.7 million.

4.1.5.4 Business Relocation and Labor Absorption Potential

The effects of employment loss assumed a "worst case" whereby none of the businesses and their employees will relocate in the region. Although the businesses presumably selected their specific locations for some comparative advantage (e.g., low rent, access to nearby businesses as either clients or suppliers), it does not appear that any businesses are tied to a specific location, as in the case of a gravel mining operation.



Therefore, the affected businesses have the opportunity to readily relocate. An impediment may be the lack of a desirable location and site. It is beyond the scope of this analysis to determine whether a business will choose to relocate, but market conditions suggest the availability of industrial real estate in the Chicago area is the highest in 15 years (Baeb, 2009). This suggests that displaced businesses that wish to relocate within the region should have sufficient locations from which to choose.

The potential for displaced workers to be absorbed into the workforce is a function of the local and national labor market conditions, which are important determinants of employment outcomes. Personal characteristics, household circumstances, and ascribed skills are also important, as employers use these attributes to screen potential recruits.

4.1.5.5 Tax Revenues

Tax revenues for affected taxing jurisdictions (e.g., municipalities, townships, fire department districts, etc.) will decrease from the conversion of private property to transportation use. Table 4-9 is a summary of tax revenue loss by alternative and south bypass connection option within each community. Tax revenues from 2007 were used to complete the analysis.

TABLE 4-9
Tax Revenue Loss per Alternative and South Bypass Connection Option (2007 $)

	Alternative 203	Alternative 402	Option A	Option D
Bensenville	$151,055	$161,086	$158,655	$441,946
Des Plaines	$978,813	$276,502	$0	$0
Elk Grove Village	$259,780	$198,387	$0	$0
Elmhurst	$0	$0	$27	$27
Franklin Park	$0	$0	$587,603	$1,777,237
Hanover Park	$4,474	$4,474	$0	$0

TABLE 4-9
Tax Revenue Loss per Alternative and South Bypass Connection Option (2007 $)

	Alternative 203	Alternative 402	Option A	Option D
Itasca	$59,650	$59,650	$0	$0
Mount Prospect	$13,681	$13,681	$0	$0
Northlake	$0	$0	$543,404	$434,105
Roselle	$18,506	$18,506	$0	$0
Schaumburg	$48,254	$48,254	$0	$0
Wood Dale	$44,225	$44,225	$0	$0
Unincorporated	$222,351	$67,859	$2,621	$15,357
Total	**$1,800,789**	**$892,624**	**$1,292,310**	**$2,668,662**

4.1.6 Public Facilities

A review of publicly available information found that no fire stations, hospitals, or places of worship would be directly affected by the proposed improvements. Alternatives 203 and 402 would affect a Chicago Police Department K-9 Training Center on the north side of Touhy Avenue between Elmhurst and South Mount Prospect Roads. The footprints for Alternatives 203 and 402 potentially encroach upon the property of Medinah Intermediate School on Medinah Road (see Exhibit 4-1B). At that location, Medinah Road would be widened from two to three lanes in each direction. Only the landscape strip between the school and the sidewalk would be shortened. No structures or activity centers on the property would be impacted, and the sidewalk would be replaced. In addition, Options A and D both would displace the Northlake water tower on the east side of I-294.

School bus routes and emergency response routes are not expected to be adversely affected. Rather, movement is expected to be enhanced by the diversion of vehicles from lower type facilities onto higher type facilities or frontage roads and by the addition or improvement of access points to and from higher type facilities.

4.2 Water Resources and Quality

4.2.1 Groundwater Resources

This analysis focuses on potential effects of the build alternatives to community and private water supplies. The communities that will be affected by the build alternatives all receive their drinking water supply from Lake Michigan; therefore, impacts to their drinking water are not anticipated. However, based on available data from IEPA and ISGS, well locations mapped within the alternative footprints must be considered.

Every community near to the proposed build alternatives has municipal wells. The active wells are used for irrigation, for water supply at parks, or other facilities that do not have a Lake Michigan water supply. Some of the wells are remnants from pre–Lake Michigan water supply and are kept operational in case the Lake Michigan water supply is compromised. Similarly, private wells are used for various purposes; not every owner is on Lake Michigan water, and therefore, wells may be used to provide potable water.

No sole source aquifers, as defined by section 1424(e) of the Safe Drinking Water Act, are located in Illinois (USEPA, 2008). No measurable change to the available groundwater supply is expected due to the build alternatives; the additional impervious area associated with the build alternatives would represent a small reduction in potential recharge area that would likely be mitigated by construction of the stormwater management basins.

The project will 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 project 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.

Noncommunity water supply wells, private water wells, and community water supply wells near the build alternatives and the south bypass connection options (see Tables 4-10 and 4-11, respectively) have a potential risk for contamination from roadway runoff. The potential for contaminating groundwater supply wells depends on well construction, proximity to pollutant sources, and geological conditions. It is expected that well impacts near the project will be minimal because of the generally clayey soils with low permeability above the aquifers, controlled roadway drainage pattern (e.g., stormwater conveyed/ captured by curb and gutter, storm sewer, and open ditches), and the dilution of runoff associated with proposed stormwater facilities.

Although roadways and other supporting transportation improvements are not considered a source for groundwater contamination, the following information is provided as documentation of consideration of the setback requirements. The Illinois Groundwater Protection Act (Chapter 415 ILCS Section 55) establishes setback zones for the location of potential sources of pollution, such as underground storage tanks (USTs), dry wells, borrow pits, and deicing salt storage facilities. The minimum setback zone around a community water supply well is 400 feet for protection of groundwater, 200 feet for private wells. Up to a 1,000-foot setback is allowed for community water supply wells, if technical data supports a wider zone. Alternative 203 has six more noncommunity/private water wells within 200 feet and an equal number of community water supply wells within 400 feet when compared to Alternative 402. Options A and D have an equal number of noncommunity/private water wells within 200 feet and no community water supply wells within 400 feet (see Tables 4-10 and 4-11).

Investigations would be completed during Tier Two environmental studies to define the potential risk of well/groundwater contamination from the build alternatives, as necessary.

TABLE 4-10
Noncommunity and Private Water Wells within 200 feet of the Build Alternatives and South Bypass Connection Options

Alternative/Option	Wellheads within 200 ft
203	66
402	60
Option A	7
Option D	7

Source: ISGS, 2008.

Note: A noncommunity water system is a public water system that is not a community water system. It has at least 15 service connections used by nonresidents or regularly serves 25 or more nonresident individuals daily at least 60 days per year (Illinois Groundwater Protection Act, 415 ILCS 55/9). A private water system is any supply that provides water for drinking, culinary, and sanitary purposes and serves an owner-occupied single family dwelling (Illinois Groundwater Protection Act, 415 ILCS 55/9).

TABLE 4-11
Community Water Supply Wells[a] near the Build Alternatives and South Bypass Connection Options

Alternative/Option	Wellheads within Setback Distance		
	200 ft	400 ft	1,000 ft
203	6	6	20
402	6	6	17
Option A	0	0	0
Option D	0	0	0

Source: IEPA, 2008b.

[a] A community water system is a public water system that serves at least 15 service connections used by residents or regularly serves at least 25 residents for at least 60 days per year (Illinois Groundwater Protection Act, 415 ILCS 55/9).

4.2.2 Surface Water Resources

This subsection discusses impacts to surface water resources that would be associated with the construction, operation, and maintenance of the alternatives, including the pollutants that could be deposited into receiving waters, potential impacts to water quality, and direct impacts through construction and the placement of fill material. Pollutants, such as sediments, solids, heavy metals (e.g., lead, zinc, and copper), oil and grease, deicing chemicals, and fertilizers/nutrients, may be released into the environment during construction or may accumulate on roadway surfaces and adjoining rights-of-way as a result of motor vehicle operations and maintenance. They can be transported to receiving waters in stormwater runoff.

Surface water impacts would be associated with the construction, operation, and maintenance of the build alternatives. The build alternatives cross 16 streams or tributaries in four different watersheds (see Exhibits 4-1A through 4-1E, Exhibit 4-5, and Table 4-12). The build alternatives would not cross the West Branch DuPage River or any streams within the West Branch DuPage River Watershed. The number of stream crossings and type of in-stream/streambank work (abutment/pier placement, bank shaping, and temporary haul roads) could result in construction-related impacts. Temporary construction-related impacts could also result even if a waterway is not crossed, depending on the proximity of the activity to the waterway, drainage patterns, and implementation of best management practices (BMPs).

TABLE 4-12
Summary of Stream Crossings by Build Alternative, South Bypass Connection Option, and Watershed

Waterway	Alternative/Option	Tributary Area at Crossing[a] (mi^2)	Total Number of Crossings[b]
Addison Creek Watershed			
Addison Creek	Option A, Option D	5.8	1
Unnamed Tributary to Addison Creek	Option A, Option D	1.3	1
Des Plaines River Watershed			
Bensenville Ditch	203, 402	2.5	1
Silver Creek	Option A, Option D	5.5	1

TABLE 4-12
Summary of Stream Crossings by Build Alternative, South Bypass Connection Option, and Watershed

Waterway	Alternative/Option	Tributary Area at Crossing[a] (mi^2)	Total Number of Crossings[b]
Salt Creek Watershed			
Salt Creek	203, 402	54.7	1
Spring Brook (Creek)	203, 402	0.4	1
Unnamed Tributary to Meacham Creek	203, 402	0.1	1
Meacham Creek	203, 402	3.1[c]	3
Devon Avenue Tributary	203, 402	0.7	1
Willow Creek Watershed			
Willow Creek	203	5.0[d]	2[d]
	402	5.0[d]	1[d]
Unnamed Tributary to Willow Creek	402	0.3	1
Unnamed Tributary to Willow Creek North Tributary	203, 402	0.2	1
Willow Creek South Tributary	203, 402	1.5	1
Higgins Creek	203	6.4[e]	4
	402	5.7[f]	3
Higgins Creek Tributary A	203, 402	2.1	1
Unnamed Tributary to Higgins Creek	203	0.4[g]	2
	402	0.2[h]	1
Total	203	—	19
	402	—	17
	Option A	—	3
	Option D	—	3

Source: USGS Quadrangle Map; DuPage County FIS (FEMA, 2007), Cook County FIRM (FEMA, 2008); Streamstats (USGS, 2007).

[a] Approximate tributary area was determined using Streamstats. When there are multiple crossings on one stream, the largest approximate tributary area is provided.

[b] Of the watersheds located proximate to proposed EO-WB improvements, no crossings are located within the Weller Creek or West Branch DuPage River Watersheds.

[c] At Medinah Road crossing.

[d] At York Road crossing, where three span land bridge is considered one crossing.

[e] At Touhy Avenue crossing.

[f] At I-90 crossing east of Elmhurst Road.

[g] Drainage area provided at I-90 crossing southwest of Lake Briarwood for Alternative 203.

[h] Drainage area provided at I-90 crossing at Oakton Street for Alternative 402.

4.2.2.1 Direct Impacts to Surface Waters

Direct impacts to surface waters would result from construction and the placement of fill to construct the proposed improvements. Construction associated with transportation projects include earthmoving practices (e.g., clearing/grubbing, grading, filling, excavation, etc.) that remove vegetative cover and expose soils. Such activities increase the potential for erosion and sedimentation by exposing disturbed soils to precipitation.

Increased impervious surface area and compaction of soils by heavy equipment may result in less stormwater infiltration and additional stormwater runoff. In-stream construction, streambank modification, and placement of structures in the streams could cause minimal

increases in turbidity and sedimentation and temporarily alter downstream hydraulics and substrate conditions. Downstream aquatic systems could be temporarily affected by the increases in turbidity and sedimentation. The magnitude of impact would vary based on several conditions, such as proposed type of crossing, stream characteristics, and soil type.

The placement of fill for stream crossings and additional lanes would also have a direct impact on surface waters (see Exhibits 4-1 and 4-5 and Tables 4-12 and 4-13). Improvements associated with the build alternatives primarily will take place adjacent to and within existing transportation corridors. As such, several surface water impacts will be associated with the replacement, widening, or lengthening of existing stream crossing structures.

TABLE 4-13
Summary of Impacts to Surface Waters and Water Basins by Build Alternative, South Bypass Connection Option, and Watershed

Watershed	Surface Waters[a] Impacts (acre)[b]				Water Basin[a, c] Impacts (acre)[b]			
	Alt. 203	Alt. 402	Option A	Option D	Alt. 203	Alt. 402	Option A	Option D
Addison Creek	0	0	0.1	0	0	0	0.1	0
Des Plaines River	0.1	0.1	0.2	0.2	0	0	0	0.1
Salt Creek	1.0	1.0	0	0	4.7	4.7	0	0
West Branch DuPage River	0	0	0	0	3.3	3.3	0	0
Willow Creek	6.4	3.4	0	0	2.3	2.3	0	0
Total[d]	**7.5**	**4.5**	**0.3**	**0.2**	**10.3**	**10.3**	**0.1**	**0.1**

[a] Surface waters and water basins included a predominance of open water at the time of preliminary field reconnaissance. Open waters may include in-channel wetland and fringe wetland at the perimeter.
[b] Acreages are approximate. Tier Two studies may result in different surface water boundaries than those that are mapped (see Section 2, Affected Environment). Impact acreages are rounded and were calculated by determining the water area within the alternative footprint. Impact acreage of 0 acre represents impacts of less than 0.05 acre.
[c] Water basins represent primarily open water stormwater management facilities. The basins are included in the table because of their potentially jurisdictional nature, but several may be exempt from federal regulation following a review of soils data, site records, and/or coordination with the USACE. A jurisdictional determination was completed as part of the OMP; therefore, within OMP limits, only jurisdictional waters are included.
[d] Depending on the source used for the data, the information in this table may vary from the information found in other tables within this document.

It is expected that the crossing structures would match existing/nearby crossing treatments at each location, but the types of crossing structures would be determined as part of Tier Two environmental studies. Efforts would be made to avoid and minimize impacts to surface waters. When impacts are unavoidable, waterway crossings would be enclosed in a culvert, bridged, or otherwise designed to accommodate anticipated high water flows to allow movement of aquatic biota, and not impede low water flows in order to minimize negative effects to the aquatic ecosystem.

The build alternatives have similar footprints and alignments along most of the improvement corridors. Most of the stream crossings are shared between Alternatives 203 and 402 with the exception of three crossings associated with Alternative 203 at the following creeks/ tributaries (one crossing each): Willow Creek, Higgins Creek, and an Unnamed Tributary to Higgins Creek. There is only one location where a tributary is crossed by Alternative 402 but

not by Alternative 203; this includes the crossing of an Unnamed Tributary to Willow Creek at Elmhurst Road (see Exhibits 4-1A through 4-1E and Exhibit 4-5). Stream crossing impacts are identical for both Options A and D.

Five of the assessed streams that would be affected by the build alternatives are impaired (on the IEPA 303(d) list),[9] and parts have been channelized or modified. None is listed as a natural area (INAI site) or rated as a higher quality Class A or B stream (based on biological diversity or integrity; see subsection 2.3.1, Water Resource and Watershed Characterization).[10] Alternative 203 would have 19 crossings at 12 creeks and would affect 7.5 acres of stream substrate/surface waters.[11] Alternative 402 would have two fewer crossings than Alternative 203, resulting in 17 crossings at 13 creeks and 4.5 acres of stream substrate/surface waters affected. The impacts to surface waters associated with Options A and D are similar (see Table 4-13). Eleven of the 19 creek crossings for Alternative 203 would be within the Willow Creek Watershed.

Based on available mapped soils data from NRCS (1999), highly erodible soils[12] are mapped as being present, though these soils have a minimal surface area near the proposed stream crossings. However, even though highly erodible soil types have been mapped by the NRCS, most of the soils within the build alternative footprints have been affected by past grading associated with the existing infrastructure and other development or historic farming. Therefore, the mapped soil characteristics may not accurately represent actual conditions.

To protect the downstream aquatic environment, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared that identifies soil erosion and sediment control practices to be used throughout the construction process. The soil erosion and sediment control practices would be implemented before any clearing, grading, excavating, or fill activities. The IDOT *BDE Manual, Chapter 59, Landscape Design and Erosion Control* would be implemented to minimize the release of sediment into the study area streams during construction. Compliance with Section 280 of the IDOT *Standard Specification for Road and Bridge Construction* would also be met. Exposed soils adjacent to surface waters, and any work below the ordinary high water mark (of a stream), would be stabilized as soon as practicable.

Increased sedimentation during construction has the potential to cover stream substrate, thereby affecting habitat for some species of fish, mussels, and/or macroinvertebrates. The degree of impact would vary based on site-specific conditions, such as the type of crossing structure, stream substrate, stream depth, and stream velocity. With the implementation of BMPs, adverse impacts to aquatic organisms due to siltation, turbidity, and suspended solids are expected to be minimal.

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[9] One additional stream (Meacham Creek) is impaired for aquatic life use, but it is not listed on IEPA's 2008 303(d) list.

[10] A segment of Meacham Creek southwest of the Medinah Road/Elgin O'Hare Expressway interchange is adjacent to a mapped DuPage County critical wetland.

[11] Impacts to open water stormwater management facilities, summarized in Table 4-13, are assumed to be exempt from federal regulation (subject to regulatory concurrence), and are not discussed further. Refer to 33 CFR Part 328 for the definition of waters of the U.S. and to the *Final Rule for Regulatory Programs of the Corps of Engineers* (*Federal Register*, Volume 51, No. 219, November 13, 1986) for waters generally not considered federally jurisdictional.

[12] Highly erodible soils were considered to be soils mapped to have slopes of four percent or greater.

4.2.2.2 Operational Impacts to Surface Waters

Operation includes the use and maintenance of the transportation system. Potential impacts associated with the operation of the build alternatives would result from pollutant accumulation on roadway surfaces, median areas, and adjacent rights-of-way. Pollutants accumulate through use and maintenance of the transportation system, natural processes, and as a result of airborne deposition. Pollutant concentrations are highly variable and are affected by numerous factors, such as traffic characteristics (volume and speed), weather (precipitation and wind), maintenance practices, and adjacent land uses. Roadway runoff transports pollutants that have accumulated on impervious surfaces.

Additional travel lanes and other impervious surfaces would be constructed under both build alternatives. When undeveloped land is converted to impervious surfaces, the volume of stormwater runoff typically increases and stormwater infiltration decreases. Use and maintenance of the additional impervious surfaces would generate and accumulate more pollutants. Table 4-14 compares the added impervious area and required stormwater detention. BMPs to control the quantity and quality of stormwater runoff are discussed later in this subsection and in subsection 4.13.4.

TABLE 4-14
Summary of Detention Parameters by Build Alternative and South Bypass Connection Options A and D

Alternative/Option	Added Impervious Area (acre)	Potential Required Detention[a] (acre/acre-foot)
Alternative 203	308.0	32.8/163.8
Alternative 402	253.1	27.7/138.7
Option A	44.8	3.7/18.6
Option D	46.1	3.8/19.2

[a] Detention requirements were analyzed in accordance with the *Illinois Drainage Manual*, Section 1-302.03 "Storm Water Storage." Local ordinance requirements were also considered. For a more detailed description of stormwater detention refer to the Stormwater Detention Analysis Memorandum.

Alternative 203 would result in approximately 55 more acres of additional impervious area than Alternative 402. Both Alternatives have a similar footprint along the Elgin O'Hare Expressway corridor, existing Thorndale Avenue, and at the southwest corner of the OMP future airport limits – resulting in a similar increase in impervious area. The 55 additional acres of increased impervious surface area under Alternative 203 is primarily due to the wider footprint associated with a freeway component that parallels the western limits of the OMP in the Willow Creek Watershed. The increase in impervious area is similar between the two south bypass connection options, with Option D resulting in approximately **1.3** acres more impervious area in the Des Plaines River Watershed than Option A. Detention would be provided to compensate for the increase in impervious area associated with all build alternatives (see Table 4-14).

Highway runoff pollution may affect the quality of receiving waters through shock or acute loadings during storms and through chronic effects from long-term accumulation within the receiving water. The significance of these impacts is site-specific and depends heavily on the characteristics of the highway and the receiving waters. The degree of pollutant loading is linked directly to the amount of roadway traffic. Research indicates few significant impacts for highways with less than 30,000 ADT (Young et al., 1996; Dupuis et al., 1985). Under these

conditions, potential impacts are generally short-term, localized, acute loadings from temporary water quality degradation, with few (if any) long-term/chronic effects.

The estimated ADT in 2030 for the build alternatives ranges from 58,700 to 186,400 vehicles for parts of Alternative 203, and 44,200 to 187,800 vehicles for parts of Alternative 402.[13] For both build alternatives, the proposed ADTs associated with the proposed Elgin O'Hare Expressway and the O'Hare West Bypass (highway component) would generally be near the higher end of that range and would include portions of the West Branch DuPage River, Salt Creek, Willow Creek, Des Plaines River, and Addison Creek Watersheds. The proposed arterial improvements to York Road/Elmhurst Road located north of existing Thorndale Avenue in the Willow Creek Watershed, associated with the O'Hare West Bypass component of Alternative 402, would have the lowest proposed ADT (excluding ramps, frontage roads, and other arterial improvements) – at approximately 44,200 vehicles. West of IL 19, in the West Branch DuPage River Watershed, the ADT is near 58,700 vehicles for both build alternatives. Existing ADTs for similar parts of the Elgin O'Hare Expressway, Thorndale Avenue, and York Road/Elmhurst Road range from 14,200 to 87,000 vehicles.[14] For streams receiving runoff along these corridors, the pollutant loading from traffic would be higher and the potential impact could be greater depending upon the stream characteristics and the post construction stormwater BMPs used. No water quality modeling was performed for the Tier One analysis. As necessary, pollutant loading analyses will be completed as part of the Tier Two environmental studies.

In general, existing pollutant concentrations and habitat modifications have affected the water quality of the streams that cross the build alternatives. Five of the streams listed in Table 4-12 (Addison Creek, Higgins Creek, Salt Creek, Spring Brook, and Willow Creek) are 303(d) impaired streams, as defined by the federal CWA and as identified by IEPA (2008a). Refer to Table 2-15 for causes and sources of impairments. Potential causes of impairment for these streams include chloride from maintenance practices, phosphorus, dissolved oxygen (DO), and/or other signature highway runoff pollutants, such as heavy metals and TSS. The present and future ADTs will cause impacts to the study area streams. TMDLs have been approved by USEPA for the Salt Creek Watershed[15, 16] to address chloride and DO,[17] and for the West Branch DuPage River to address chloride (CH2M HILL, 2004b). Chloride used for road deicing is a primary pollutant associated with highway maintenance and is discussed in subsection 4.2.2.3.

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[13] ADT forecasts were obtained from the EO-WB Travel Demand Model and should be used only for planning purposes. Bidirectional ADTs are provided for the proposed Elgin O'Hare Expressway and West Bypass only (including proposed improvements to York Road/Elmhurst Road for Alternative 402); ramps, frontage roads, and other arterial improvements are not included. Design traffic will be provided in Tier Two.

[14] 2007 existing condition ADTs are provided for the Elgin O'Hare Expressway, Thorndale Avenue, and York Road/Elmhurst Road (from Thorndale Avenue to I-90). ADTs were obtained from IDOT's "Getting Around Illinois" Web site (IDOT, 2009).

[15] The Salt Creek TMDLs address segments of the following waterways within the study area: Salt Creek, Addison Creek, Spring Brook, Meacham Creek, and Busse Woods Lake (CH2M HILL, 2004a). Meacham Creek is not on the IEPA's 2008 303(d) list.

[16] The build alternatives cross surface waters that are in the first of three stages of TMDL development to address additional impairments (IEPA, 2008a). Additional TMDLs and other National Pollutant Discharge Elimination System (NPDES) requirements would be followed, as necessary.

[17] The dissolved oxygen (DO) TMDL includes load allocations for carbonaceous biochemical oxygen demand (CBOD), volatile suspended solids (VSS), and ammonia-nitrogen. In general, the DO TMDL recommendations pertain to wastewater treatment plants and dam removal on Salt Creek. Stormwater control for MS4s would be accomplished through the NPDES Phase II General Permit No. ILR40.

Stormwater runoff and highway pollutants could cause further degradation of receiving waters, flooding, erosion, harm/stress to aquatic life, algal blooms, and decreased recreational use/aesthetics. BMPs would be incorporated into the preferred alternative to minimize adverse impacts to the downstream aquatic environment. Water quality would be managed through a combination of stormwater runoff and drainage collection facilities and the implementation of other post-construction BMPs in accordance with state and federal water quality goals of restoring water quality of the impaired/degraded streams. Because of the land use constraints associated with the heavily developed study area, the opportunity to retrofit, or upgrade, stormwater management facilities within the project limits will also be considered. Improvements would be designed so that stormwater runoff would be infiltrated, detained, or treated before discharge to surface waters. Stormwater controls that treat stressors of concern based on TMDLs or typical highway pollutants (e.g., suspended solids/sediment, heavy metals, inorganic salts, aromatic hydrocarbons) and that control the volume of stormwater runoff would be considered in Tier Two environmental studies to reduce pollutant loads to the receiving waters while maintaining the hydrology of the watershed to the extent possible.

As practical, BMP selection during Tier Two environmental studies would include a watershed approach to stormwater management that integrates both water quantity and quality control. Stormwater controls would be designed to meet regulatory requirements to capture and treat the "first flush" water quality volume of a storm, as necessary. The first flush is often referred to as the first one inch of runoff per impervious area in a drainage basin and typically includes a higher concentration of pollutants compared to later during the storm (CMAP, 2008).

In addition to the detention facilities that would be provided to compensate for the increase in impervious area associated with the preferred alternative, other practices such as naturalized basins, vegetated buffers, infiltration basins, and/or bioswales, would be installed where practicable to minimize transport of sediment, heavy metals, and other pollutants to surface waters. Pollutant removal in stormwater basins could be accomplished through gravity settling, assimilation of nutrients, bacterial degradation, and filtration. Vegetated stormwater conveyance channels could be used alone or in conjunction with stormwater basins to remove pollutants by filtering particulates through the vegetation and infiltration into the subsoil, which would remove soluble pollutants. Studies show that BMPs such as infiltration basins, detention basins, and vegetated swales can have a pollutant removal effectiveness of 90 percent or more for TSS and similarly high removal percentages for other pollutants such as metals. Studies suggest that by controlling TSS, other constituents (e.g., metals and nutrients), could also be controlled. Refer to FHWA's *Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring* for a summary of water quality BMPs and their pollutant removal effectiveness (Shoemaker et al., 2002).

Based on available data, most of the aquatic species found in the surface waters that cross the build alternatives generally are locally common, widespread, and/or tolerant of urban conditions. Several waters are impaired for support of aquatic life (see Table 2-15). As a result, potential impacts to fishing and other recreational surface water uses near the proposed improvements would be minimal with implementation of BMPs.

4.2.2.3 Maintenance Impacts (Deicing Chemicals)

Seasonal deicing with salt, commonly sodium chloride, along with plowing and other alternative measures, are used to reduce snow and ice build-up on roads. Deicing assists with safe traffic movement by improving road conditions in winter, but road salt application contributes chloride loads to surface waters. Road salt is highly soluble and moves through the environment in solution as runoff, splash, spray, and dust. The General Use Water Quality Standard for chloride in Illinois is 500 milligrams per liter (mg/L).[18] Sodium does not have a numeric standard.

The primary methods of snow and ice removal in IDOT, District One, are plowing and the application of road salt. Two IDOT maintenance yards (Rodenburg and Northside Yards) have snow and ice removal responsibilities for existing roads under IDOT's jurisdiction within the EO-WB build alternatives' footprints. Together, the two maintenance yards spread approximately 19,100 tons of salt in the winter of 2008/2009 and 87,400 tons of salt over the last five winter seasons (2004/2005 through 2008/2009).

Parts of the build alternatives are within the Salt Creek, Addison Creek, and/or West Branch DuPage River Watersheds, which have a chloride TMDL.[19] A Stage 1 TMDL Report for chloride has also been prepared for Higgins Creek.[20] The IEPA's General National Pollutant Discharge Elimination System (NPDES) Permit No. ILR40 requires that small Municipal Separate Storm Sewer System (MS4) permittees, such as IDOT, implement TMDLs, as applicable.[21]

Of the creeks crossed by the EO-WB footprints, a chloride TMDL is in effect for Salt Creek and Addison Creek; however, the TMDL and BMPs to address chloride loads can be applied to protect other streams located downstream of the proposed EO-WB transportation improvements, as well. Elevated levels of chloride in receiving streams are seasonal and occur predominantly during the winter months as a result of road salt application (CH2M HILL, 2004a). Though road deicing is necessary, the overall goal of the TMDL is to reduce chloride loading from winter road salting applications.

BMPs and recommendations for chloride reduction are provided in the chloride TMDLs and in the *Chloride Usage Education and Reduction Program Study* published by the DuPage River Salt Creek Workgroup (CDM, 2007). Further evaluation of these practices would be included in Tier Two environmental studies. BMPs to reduce chloride loads could include:

- Public education and employee training
- Storage and handling operations (e.g., perform on impervious surfaces, completely cover salt piles, control stormwater runoff, etc.)
- Use of digitally-calibrated spreaders to minimize over application

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[18] Title 35 Illinois Administrative Code, Subtitle C, Chapter 1, Part 302.

[19] The Salt Creek TMDL includes Addison Creek. Based on the Salt Creek TMDL report (CH2M HILL, 2004a), Salt Creek and Addison Creek are listed for TDS/conductivity impairments. Chloride constitutes a significant part of TDS/conductivity and chloride management provides a means to control exceedances of the TDS/conductivity standard.

[20] Refer to the Des Plaines River/Higgins Creek Watershed TMDL Stage 1 Report (AECOM, Inc., 2009a) for Higgins Creek. In addition to chloride, the TMDL for Higgins Creek is also being prepared for dissolved oxygen and fecal coliform.

[21] Road deicing is necessary for public safety. Thus, the implementation of the chloride TMDL by MS4s should be based on prudent and practicable road salting BMPs to the extent that the safety of the public is not compromised (CH2M HILL, 2004a).

- Consideration of alternative non-chloride products (e.g., acetate deicers or corn and beet derivatives)
- Implementation of pre-wetting and anti-icing programs throughout the watershed

IDOT implements some of these BMPs (e.g., having a written snow plan, utilizing digital spreaders, etc.). The use of alternative deicing agents could be considered in relation to cost, applicability, feasibility, and public safety. Costs for sodium chloride alternatives tend to be substantially higher, and those alternatives cannot be used in all conditions or locations. In addition, alternatives may present potential adverse water quality impacts that must be taken into consideration.

All the alternatives will result in increased pavement area. Studies show that 60 to 80 percent of the salt runs into surface water, 15 to 35 percent occur as splash, and up to three percent occurs as spray (Frost et al., 1981; Diment et al., 1973; Lipka and Aulenbach, 1976; Sucoff, 1975). In the winter, deicing salt moves primarily through the environment adjacent to the preferred alternative as surface runoff. It also percolates into the soil profile. The highest salt concentrations generally are found near the roadway shoulders because of plowing and splash and can have detrimental environmental effects. Salt deposition and concentrations adjacent to roadways decrease as the distance from a treated roadway increases (Kelsey and Hootman, 1992; Williams et al., 2000). Sodium chloride can decrease soil permeability and raise soil pH, which could adversely affect soil fertility and plant growth (Transportation Research Board, 1991).

High salinity levels may adversely affect sensitive floral communities, particularly wetland plants. Road salt runoff can stress wetland plant communities and may result in reduction of native plant diversity and replacement by more salt-tolerant plant species, such as narrow-leaved cattail (*Typha angustifolia*) and common reed (*Phragmites australis*). Both cattail and common reed are common wetland plant species that can be observed in roadside ditches, stormwater management facilities, and wetlands within and adjacent to the build alternatives.

Surface Runoff. Surface runoff is the primary means of road salt transport following application. Runoff would be directed into roadside ditches and other stormwater management structures/facilities before discharge into receiving waters. Studies of the effects of sodium chloride on fish, aquatic invertebrates, and aquatic plants—including acute and chronic toxicity—indicate that salt does not have significant harmful effects on aquatic biota in large or flowing bodies of water, where dilution takes place quickly (Jones and Jeffrey, 1992). Peak concentrations in waterways could be reduced by using detention basins.

Splash and Spray. Plants, soils, and to a limited extent aquatic biota, could be affected by salt brine splash and spray from the build alternatives. The greatest affect from splash would generally be expected within 45 to 60 feet of the edge of the road in the splash deposition zone (Transportation Research Board, 1991; Public Sector Consultants, Inc., 1993; Williams and Stensland, 2006). Splash could increase soil erosion because of soil impact and subsequent flow concentration on embankments and other slopes. Spray consists of smaller sized droplets than splash and may be deposited further from the roadside. Roadside vegetation (trees, shrubs, ground cover, grasses) may suffer salt injury with drought-like symptoms, such as inhibited growth, leaf discoloration, and defoliation. Some plant species

are more susceptible than others (e.g., grasses are generally more tolerant of salt than trees). Vegetative damage generally increases with greater salt usage, traffic speed and volume, and steeper side slopes; vegetative damage generally diminishes as the distance from the road increases (Transportation Research Board, 1991; Public Sector Consultants, Inc., 1993; Xianming et al., 2009).

4.3 Wetlands

This section describes wetland resources potentially affected by the build alternatives. Wetland impacts associated with the transportation improvements include vegetation removal, discharge of clean fill material, and changes to hydrology. Impacts could be either direct or indirect. Direct wetland impacts would result from construction and the placement of fill material to construct the roadways, ramps, and grading for drainage/stormwater management facilities. Indirect impacts could result from changes in hydrologic regime, quality of stormwater runoff, or habitat continuity.

Per USEPA's comments on the Draft EIS, information regarding conceptual mitigation measures is included in this Final EIS (see Page 5-25 for a full description of USEPA's comments and IDOT's response. USEPA's comment letter can be found in Appendix D beginning on Page D_5-1). Compensatory wetland mitigation will be provided for wetland impacts that cannot be avoided or minimized. At the current stage of project development, the preferred mitigation method is to purchase wetland mitigation credits from a USACE/IDNR approved wetland mitigation bank located within the Des Plaines River Watershed. Additional mitigation preferences and strategies are discussed in subsection 4.13.5. Wetland mitigation options will be coordinated with the appropriate regulatory agencies and will be discussed further during Tier Two studies to achieve agreement on the final course of action.

The impacts herein are based on approximate wetland boundaries that were identified through review of available GIS wetland data sources, including the NWI and the DCWI, supplemented by preliminary field reconnaissance.[22] Potential direct wetland impacts were determined by calculating the approximate wetland acreage located within the footprint of each proposed alternative using GIS aerial photographic interpretation. Wetlands not directly affected by the footprint are not counted as affected. In addition to the potential loss of wetland acreage associated with the alternatives, wetland functions and values may also be affected.

Based upon coordination, the USACE, USFWS, and USEPA concurred with the Tier One wetland methodology, wherein the level of detail and field verification was sufficient to support reasonably representative levels of impact for this type of study. The agencies concurred that only direct wetland impacts need to be calculated as part of the Tier One study. Indirect wetland impacts will be assessed individually during Tier Two environmental studies.

A comprehensive wetland delineation and assessment will be completed in Tier Two environmental studies for the preferred alternative to determine exact wetland sizes and locations with respect to the proposed limits of the project improvements. The assessment

[22] Wetland data from the OMP was used for parts of the study area that overlapped with the OMP project limits.

would provide a qualitative analysis of wetland functions and values, including floristic composition and wildlife habitat presence.

4.3.1 Affected Wetlands

4.3.1.1 Alternatives 203 and 402

Based on preliminary field reconnaissance, up to 79 wetlands would be affected by the build alternatives (see Exhibit 4-6; Appendix H, Exhibit H-1; and Table 4-15). The alternatives have similar alignments that result in impacts at 75 mutual wetland sites. Overall, Alternative 203 would directly affect 38.7 acres of wetland at 79 sites, and Alternative 402 would directly affect 36.1 acres of wetland at 75 wetland sites, or 2.6 acres less than Alternative 203. Relatively small impacts to isolated emergent wetlands (average impact approximately 0.2 acre), isolated wet old fields (average impact about 0.1 acre), and wetland bottom stormwater management facilities (average impact about 0.7 acre) make up most of the individual wetland sites affected by both alternatives.

From an acreage perspective, USACE jurisdictional emergent wetlands have the most impact (average impact roughly 1.5 acres). Under both alternatives, most of the wetland impacts occur in the Salt Creek Watershed followed by the Willow Creek Watershed. See Tables 4-15 and 4-16, and Appendix H for a summary of the wetland impacts.

TABLE 4-15
Wetland Summary by Build Alternative and Watershed

	Impact (acre)[a]			Number of Wetlands		
Watershed[b]	**Alt. 203**	**Alt. 402**	**Difference**	**Alt. 203**	**Alt. 402**	**Difference**
Des Plaines River	0	0	—	2	2	—
Salt Creek	22.4	22.4	—	38	38	—
West Branch DuPage River	0.8	0.8	—	8	8	—
Willow Creek	15.5	12.9	2.6	31	27	4
Total[c]	**38.7**	**36.1**	**2.6**	**79**	**75**	**4**

[a] Impact acreage is rounded; therefore, impact acreages may vary slightly between tables. 0 acre represents impacts of less than 0.05 acre.
[b] Of the watersheds located proximate to proposed EO-WB improvements, direct wetland impacts associated with Alternatives 203 and 402 are not anticipated in the Addison Creek and Weller Creek Watersheds.
[c] Total acreage represents impacts to wetlands, wetland bottom stormwater management facilities, and wetland mitigation sites.

Federally jurisdictional waters of the U.S. (including wetlands) are regulated by the USACE under Section 404 of the CWA. Federally jurisdictional wetlands include wetlands that are adjacent to navigable waters of the U.S. and/or have a direct hydrologic/ecologic connection (i.e., significant nexus) to navigable waters of the U.S. The U.S. Supreme Court Rapanos Decision[23] established that not all wetland areas are federally regulated by the USACE under the CWA. Consequently a Jurisdictional Determination is required for each wetland to determine its jurisdictional status for permitting purposes. Wetlands found to be isolated

[23] Rapanos et ux., et al. v. United States, 2006.

because they are not adjacent to navigable waters of the U.S. or do not have a direct hydrologic/ecologic connection to navigable waters of the U.S. are not regulated by the USACE.

TABLE 4-16
Summary of Wetland Community Type Impacts and Regulatory Status by Build Alternative

	Alternative 203			Alternative 402		
Wetland Type[a]	USACE Jurisdictional	Isolated	Exempt[b]	USACE Jurisdictional	Isolated	Exempt[b]
Emergent wetland	12.1 (8)	3.9 (16)	— (0)	11.0 (7)	3.9 (16)	— (0)
Scrub-shrub wetland	0.1 (1)	2.2 (6)	— (0)	0.1 (1)	2.2 (6)	— (0)
Wet old field	4.4 (2)	1.4 (10)	— (0)	4.4 (2)	1.4 (9)	— (0)
Wooded wetland	0 (1)	2.2 (5)	— (0)	0 (1)	2.2 (5)	— (0)
Vegetated drainage ditch/channel	2.4 (8)	0.1 (1)	— (0)	1.4 (7)	0.1 (1)	— (0)
OMP wetlands	0 (2)	0.4 (1)	— (0)	0 (2)	— (0)	— (0)
Wetland mitigation sites	0.3 (4)	N/A	— (0)	0.3 (4)	N/A	— (0)
Wetland bottom stormwater management facility	N/A	N/A	9.1 (14)	N/A	N/A	9.1 (14)
Total	**19.3 (26)**	**10.2 (39)**	**9.1 (14)**	**17.2 (24)**	**9.8 (37)**	**9.1 (14)**

Note: Approximate acreage of wetland impact is provided, with total number of affected wetlands in parentheses. Acreage is based on preliminary field reconnaissance and available GIS wetland resource data. Approximate wetland impact acreage is rounded; therefore, impact acreages may vary slightly between tables. 0 acre represents impacts of less than 0.05 acre.
Jurisdictional status is based on preliminary assessment and is subject to change pending more detailed studies to be completed as part of the Tier Two environmental studies and following a USACE jurisdictional determination. Mitigation sites were assumed to be USACE jurisdictional.

[a] Some wetlands include more than one community type or contained areas of open water. The dominant community type is listed.
[b] Exempt areas include man-made wetland bottom stormwater management facilities where wetland impacts may not be regulated by the USACE and/or IDNR. Subject to regulatory concurrence.

All wetlands, including isolated wetlands, are regulated by the IDNR under the Interagency Wetland Policy Act (IWPA).[24] Within the study area, several wetland bottom stormwater management facilities would be affected by the build alternatives. The manmade wetland bottom basins should be exempt from Section 404 of the CWA and the IWPA requirements, subject to USACE and IDNR approval. See subsection 4.13, Mitigation Concepts and Commitments and subsection 4.14, Permits/Certifications.

Based on a preliminary assessment of adjacency and/or potential significant nexus to navigable waters of the U.S., 10.2 acres of isolated wetland and 19.3 acres of USACE jurisdictional wetland**s** would be affected by the Alternative 203 alignment. Alternative 402 would have similar impacts, resulting in 9.8 acres of isolated wetland impact and 17.2 acres of USACE jurisdictional wetland impact. Thus, Alternative 203 would affect 2.1 acres more USACE jurisdictional wetland than Alternative 402. Both Alternative 203 and Alternative 402 would affect 9.1 acres of wetland bottom stormwater management facilities.

[24] In addition to federal and state regulations, DuPage County also regulates wetland impacts through the DuPage County Countywide Stormwater and Flood Plain Ordinance (revisions effective August 1, 2008). Any component of the alternatives that may be local non-IDOT roads may be subject to the DuPage County Countywide Stormwater and Flood Plain Ordinance or the pending Cook County Watershed Management Ordinance.

Alternative 203 would affect roughly 2.6 acres more of regulatory wetland (2.1 acres are USACE jurisdictional wetland) than Alternative 402. The 2.6 acres of wetland impact is within the Willow Creek Watershed and attributed primarily to three sites. One site (slightly larger than one acre) is a vegetated drainage ditch that drains to Higgins Creek located on the north side of I-90 adjacent to the ISTHA's Des Plaines Oasis and the Majewski Athletic Complex (owned by MWRDGC). A second site (slightly larger than one acre) is an emergent wetland that also drains to Higgins Creek located adjacent to the south side of I-90 at the Arlington Heights Road interchange. The third site (0.4 acre of isolated wetland impact) is within OMP limits adjacent to York Road and north of Thorndale Avenue.

The largest wetland impacts (more than 2.8 acres each) associated with both build alternatives would occur at three locations: northwest of the intersection of Thorndale Avenue and York Road (5.0 acres), at Salt Creek and Thorndale Avenue (3.7 acres), and southwest of the Elgin O'Hare Expressway/Medinah Road interchange (2.8 acres). All three impacts affect wetlands that appear to be USACE jurisdictional. At 5.0 acres, the wetland impact near the intersection of Thorndale Avenue and York Road would be the largest. The wetland would be affected in its entirety. Based on preliminary field reconnaissance, the predominately emergent wetland appears to be of moderate quality, most likely because of its size and functional value: primarily wildlife habitat and flood storage. Given that the surrounding area includes commercial/industrial land uses and O'Hare Airport, wildlife that use the wetland would have to find new habitat within the developed areas or migrate outside the immediate area. Although developed portions of the adjacent O'Hare Airport are unlikely to provide desirable wildlife habitat, potential increased wildlife usage at the airport due to increased wildlife populations or movement of species may be addressed with wildlife deterrent methods. The depressional storage may be lost unless compensated nearby. The wetland is dominated by cattail (*Typha* sp.) and common reed (*Phragmites australis*), but it includes other wetland community types, such as wet old field and wooded wetland. Parts of this wetland are contiguous with Willow Creek South Tributary.

The next largest wetland impact (about 3.7 acres) would take place at Salt Creek and Thorndale Avenue. Approximately 1.6 acres of a wetland bottom stormwater management facility would also be impacted at this location. The potential wetland impacts at Salt Creek include part of a wetland mitigation site at the Wood Dale - Itasca Reservoir (0.2 acre) and part of Salt Creek Marsh Forest Preserve (owned by FPDDC) (0.4 acre). Based on preliminary field reconnaissance, the wetland adjacent to Salt Creek appears to be of moderate quality most likely due to its size, location, and functional value. The wetland is primarily wet old field dominated by reed canary grass (*Phalaris arundinacea*) with eastern cottonwood (*Populus deltoides*). Based on field reconnaissance and available wetland mapping, about two percent of the mapped wetland would be affected. The wetland extends north and south adjacent to Salt Creek beyond the alternative footprints. Thorndale Avenue transversely crosses the wetland. The proposed alternatives would widen the transportation corridor and relocate the roadway edge closer to Salt Creek Marsh Forest Preserve. Coordination with the FPDDC would take place as necessary during Tier Two environmental studies or the Section 404 permit process to minimize potential forest preserve impacts. With the implementation of stormwater quantity and quality control BMPs and the bridge at Salt Creek, impacts to the functions provided by this wetland and the overall aquatic environment/Salt Creek are anticipated to be minimal.

The third of the larger impacts is located southwest of the Elgin O'Hare Expressway and Medinah Road. The wetland is discussed in subsection 4.3.1.3.

4.3.1.2 South Bypass Connection Options A and D

Based on preliminary field reconnaissance, up to four wetlands and two wetland bottom stormwater management facilities would be impacted by Options A and D (see Exhibit 4-6 and Appendix H, Exhibit H-1). Option A would impact two wetland sites, including 0.1 acre wetland bottom stormwater management facility in the Addison Creek Watershed. Option D would affect five sites in the Des Plaines River Watershed including 0.2 acre wet old field wetland, 0.1 acre emergent wetland, and 0.1 acre wetland bottom stormwater management facility. Both options would affect one isolated wetland within OMP project limits. Relatively small impacts to isolated wetlands and wetland bottom stormwater management facilities make up the individual wetland sites affected under the two south bypass connection options. Based on preliminary field reconnaissance, there would be no impacts to USACE regulated wetlands or to wetlands that would be considered moderate or higher quality. Proposed impacts would occur in lower quality wetland areas dominated by relatively common species or those tolerant of disturbance, including reed canary grass, common reed, cattail, eastern cottonwood, red-rooted spike rush (*Eleocharis erythropoda*), squirrel-tail grass (*Hordeum jubatum*), and sandbar willow (*Salix interior*). Table 4-17 summarizes the potential wetland impacts by south bypass connection option.

TABLE 4-17
Potential Wetland Impacts by South Bypass Connection Options A and D

Wetland ID	Wetland Type[a]	Jurisdictional Status[b]	Watershed	Impact[c] (ac)		Size[c] (ac)	% Impact[c]	
				Opt. A	Opt. D		Opt. A	Opt. D
WL24.3	OMP wetland	Isolated	Des Plaines River	0	0	0.4	2.7	2.7
WL28.1	Wet old field	Isolated	Des Plaines River	—	0.2	0.2	—	100
WL29.2	Wet old field	Isolated	Des Plaines River	—	0	0	—	100
WL29.5	Emergent	Isolated	Des Plaines River	—	0.1	0.1	—	100
WLB29.2	Wetland bottom stormwater management facility	Exempt	Des Plaines River	—	0.1	0.1	—	72.7
WLB34.1	Wetland bottom stormwater management facility	Exempt	Addison Creek	0.1	—	0.1	100	—
Total				**0.1**	**0.4**	**0.9**	**—**	**—**

[a] The dominant community type is listed.
[b] Jurisdictional status is based on preliminary assessment and is subject to change pending more detailed studies to be completed as part of the Tier Two environmental studies and following a USACE jurisdictional determination.
[c] Wetland acreages, impacts and percentages are approximate and rounded; "0" represents a value of less than 0.05 acre. Percentages and impact totals for each alternative were calculated before rounding. "—" represents no impact. Acreage is based on preliminary field reconnaissance and available wetland resources as discussed in Section 2, Affected Environment. Wetland boundaries may vary from those that are mapped.

4.3.1.3 Impacts to Mapped Critical Wetland and Mitigation Sites

Based on preliminary field reconnaissance and available wetland resources, Alternatives 203 and 402 both could affect higher quality wetland areas, such as mapped critical wetland and wetland mitigation sites, but Options A and D would not. The DuPage County Countywide Stormwater and Flood Plain Ordinance describes critical wetlands as high quality wetlands that "play crucial roles in storing or conveying flood waters, controlling erosion, maintaining or enhancing water quality, and providing habitat for threatened or endangered species."[25] Based on the DCWI, 142 acres of mapped critical wetlands are within the study area, most of which are avoided by the build alternatives.

Both Alternatives 203 and 402 would affect 2.0 acres of a mapped critical wetland located southwest of the Elgin O'Hare Expressway/Medinah Road interchange. The entire wetland is not mapped as critical. Roughly 2.8 acres (four percent) of the 67.2-acre wetland complex (including both the mapped critical wetland and adjacent wetland area) would be affected by the build alternatives. The wetland complex appears to be USACE jurisdictional and has a direct hydrologic connection to Meacham Creek, which flows through the complex. The direct impacts to the wetland complex would be partially within the Medinah Wetlands Forest Preserve and partially within a parcel proposed for acquisition by the FPDDC. Based on preliminary field reconnaissance, this is a primarily emergent wetland dominated by cattail, common reed, and reed canary grass. Impacts to the wetland are expected to be associated with lower quality edge habitat adjacent to the Elgin O'Hare Expressway, and no impacts are proposed within potentially higher quality interior wetland habitat. No fragmentation of the critical wetland habitat would occur. Recreational or educational amenities would not be affected as a result of either alternative.

Studies to be conducted as part of the Tier Two environmental studies would include detailed wetland plant inventories and habitat assessments to evaluate if there are other critical wetland resources that would be affected by the build alternatives. Under the local DuPage County Countywide Stormwater and Flood Plain Ordinance, critical wetland impacts require compensatory wetland mitigation at a 3.0:1.0 mitigation ratio.

Alternatives 203 and 402 would affect 0.3 acre of wetland mitigation at four sites adjacent to the Elgin O'Hare Expressway or Thorndale Avenue. Impacts would occur at the perimeter of the mitigation areas. Based on preliminary field reconnaissance, the mitigation sites consist primarily of emergent wetland dominated by cattail or common reed, or by open water. From a regulatory standpoint, impacts to mitigation sites may require higher compensation ratios. Provision of compensatory wetland mitigation for the selected build alternative can be expected to replace wetland functions and values lost through filling activities.

4.3.2 Wetland Functions and Values

During the preliminary field reconnaissance, dominant wetland plant species were identified, general notes pertaining to wetland functions and values were recorded, and the general quality of the identified wetlands was established. Detailed plant inventories were

[25] Several criteria are used to determine if a wetland is critical. Wetlands, in addition to those mapped as critical on the DCWI, may be considered critical following site investigation and data analysis.

not completed, and a Floristic Quality Index and native mean C-value were not calculated (Swink and Wilhelm, 1994).

The largest wetland community type impacts associated with Alternatives 203 and 402 would be to emergent wetlands, wetland bottom stormwater management facilities, and wet old fields. Options A and D would affect wet old fields, emergent wetland, an OMP wetland, and wetland bottom stormwater management facilities. Emergent wetlands generally are characterized by the presence of standing water throughout the growing season. They consist of vegetation that prefers standing water for prolonged periods, such as cattails. Wet old fields generally are characterized by moist to saturated soils with standing water for only brief to moderate periods of the growing season. In general, the dominant plant species in wet old fields in the study area was reed canary grass.

Past human disturbances and runoff from the urban environment appear to have adversely affected most of the wetlands near the proposed improvements. In general, most of the field identified wetland sites are dominated by invasive plant species and exhibit low diversity and richness of native plant species. The principal functions performed by most of the wetland sites are stormwater storage, conveyance, and water quality benefits. The wetlands may provide habitat for common and adaptable wildlife. In general, wetlands that would be affected by the alternatives provide limited functional value on an individual basis, but when combined, the wetlands provide overall water quality benefits.

Overall, wetland functions, such as stormwater storage and pollution control, that would be affected as a result of the alternatives are expected to be minimal. Functions lost as a result of wetland fill could be offset by proposed compensatory wetland mitigation, stormwater management facilities, and other BMPs. Wetland mitigation credit will not be generated within detention facilities; however, detention facilities and other BMPs will provide stormwater storage and pollution control. Wetland mitigation will be coordinated with the appropriate regulatory agencies so that impacts (including lost functions and values) are adequately compensated in accordance with applicable federal and state regulations. The preferred method is to purchase wetland credits in a USACE/IDNR-approved mitigation bank. In addition to wetland mitigation, to minimize potential environmental impacts at (and downstream from) the project site, stormwater detention facilities would be provided to compensate for increased impervious area associated with the alternatives. To provide water quality benefits, improvements would be designed, as practical, to infiltrate, detain or treat stormwater runoff before it is discharged to surface waters. BMPs that control the volume and treat stormwater runoff would be considered in Tier Two environmental studies to reduce pollutant loads to wetlands and other receiving waters, while maintaining the hydrology of the watershed, to the extent possible.

Development within the study area restricts sensitive wildlife species to protected lands, which are primarily located outside and beyond the proposed build alternatives. Wildlife species in urban and suburban areas tend to be tolerant of disturbance and human activities and generally are common, adaptable species. Wetlands that would be affected as a result of the alternatives are located primarily in developed areas adjacent to transportation corridors that provide limited wildlife use potential. Most wetland impacts would affect relatively small percentages of larger wetland complexes (mainly edge takes adjacent to roadways) or small isolated wetlands; thus, wildlife habitat impacts associated with the proposed wetland

impacts would be minimal. See subsection 2.6.2, Wildlife, and subsection 4.5, Biological Resources.

As part of the planning process for the proposed transportation improvements, direct impacts to wetlands in special lands (e.g., forest preserves) and ecologically sensitive habitats (including natural areas, nature preserves, known threatened and endangered species sites, etc.) have been avoided or minimized. Wetland impacts will be reviewed in accordance with state and federal regulatory procedures to ensure that they are avoided, minimized, or compensated appropriately, and that there is no overall net loss of the state's wetland acres or functional value because of the project. Appropriate wetland mitigation will be provided, and water quality and quantity BMPs will be implemented as necessary to meet regulatory requirements and to protect the downstream aquatic environment from potential construction, operation, and maintenance impacts associated with the proposed transportation improvements. Therefore, the wetland displacement associated with the alternatives is not expected to have a net negative effect on the larger Des Plaines River Watershed or the region. See subsections 4.2 and 4.12 for discussions on water quality BMPs and mitigation measures, respectively.

4.3.3 Threatened and Endangered Species within Wetland Areas

Wetlands supporting federal- or state-listed threatened or endangered species are considered high quality aquatic resources by the USACE and critical wetlands by DuPage County. The higher quality wetland areas typically are unsuitable for fill activities or require higher wetland compensation ratios at the federal, state, or local levels.

Based on information from the IDNR and the Illinois Natural Heritage Database (dated December 12, 2008) and correspondence from the USFWS (dated January 29, 2009), no known threatened or endangered species sites would be directly affected by the proposed build alternatives (see Appendix D). However, USFWS has stated that a moderate to high quality wetland habitat within the study area could support a federal-threatened and state-endangered plant species, the eastern prairie fringed orchid (*Platanthera leucophaea*).

Based on preliminary field reconnaissance, 13 of the identified wetland areas[26] that would be affected by the alternatives could be classified as moderate to high quality based on vegetation or functional values, when compared to the low quality wetlands along the project corridor. Four of the wetland areas are mitigation sites. All but one of the 13 wetland areas are located adjacent to the Elgin O'Hare Expressway or Thorndale Avenue. The remaining wetland is located along the south side of I-90 near Arlington Heights Road (see Appendix H, Exhibit H-1). Quality determinations were not based on detailed plant lists and are subject to change. Additional studies, including a qualitative analysis of wetland functions and values (e.g., floristic composition, wildlife habitat presence, etc.) and the required consultation with IDNR or USFWS would be conducted as part of the Tier Two environmental studies.

[26] This total includes one wetland bottom stormwater management facility that appears to have been planted with native vegetation, based on preliminary field reconnaissance. Mitigation areas were assumed to be high quality.

4.4 Floodplains

The floodplain encroachment evaluation was conducted in accordance with EO 11988 "Floodplain Management," "Assessment and Documentation of Floodplain Encroachment" as contained in the IDOT *Bureau of Design and Environment Manual*, "Floodplain Encroachments" in the *Drainage Manual,* and Illinois Administrative Code 3708 "Floodway Construction in Northeastern Illinois." Guidance from the DuPage County Countywide Stormwater and Flood Plain Ordinance was applied in determining compensatory storage requirements, because the County ordinance is more restrictive than IDOT requirements.

Potential floodplain encroachments were identified by overlaying proposed roadway locations onto FIRMs published by the FEMA. Proposed roadways were separated by county—Cook or DuPage—and compensatory storage requirements due to fill in floodplains were analyzed in accordance with the respective local stormwater management ordinance since they are more strenuous or demanding. Because of the absence of a proposed roadway profile, all floodplains were assumed to be affected to the 100-year flood elevation. The width of encroachment area was based on proposed roadway width (roadway footprint) from proposed typical cross sections. Affected floodplain and floodway areas were calculated using GIS software and overlaying proposed roadways onto the FIRMs.

Floodplain encroachments and mitigation measures are discussed below. Tables 4-18, 4-19, and 4-20 include itemized descriptions of encroachment type, encroachment area, compensatory storage volume required to mitigate encroachment, and assessment category for each floodplain. Exhibits 4-1A through 4-1E and Exhibit 4-5 depict floodplain impacts. Transverse (crossing) and longitudinal (edge) floodplain encroachments are differentiated. Longitudinal encroachments often result in significant floodplain impacts and greater reduction in conveyance.

TABLE 4-18
Summary of Floodplain/Floodway Encroachment by Build Alternative and South Bypass Connection Option in Cook County

Encroachment	Alternative 203	Alternative 402	Option A	Option D
Potential Transverse Encroachments	2	2	1	1
Potential Longitudinal Encroachments	2	3	1	1
Floodway Encroachment (acre)	1.5	1.1	0.3	0.3
Floodplain Encroachment (acre)	2.1	4.6	0.6	0.6
Estimated Compensatory Storage for Filling Floodway (acre)/(acre-foot)[a]	3.0/14.8	1.6/8.2	1.6/7.8	1.6/7.8

Note: Shoulder-to-shoulder roadway widths were used to determine the amount of fill in the floodplain or floodway. Methodology will be redefined during Tier Two environmental studies, when proposed profiles are available.

[a] Compensatory storage locations are assumed to have a five-foot depth. Compensatory storage is provided at a ratio of 1:1 for encroached floodways in Cook County. Mitigation ratios refer to acre-foot values.

TABLE 4-19
Summary of Floodplain/Floodway Encroachment by Build Alternative and South Bypass Connection Option in DuPage County

Encroachment	Alternative 203	Alternative 402	Option A	Option D
Potential Transverse Encroachments	5	7	0	0
Potential Longitudinal Encroachments	0	1	0	0
Floodway Encroachment (acre)	1.6	1.6	0	0
Floodplain Encroachment (acre)	22.0	22.0	0	0
Estimated Compensatory Storage for Filling Floodplain (acre)/(acre-foot)[a]	29.7/148.6	29.7/148.6	0/0	0/0

Note: Shoulder-to-shoulder roadway widths were used to determine the amount of fill in the floodplain or floodway. Methodology will be redefined during Tier Two environmental studies, when proposed profiles are available.

[a] Compensatory storage locations are assumed to have a five-foot depth. Compensatory storage is provided at a ratio of 1.5:1 for encroached floodplains in DuPage County. Mitigation ratios refer to acre-foot values.

Design alternatives to avoid or minimize significant impacts would need to be investigated in subsequent detailed design, Tier Two. It is expected that all Category 6 (i.e., significant) encroachments (see Table 4-20) would be avoided or mitigated during the future phase of work. Category 6 encroachments are either transverse or longitudinal, and are predicted to result in a significant adverse impact on natural and beneficial floodplain values, a significant increase in flood risk, or a significant increase in potential for interruption or termination of emergency service or emergency evacuation routes. In subsequent phases of design, notices published in the news media would indicate that such floodplain encroachments are being considered. All potential floodplain encroachments would be identified during the presentation hearings or meetings.

TABLE 4-20
Summary of Floodplain Encroachment by Waterway and Assessment Category

Floodplain	Transverse	Longitudinal	Assessment Category[a,b,c]
Meacham Creek	X		3
Salt Creek	X		4
Higgins Creek	X		3, 6
Higgins Creek Tributary A	X	X	4, 6
Higgins Creek Tributary B		X	6
Willow Creek	X		4
Willow Creek North Tributary	X	X	4, 6
Willow Creek South Tributary	X	X	4, 6
Bensenville Ditch	X		4
Addison Creek	X		3

[a] Assessment categories are from IDOT's *BDE Manual,* 2002: Chapter 26, Section 26-7, *Floodplain Finding* and *IDOT Drainage Manual*: Chapter 3, Section 3-005 Categories. Assessment categories range from 1 to 6. Category 1 represents projects that will not involve any work below the 100-year flood elevation. Category 6 represents significant floodplain encroachment.
[b] Category 3 represents projects involving modification to existing drainage structures.
[c] Category 4 represents projects involving replacement of existing drainage structures on existing alignment.

Alternative 203 may encroach upon seven base floodplains—Meacham Creek, Salt Creek, Willow Creek, Willow Creek South Tributary, Higgins Creek, Higgins Creek Tributary A, and Bensenville Ditch—both transversely and longitudinally (see Tables 4-18, 4-19, and 4-20). The area of floodplain encroachment is roughly 24.1 acres. The total potential floodway encroachment is 3.1 acres. As a result, Alternative 203 would require a compensatory storage area of 32.7 acres to comply with the local stormwater management requirements. The compensatory storage would be provided at an area hydraulically connecting to the floodplain (see Tables 4-18 and 4-19).

The encroachments at the Higgins Creek floodplain and the Higgins Creek Tributary A floodplain would be longitudinal along I-90. Retaining walls would be used to eliminate potential longitudinal impacts and possible creek relocation or realignment.

Alternative 402 may encroach on nine base floodplains—Meacham Creek, Salt Creek, Higgins Creek, Higgins Creek Tributary A, Higgins Creek Tributary B, Willow Creek, Willow Creek North Tributary, Willow Creek South Tributary, and Bensenville Ditch—both transversely and longitudinally (see Tables 4-18, 4-19, and 4-20). The areas of floodplain encroachment are 26.6 acres of floodplain and 2.7 acres of floodway. The compensatory storage area is estimated to be 31.3 acres to comply with the local stormwater management requirements. Compensatory storage would be provided at an area hydraulically connecting to the floodplain (see Tables 4-18 and 4-19).

York Road is supported by a dry-land bridge over the Willow Creek floodplain. The dry-land bridge extends 1,200 feet northward from a location 2,400 feet north of the intersection of York and Thorndale Roads. Under this dry-land bridge, there are three irregular trapezoidal structures: 30 feet (top width) by six feet (height) by six feet (bottom width); 40 feet (top width) by 8.4 feet (height) by six feet (bottom width); and 31 feet (top width) by 5.2 feet (height) by 10 feet (bottom width). This condition would be maintained to avoid affecting the effective waterway opening. Retaining walls would be used at Higgins Creek, Higgins Creek Tributary A, and Higgins Creek Tributary B to eliminate longitudinal floodplain encroachment.

Options A and D would have the same floodplain impact: a transverse encroachment with a potential longitudinal encroachment on the Addison Creek floodplain, on the west side of I-294 near Grand Avenue. The Addison Creek 100-year floodplain impact is located in Cook County, and either connection option could encroach on 0.6 acre of the floodplain and 0.3 acre of the floodway. Roughly 1.6 acres of compensatory storage would be required (see Table 4-18 and Table 4-20).

4.5 Biological Resources

This section discusses impacts on biological resources, including loss of vegetative cover, impacts to wildlife and their habitats, and effects on threatened and endangered species.

4.5.1 Vegetation and Cover Types

Most vegetative cover types in the study area have been altered by urbanization. Thus, few areas contain a dominance of native vegetation. Most of the vegetated areas are dominated by nonnative or invasive species. The biological resources within the study area primarily

consist of common/adaptable plant and wildlife species that are relatively tolerant of disturbance and human activities. The dominant cover type within the study area is urban and built-up land comprising buildings, roads, parking lots, and driveways, intermixed with urban landscaping, open space (including old fields), or limited forested cover.

Overall, impacts to cover types would be minimal. The alternatives would displace vegetation by expanding the pavement area. Vegetative cover beyond the edge of pavement to the right-of-way line would be converted to grass with intermittent landscape plantings of trees and shrubs, or vegetated swales. The new vegetated areas could be stabilized with native plant species that would reduce maintenance costs, provide water quality benefits, and provide a more natural cover type than turf grasses. The number of invasive/noxious species present and the degree of infestation within the project limits are not expected to increase notably as a result of the proposed improvements.

The proposed alternatives are primarily associated with roadways or include urban and built-up land as the dominant cover type. The alternatives avoid most of the study area's special lands and valuable habitat areas located in forest preserves, nature preserves, INAI sites, and large forested tracts. Impacts to special lands would be minimized and generally be located at the perimeter of the property. As a result, most of the cover type conversions and the fragmentation of large forested tracts or other ecologically valuable cover types would be minimal.

Table 4-21 summarizes impacts associated with Alternatives 203 and 402 based on mapped land cover types.

TABLE 4-21
Land Cover Impacts by Build Alternative

Cover Type[a]	Alternative 203		Alternative 402	
	Acres[b, c]	Percent[d]	Acres[b, c]	Percent[d]
Forested Land				
Upland	63.4	3.8	56.7	4.2
Partial canopy / savannah upland	30.7	1.9	25.6	1.9
Floodplain forest	6.3	0.4	6.3	0.5
Total	100.4	6.1	88.6	6.6
Urban and Built-up Land				
High density	483.6	29.3	384.5	28.7
Low / medium density	646.1	39.1	525.3	39.2
Urban open space[e]	400.2	24.2	331.1	24.7
Total	1,529.9	92.6	1,240.9	92.6

TABLE 4-21
Land Cover Impacts by Build Alternative

Cover Type[a]	Alternative 203		Alternative 402	
	Acres[b, c]	Percent[d]	Acres[b, c]	Percent[d]
Footprint Total[d]	**1,650.4**	**—**	**1,340.8**	**—**

Source: USDA National Agriculture Statistics Service, IDOA, and IDNR, 2002.

[a] Only land cover types included in the *Land Cover of Illinois 1999–2000* that would be affected by the alternatives are included in the table. See subsection 2.2 for agriculture, subsection 4.2 for surface waters, and subsection 4.3 for wetlands.

[b] Land cover impact acreages for this table were calculated for the alternatives based on data from the *Land Cover of Illinois 1999–2000*; the data may vary from data provided by other sources found in other tables within this document.

[c] Acreage includes land cover mapped within proposed OMP limits. OMP construction has commenced, and most of the vegetated land cover at the west end of the OMP limits has been cleared; therefore, actual land cover within OMP limits may vary from that which is mapped.

[d] Percent of "footprint total" acreage. Footprint total represents the total acreage within the footprint.

[e] Urban open space includes parks, golf courses, cemeteries, and other grassland cover within urban and built-up areas.

Although Alternatives 203 and 402 differ in total acreage by about 310 acres, the impacts to individual cover types would be relatively similar in terms of the percent of each cover type taken. The dominant cover type affected would be urban and built-up land. Impacts to this cover type would account for almost 93 percent of the total acreage within both alternative footprints, and the majority of the 310 acre difference between the alternatives. Mapped forested land losses would account for between six and seven percent of the total footprint area for Alternatives 203 and 402, including roughly 12 acres more forested impact associated with Alternative 203 than for Alternative 402. Impacts to surface waters and wetlands are discussed in subsections 4.2 and 4.3, respectively.

Preliminary field reconnaissance showed most of the undeveloped land near the proposed improvements is surrounded by development and primarily consists of urban open space (e.g., mowed lawn and old field successional areas) and to a lesser extent degraded woodlands. In general, large contiguous mapped urban open space or forested land would not be divided. Stands of native oak/hickory forests would not be impacted by either build alternative. Exhibit 4-7 shows mapped forest land and urban open space in relation to the build alternative footprints. Most impacts would be at habitat edges, associated with widening existing transportation corridors, or take place in areas reserved for transportation improvements.[27] For example, the urban open space/forested land impact within Alternatives 203 (33 percent) and 402 (39 percent) would take place within the Elgin O'Hare Expressway and Thorndale Avenue rights-of-way. Nonnative or aggressive plant species, such as cut-leaved teasel (*Dipsacus laciniatus*) and common buckthorn (*Rhamnus cathartica*), dominate many of the old field and woodland open spaces, respectively. The old field successional areas are entirely herbaceous or are scattered with trees that are beginning to colonize idle, open space.

[27] Both Alternatives 203 and 402 would impact mapped urban open space and forested areas located within OMP limits. Mapped forested area/urban open space impacts within OMP account for about 25 percent of the land cover impacts associated with Alternative 203 and 19 percent for Alternative 402. OMP construction has commenced and the majority of the vegetated land cover in the vicinity of the alternatives within OMP limits has been removed; therefore, areas within OMP limits are not discussed further in this section.

Both build alternatives would affect roughly 0.8 acre at the edge of a 124-acre mapped forested area located adjacent to Medinah Road, south of the Elgin O'Hare Expressway.[28] Based on preliminary field reconnaissance, this mapped forested area includes woodland, wetland (including wet old field and emergent communities), part of Meacham Creek, and a residential development. The wooded area is dominated by box elder (*Acer negundo*), common buckthorn, and ash trees (*Fraxinus* sp.). Based on plant species composition and habitat characteristics, the areas to be impacted include lower quality woodland, degraded wetland communities**,** and lower quality riparian habitat associated with Meacham Creek.

The largest of the mapped forested impacts would take place near Salt Creek adjacent to Thorndale Avenue and near the northwest corner of Thorndale Avenue and York Road. Near Salt Creek, 9.8 acres of mapped forested cover would be affected by both Alternatives 203 and 402. Based on preliminary field reconnaissance, a woodland near Salt Creek included common buckthorn, Siberian elm (*Ulmus pumila*), and tall goldenrod (*Solidago altissima*). Roughly 1.5 acres of the mapped forested impacts near Salt Creek include a stormwater management facility dominated by common reed. The mapped forested impact near the corner of Thorndale Avenue and York Road consists of a 10.5-acre degraded woodland dominated by box elder, common buckthorn, eastern cottonwood, Siberian elm, and sandbar willow at the woodland edge. Alternative 402 would affect the entire woodland; Alternative 203 would affect about 0.9 acre less.

Alternative 203 would affect 69.1 acres more of mapped urban open space than Alternative 402 and 11.8 acres more of mapped forested area. Of these impacts, Alternative 203 would include about 34 acres of mapped urban open space and 6.6 acres of forested land near the Touhy Avenue Reservoir[29] and mapped vegetative cover near the OMP limits. The additional land cover impacts are the result of a wider footprint attributable to a freeway component that parallels the west limits of the OMP.

Table 4-22 summarizes impacts associated with Options A and D based on mapped land cover types. Impacts to urban and built-up land account for close to 100 percent of the total area within the south bypass connection footprints. Most of the impacts for both south bypass connection options would be high density urban/built-up land followed by impacts to low/medium density urban/built-up and urban open space cover types. Exhibit 4-7 shows mapped forest land and urban open space in relation to the south bypass connection footprints. Option A would impact a slightly lower percentage of high density urban/built-up land than Option D, and would affect a slightly higher percentage of low/medium density, urban open space, and forested land. Option A contains a greater number of smaller sized commercial/industrial buildings and parcels than Option D. Option D would impact fewer, but larger industrial buildings. The 7.2 acres of additional mapped urban open space and forested land impacts associated with Option A would primarily affect scattered open lots and lawns along County Line Road. As a result, most of the cover type conversions would be minimal and fragmentation of valuable wildlife habitats would not occur with either south bypass connection option.

[28] This area also includes roughly 22 acres of mapped urban open space, of which 0.5 acre of its edge would be affected along the east side of Medinah Road.

[29] The Touhy Avenue Reservoir is located near the northwest corner of OMP. Over 83 percent of the mapped forested impact at this location is within OMP limits and does not appear forested based on a review of aerial photography.

TABLE 4-22
Land Cover Impacts Associated with the South Bypass Connection Options

Cover Type[a]	Option A		Option D	
	Acres[b]	Percent[c]	Acres[b]	Percent[c]
Forested Land				
Upland	0.9	0.3	0.3	0.1
Total	0.9	0.3	0.3	0.1
Urban and Built-up Land				
High density	185.1	68.0	199.7	74.2
Low/medium density	73.4	27.0	63.1	23.4
Urban open space[d]	12.6	4.6	6.0	2.2
Total	271.1	99.6	268.8	99.8
Footprint Total[c]	**272.1**	**—**	**269.1**	**—**

Source: USDA National Agriculture Statistics Service, IDOA, and IDNR, 2002.

[a] Only land cover types included in the *Land Cover of Illinois 1999-2000* that would be impacted by the alternatives are included in the table. See subsection 4.2 for surface waters and subsection 4.3 for wetlands.

[b] Land cover impact acreages for this table were calculated for the alternatives based on data from the *Land Cover of Illinois 1999-2000*; this data may vary from data provided by other sources found in other tables within this document.

[c] Percent of "footprint total" acreage. Footprint total represents the total acreage within the footprint.

[d] Urban open space includes parks, golf courses, cemeteries, and other grassland-like cover within urban and built-up areas.

4.5.2 Wildlife

The proposed alternatives are located predominantly in developed areas associated with existing roadways that provide poor wildlife habitat. Wildlife that uses the available habitat tends to be tolerant of disturbance and human activities. Urban tolerant wildlife species are generally common, adaptable species and include limited numbers of birds, mammals, reptiles, and amphibians.

Wildlife can be affected by transportation projects constructed on new or existing alignment that results in a loss of habitat/cover type, disruption of habitat continuity, and creation of barriers to wildlife movement. Transportation improvement projects can lead to direct and indirect wildlife impacts, such as wildlife-vehicle collisions (direct impact) and increased predation because of loss of habitat (indirect impact). Construction (e.g., grading and equipment operation) could also result in wildlife impacts as can traffic and construction noise. Many mobile wildlife species will avoid harm due to construction operations, but some mortality is expected, especially to small mammals, amphibians, and reptiles that may be present in construction areas.

Old fields are the most common wildlife habitat type near the alternatives. They are important to woodland edge and grassland bird and mammal species when large and unfragmented. Near the build alternatives, most of the old field areas are highly fragmented and have less stable wildlife populations. The smaller open areas and linear rights-of-way tend to be most valuable for common urban bird species, such as the American robin

(*Turdus migratorius*), common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), and small mammals (voles, mice).

Potential wildlife habitat in the study area is in close proximity and/or adjacent to existing noise generators (e.g., roads, industrial/developed areas with truck traffic, rail lines/yards, and/or airports). As a result of the highly developed nature of the study area, wildlife species that are less tolerant of urban conditions may prefer to use remaining open space and/or protected habitats within special lands, such as forest preserves. The proposed EO-WB project primarily consists of improvements to existing roads and land already dedicated to transportation infrastructure in close proximity to developed lands. Relatively large, protected habitat types associated with special lands will remain in the study area following the proposed EO-WB improvements (see Exhibit 2-10 and Exhibit 4-8). Proposed improvements proximate to the special lands could potentially affect noise sensitive species, such as migratory birds. The proposed widening of the existing transportation corridor may result in noise traveling farther into the existing adjacent landscape resulting in potential noise impacts. Refer to Section 4.8 for additional discussion on potential traffic noise impacts.

Current literature (Dooling and Popper, 2007) states that the effects of highway noise on birds range from insignificant (under certain circumstances) to noticeable (e.g., physiological/behavioral responses, masking communication/impaired detection of predators or prey, and/or hearing damage[30]). Potential noise impacts generally decrease with an increase in distance from the roadway and reduction in noise level. Traffic noise has the potential to affect birds up to several hundred meters from a highway; distance varies depending on factors, such as traffic volume and land cover. Noise levels may affect bird species differently. Birds may use short-term behavioral strategies to cope with noisy environments, such as scanning their surroundings by turning their heads, switching to a different location or height, and adjusting vocalization characteristics.

Migratory birds must travel significant distances over similar urban landscape prior to reaching and/or leaving the study area. The high traffic volumes and high ambient noise levels associated with the location and context of the proposed improvements affect wildlife habitat use in the existing condition. The future traffic volumes and noise levels that may be attributable to the EO-WB project are not anticipated to alter habitat use, and impacts to migratory birds are expected to be minimal.

Overall, project-related impacts to wildlife would be minimal and relatively similar between Alternatives 203 and 402 and between Options A and D. Potential wildlife impacts are discussed in the following subsections.

4.5.2.1 Habitat Loss and Fragmentation

Direct conversion from vegetative cover to paved areas would result in the loss of wildlife habitat for breeding, foraging, and resting. Impacts to wildlife could involve limited population reductions of species or displacement associated with the habitat within the project footprint. Species that rely upon higher quality habitat such as wetlands could be adversely affected. However, the study area contains limited areas of prime wildlife habitat,

[30] Traffic noise levels do not reach the threshold that could cause bird hearing loss/damage, and even if the noise levels did, birds are most likely to leave the area being exposed to the loud noise before damage could occur.

and it is expected that the overall effect on wildlife would be minimal**.** Of the land cover types listed in Tables 4-21 and 4-22, the most important in the study area for wildlife are forested lands and urban open space. Surface waters and wetlands are also important to wildlife. Subsections 2.3, Water Resources and Quality, and 2.4, Wetlands, discuss the general distribution of aquatic/wetland habitats. The alternatives avoid most of the study area's valuable habitat that is located within forest preserves, the nature preserve (Busse Forest Nature Preserve), INAI sites, and large forested tracts.

Habitat fragmentation involves dividing larger continuous habitat (such as woodlands and old fields) into smaller habitat patches. Transportation projects can cause fragmentation, thus creating additional edge habitat. Edge habitat is the boundary between habitat types, such as between woodlands and fields. Some species within the study area, such as the American robin and the brown-headed cowbird (*Molothrus ater*), prefer edge habitat. Edge habitat is usually created at the expense of large continuous habitat—the smaller the habitat patch, the larger the edge effect. Edge effects may result in differences in predation, interspecific competition, and prey availability that may vary near the edge of a habitat when compared to the interior of a larger patch. Habitat fragmentation will favor species that are more adaptive to edge environments thereby affecting non-edge species to a greater extent.

Edges often are associated with transportation rights-of-way or urbanized sections of the landscape. Most cover type impacts within the alternative footprints (between 93 and 100 percent) include urban and built-up land (including urban open space), which are already disrupted by residential, commercial, and industrial areas, roads, rail, utilities, and other types of development. Most of the forested area and open space impacts that would occur as a result of the build alternative include edge habitat. Widening the transportation corridors, as proposed, generally would relocate the habitat edge. Many of the improvements that upgrade existing transportation systems would have a minimal effect upon wildlife species that have already adapted to edge habitat.

Neotropical migrant birds are a primary wildlife group that could be affected by the displacement and fragmentation of forest habitat. There would be some loss of bird nesting and foraging areas because of conversion of undeveloped land within the proposed right-of-way to highway uses. Some neotropical migrant birds require forested stands of a minimum size and are not found in smaller wooded areas, even if suitable habitat is present. The largest mapped forested stands within the overall EO-WB study area include forest preserve properties that would not be affected by the proposed transportation improvements, such as the Ned Brown Preserve (see Exhibit 4-7). The largest mapped forested impact associated with the proposed transportation improvements is about 10.5 acres in size and is located near the west side of O'Hare Airport in a developed area near the northwest corner of Thorndale Avenue and York Road. An additional five mapped forested areas (excluding areas within OMP limits) impacted by the proposed transportation improvements are over 10.5 acres in size. Adverse effects to these forested areas, however, would consist primarily of edge takes adjacent to existing roadways and impacts are less than 9.8 acres in size (see Exhibit 4-7). Impacts to forested areas are discussed in subsection 4.5.1. Based on edge effect, nest predation could increase in fragmented wooded patches.

Edge habitat may be widely used by several of the relatively urban-tolerant mammals within the study area, such as raccoon (*Procyon lotor*) and Virginia opossum (*Didelphis virginiana*). Both raccoons and opossum, which are opportunistic feeders and nest predators, use this type

of habitat. Impacts to neotropical migrant birds, however, are expected to be minimal. Impacts to edge areas will reduce the size of available wildlife habitat, thus forcing relocation of remaining wildlife to interior locations. Forced relocation of wildlife can be expected to increase population densities and increase competition within the remaining interior habitat areas. Given the relatively small impacts to edge habitat compared with remaining cover and the adaptability of the urban-tolerant wildlife known to use these areas, adverse impacts as a result of the project are expected to be negligible.

4.5.2.2 Barriers to Wildlife Movement

Even in the most urban areas, certain corridors allow wildlife to travel between habitat patches. Wildlife use linear corridors, such as rights-of-way, fence rows, and riparian environments for movement, dispersal, and to access habitat divided by roads, rail, or other types of development. Newly constructed barriers, such as roads or rail, can reduce wildlife movement between two adjacent habitats by interrupting established travel routes. Barriers may pose a significant threat to wildlife because of traffic volumes, speeds, and width of roadway/rail corridor. Road and rail do not pose barriers to all forms of wildlife equally. Birds and most mammals are relatively mobile; therefore, the direct loss of habitat to any alternative would not be as critical as it would be to other species of wildlife. Birds and mammals typically seek other areas in which to forage, breed, and rest. Their mobility exposes them to collisions with vehicles as they attempt to cross roadways that have been widened or new roadways to areas not previously served. Deer/vehicle collisions would be a safety concern, but no negative impact to the overall deer population is expected. Minimal to no loss of species groups is anticipated.

Small, terrestrial wildlife species are more affected by barriers than birds and larger mammals. Most reptiles and amphibians in the study area are less mobile and rely on their immediate habitat. Transportation improvements could pose a higher road kill hazard potential to reptiles and amphibians than to larger mammals, although mammal/vehicle collisions are known to occur. Reptiles and amphibians most likely would be affected by road and rail crossings during breeding, nesting, and seasonal movements. Even though impacts may occur, negative impacts to the overall reptile or amphibian population within the study area are not anticipated as a result of the proposed transportation improvements.

To minimize the potential "barrier effect" of transportation improvements on wildlife, direct impacts to large contiguous open spaces, riparian habitat, greenways, and other wildlife corridors have been avoided or minimized, as part of the planning process. The study area contains limited areas of prime wildlife habitat. Roughly 87 percent of the study area is urban and developed land (see Table 2-19). The large percentage of urban development, habitat fragmentation, and existing transportation infrastructure throughout the study area limits wildlife movement. The largest contiguous open space habitat types within the study area are the Ned Brown Preserve, a system of forest preserve properties along the Des Plaines River in Cook County, and a cluster of forest preserves and other special lands in DuPage County along Salt Creek/adjacent to I-290. The preserved open space and Salt Creek provide connectivity among the DuPage County Forest Preserves and may allow animal movement between those areas. Both build alternatives would affect part of the riparian corridor adjacent to Salt Creek. However, Salt Creek and many potential wildlife corridors in the study area, including other streams and railroad rights-of-way, would be bridged by a build alternative that may facilitate wildlife movement.

Bridges and culverts can facilitate wildlife movement. Proposed roadway bridges and/or culverts will be evaluated for their ability to accommodate the movement of wildlife (and aquatic biota) as part of preliminary engineering in Tier Two. Also, the need for wildlife crossings along the project corridor will be evaluated independent of roadway bridge or culvert openings. If required, stand-alone wildlife crossings would be implemented with the project. As practical, these structures will be designed to support habitat connectivity and animal movement.

4.5.3 Threatened and Endangered Species

Based on correspondence from the USFWS (dated January 29, 2009), the study area includes two known locations of the federal-threatened eastern prairie fringed orchid (*Platanthera leucophaea*). The eastern prairie fringed orchid is also a state-endangered species. Neither known location is in or near the proposed alternatives. Possible habitat for the orchid includes mesic prairie, sedge meadows, marsh edges, and bogs. Any moderate to high quality wetland habitat within the study area could support the species. There is no known critical habitat for the species within the study area (Rogner, 2009).

According to information provided by the IDNR and the Illinois Natural Heritage Database (dated December 12, 2008), the build alternatives and south bypass connection options do not directly affect any recorded state-listed threatened or endangered species sites. The nearest recorded sites are more than 3,500 feet from Alternatives 203 and 402 and are associated with a state-endangered bird at a privately owned natural area located near the southwest corner of the Ned Brown Preserve, and a state-threatened plant species at the Ned Brown Preserve. The Ned Brown Preserve and the privately owned natural area will not be directly affected by the proposed improvements.

The accuracy of available data does not allow a conclusive determination of specific impact to the state- and federal-listed species. As part of Tier Two, additional studies will be conducted to determine potential presence and potential impacts to threatened and endangered species. Future work associated with the preferred alternative would include detailed threatened and endangered species field surveys (if necessary) and the required consultation with IDNR and USFWS.

4.6 Section 4(f)

Significant publicly-owned parks, recreational areas, wildlife and waterfowl refuges, and historic sites of national, state, or local significance, are afforded special protection under Section 23 CFR 774, *Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites (Section 4(f))*. An evaluation of the project's potential impacts to these resources is being conducted under §774.7(e), which allows for a preliminary Section 4(f) approval for first tier documents. To receive a preliminary Section 4(f) approval, a Section 4(f) determination must be made for affected properties, and potential impacts to such properties must be described. Further, feasible and prudent avoidance alternatives, if any, should be identified, and all possible planning to minimize impacts by the build alternatives (to the extent that the Tier One level of engineering allows) must be included. The documentation should reflect that opportunities remain for minimizing harm to Section 4(f) resources in the subsequent tier.

Based on the information provided in this section, the preliminary Section 4(f) approval for this project will be provided in the Tier One ROD.

As mentioned in Section 2.11, no historic sites qualifying as Section 4(f) properties are located within the study area. However, three resources meeting the criteria for protection under Section 4(f) are located along the proposed improvements.

4.6.1 Section 4(f) Applicability

A property qualifies for Section 4(f) protection if it is a significant publicly-owned park, recreational area, wildlife or waterfowl refuge area, or a historic site of national, state, or local significance. If a publicly-owned property has multiple uses, at least one of which is not recreational in nature, Section 4(f) only applies to the portion of the land that functions as a significant public park, recreational area, or wildlife or waterfowl refuge (§774.11[d]). Section 4(f) permits the Secretary of Transportation to approve a transportation program or project that would use land from a significant publicly-owned park, recreational area, wildlife or waterfowl area, or land from a significant historic site (regardless of ownership) only if there is no prudent or feasible alternative to using that land and all possible planning has been done to minimize harm to these properties by the build alternatives.

A project could "use" land from a Section 4(f) resource under one of three circumstances:

- 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 preservation purpose as determined by the criteria in §774.13(d); or
- When there is a constructive use of a Section 4(f) property as determined by the criteria in §774.15 (§774.17).

If an alternative avoids Section 4(f) resources and is prudent and feasible to construct, then it must be selected. If no prudent and feasible avoidance alternatives exist, only the alternative that causes the least overall harm and includes all possible planning to minimize harm to Section 4(f) property may be approved (§774.3[a][2] and [c][1]). The following factors are to be considered when conducting the least harm analysis (§774.3[c][1][i-vii]):

- Ability to mitigate adverse impacts to each Section 4(f) property
- Relative severity of remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each property for Section 4(f) protection
- Relative significance of each Section 4(f) property
- Views of the officials with jurisdiction over each Section 4(f) property
- Degree to which each alternative meets the project purpose and need
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)
- Substantial differences in costs between the alternatives

Based on the seven factors above, in cases where all project alternatives would cause substantially the same harm, FHWA may select any of the remaining alternatives.

Section 23 CFR 774.7(e) defines the parameters for evaluating Section 4(f) impacts in a tiered document such as this one. This Section 4(f) analysis is being conducted in accordance with these regulations.

4.6.2 Description of Section 4(f) Properties

Readily available information was used to identify potential Section 4(f) properties in the study area. Properties within the proposed project footprints were evaluated to determine the applicability of Section 4(f). Based on the level of engineering used in the Tier One Draft EIS, nine potential Section 4(f) properties were identified as being potentially impacted. In this Final EIS, three Section 4(f) properties have been identified that may be impacted by Alternatives 203 and 402 (see Exhibits 4-1 and 4-8).

Refinements to the roadway design in the Final EIS resulted in the elimination of impacts to four of the original nine properties identified in the Draft EIS. The proposed improvements were modified to remain within the existing right-of-way, therefore avoiding those four properties (i.e., Alexian Field, Shenandoah Park, Salt Creek Marsh Forest Preserve, and Legends of Bensenville Golf Course).

Two publicly-owned parcels are still expected to be impacted, but do not meet Section 4(f) criteria. The Elk Grove Detention Pond is in Elk Grove Village located on the southeast corner of Coyle Avenue and Carmen Drive (see Exhibit 4-8). The primary function of the property is detention for stormwater runoff from the Rogers Industrial Park in Elk Grove Village and Des Plaines. No formal recreational facilities have ever been developed at the site, nor does Elk Grove Village plan to do so in the future. Its location is within an industrial area; therefore, it is not conducive to recreational uses and does not attract any users. The Elk Grove Detention Pond is not identified on the Elk Grove website as a public park. Impact to this property is discussed in Section 4.7 below.

The other public land, the Majewski Athletic Complex, is owned by MWRDGC for potential future expansion of the Kirie Wastewater Treatment Plant, and currently leased to the Mount Prospect Park District (MPPD). The MPPD uses the property for field sports. The lease was originally established in 1980, extended in 1992 and again in 2000, with a renewal date of 2012. The lease does provide for the MWRDGC to recover the property for the agency's corporate purposes with the provision that one-year notice be supplied. The recapture clause in the lease categorically defines the property as a temporary recreational area; the lease is not considered a long term lease for Section 4(f) purposes; and the land being temporarily used for recreational purposes could be recaptured by the property owners with a 1-year notice. Therefore, FHWA does not consider the Majewski Athletic Complex a Section 4(f) resource. However, there is the possibility that the lease could be converted to a long term arrangement in the future and qualify the property as a Section 4(f) resource. Therefore, this property is considered a potential future Section 4(f) property and is discussed further in Section 4.6.6.

There are three properties that remain of the original nine (as discussed in the Draft EIS) that are Section 4(f) properties and may be impacted by the proposed improvements. They include the DuPage County forest preserve (Medinah Wetlands Forest Preserve) and two trails (Salt

Creek Greenway Trail and North Central DuPage Regional Trail) (see Table 4-23 and Exhibits 4-1 and Exhibit 4-8). These properties are described below.

As explained in the Draft EIS, two other properties within the proposed build alternative footprints include Bretman Park (owned by the Village of Bensenville) and Silver Creek Forest Preserve (owned by FPDDC and maintained by the Village of Bensenville). Both properties have been acquired by the O'Hare Modernization Project (an FAA project), and a Section 4(f) analysis was completed for the acquisition of those properties. Therefore, effects to these properties have been accounted for under the Section 4(f) process undertaken for the federally-approved OMP EIS and those properties are not considered impacted by this project (FAA, 2005).

4.6.2.1 Medinah Wetlands Forest Preserve

Forest Preserves, by Illinois Statute, are public recreational areas and are, therefore, considered Section 4(f) resources by FHWA. The Medinah Wetlands Forest Preserve qualifies as a Section 4(f) property. It is a 23-acre FPDDC property located in the southwest quadrant of Elgin O'Hare Expressway and Meacham Road, and is used for wetland habitat preservation. There are currently no amenities or parking provided; however, an observation deck is planned for this property and a trail connecting users from Medinah Road to this deck is under construction. Two potential encroachments are anticipated: 1) along Medinah Road and 2) along the improved eastbound ramp terminal at Medinah Road from the Elgin O'Hare Expressway.

4.6.2.2 Salt Creek Greenway Trail

The Salt Creek Greenway Trail is considered a Section 4(f) resource because it is a significant recreational area. When complete, it will be an approximately 35-mile long multi-purpose recreational trail primarily following Salt Creek in west central Cook County and also east DuPage County connecting Ned Brown/Busse Woods on the north and Brookfield Zoo on the south. The route of the trail travels through multiple recreational areas. The construction of the trail is a joint effort by the FPDDC, local communities, and park districts. The sections of the trail that cross the proposed improvements have been constructed. The proposed roadway improvements intersect the trail in two locations: 1) as it crosses Thorndale Avenue along Mittel Boulevard/Mittel Drive, and 2) where it veers north as it travels east/west along the south side Thorndale Avenue between Prospect Avenue and Mittel Drive.

4.6.2.3 North Central DuPage Regional Trail

The North Central DuPage Regional Trail also qualifies as a Section 4(f) property because it is a significant recreational area. It is also a 35-mile long multi-purpose recreational trail that will travel through multiple communities to connect the Illinois Prairie Path-Elgin Branch with Cook County's Ned Brown/Busse Woods Forest Preserve and the Schaumburg bikeway system. When complete, users will be able to access the Fox River Trail in Kane County via the Illinois Prairie Path. It is being implemented by several entities including local park districts, the FPDDC, the DuPage County DOT, and IDOT. In the vicinity of the proposed roadway improvements, the trail crosses the Elgin O'Hare Expressway along Plum Grove Road. This section of the trail has been constructed.

TABLE 4-23
Potential Impacts to Section 4(f) Properties

Property Name	Location	Size/Length	Description	Size of Potential Impact (area or length/percent of entire property)	Proposed Improvements in the Vicinity
Medinah Wetlands Forest Preserve (FPDDC)	Southwest quadrant of Elgin O'Hare Expressway and Medinah Road	23 acres	Wetland habitat; no amenities or parking (trail under construction and observation deck planned)	0.75 acre/1.3% of entire forest preserve (0.48 acre of the impact is wetland, which is 0.71% of entire wetland)	Southbound shift of eastbound Elgin O'Hare Expressway exit ramp; widening from two to three lanes in each direction along Medinah Road approaching Elgin O'Hare Expressway on east side of property.
Salt Creek Greenway Trail (within the study area)	Across Thorndale Avenue along Mittel Boulevard/Mittel Drive South side of Thorndale Avenue, on the north side of Salt Creek Marsh Forest Preserve	35 miles	Multi-purpose recreational trail	Two potential impacts: 1) temporary disruption across Thorndale Avenue during construction, and 2) 600 feet (0.2 acre)/ 0.3% of entire trail	Construct a two-lane one-way westbound frontage road on the existing Thorndale Avenue alignment; construct an access-controlled facility with five lanes in each direction (extension of the Elgin O'Hare Expressway); and construct a new two-lane eastbound frontage road.
North Central DuPage Regional Trail (within the study area)	Across Elgin O'Hare Expressway along Plum Grove Road	35 miles	Multi-purpose recreational trail	Temporary disruption across Elgin O'Hare Expressway during construction	Add one lane and two auxiliary lanes in each direction to Elgin O'Hare Expressway and lengthen Plum Grove Road bridge to accommodate widening.

4.6.3 Potential Impacts to Section 4(f) Properties

In addition to the No-Action Alternative, a total of 15 roadway system strategies were evaluated, as documented in Appendix E. Five roadway system strategies (Alternatives 101, 102, 301, 302, and 601) were eliminated from further study because they did not address the purpose and need of the project.

Of the remaining ten roadway system strategies, three strategies (Alternatives 201, 204, 205) were eliminated because they had higher potential relocations relative to the other alternatives (Appendix E, Table 4). The impacts to Section 4(f) resources associated with these three strategies were about the same or greater than the seven alternatives carried forward in the analysis.

The seven finalist alternatives were then evaluated on a comprehensive range of engineering and environmental factors. The result of the analysis was the identification of two build alternatives to analyze in detail (Alternative 203 and Alternative 402) and dismissing five alternatives (Alternatives 202, 401, 403, 404 and 501) from further analysis. The alternatives that were retained had among the lowest relative impacts to Section 4(f) properties (see Table 5 in Appendix E).

The build alternatives (203 and 402) have the same impacts to the three Section 4(f) properties. The resources are located along the east-west element of the proposed improvements (the Elgin O'Hare Expressway/Thorndale Avenue corridor), which is common to both alternatives. The impacts presented below are a result of engineering considered in Tier One and may be lessened in Tier Two when more detailed design occurs. Potential impacts to Section 4(f) properties based on Tier One engineering are shown on Exhibits 4-1 and 4-8.

4.6.3.1 Medinah Wetlands Forest Preserve

Travel demand developed in Tier One indicates the need for widening Medinah Road from two to three lanes in each direction as it approaches the Elgin O'Hare Expressway. It would require a narrow strip of land measuring 0.28-acre from the east side of Medinah Wetlands Forest Preserve. The northern part of the narrow longitudinal strip take is emergent wetland (0.01 acre, which is 0.01 percent of the entire wetland). The southern part is upland habitat and includes a section of a trail currently being constructed to access a planned observation deck. The completed trail would not be disrupted; the only impact would be the trailhead at the edge of the existing roadway would be moved westward with the expansion of the roadway. Detailed traffic analysis in Tier Two may demonstrate less travel demand and less capacity improvements, thereby reducing the impact to the forest preserve along Medinah Road.

A second small strip take (impacting approximately 0.47 acres of wetland, which is less than one percent of the entire wetland) would be required in the northeast corner of the forest preserve for the improved eastbound to southbound turning lane at the eastbound exit ramp terminal. Combined, the roadway improvements in this locale would impact a total of 0.75 acre of the Medinah Wetlands Forest Preserve.

4.6.3.2 Salt Creek Greenway Trail

The Salt Creek Greenway Trail is co-located along Mittel Boulevard/Mittel Drive crossing Thorndale Avenue on a north-south alignment. The bike trail would be temporarily disrupted

with the construction of the proposed improvements at this location, a freeway section with frontage roads on both sides with an overall cross-section of approximately 400 feet. During Tier Two, efforts will be made to satisfy the temporary occupancy exception requirements pursuant to 23 CFR 774.13(d). Specifically, it is anticipated any disruption to the trail at this location will be less than the time needed to construct the project. In addition, there will be no change in ownership to the land; the scope of the work affecting the trail will be minor and the change to the Section 4(f) property will be minimal; there are no anticipated permanent adverse physical impacts and the trail continuity will be maintained or re-routed during construction; and the land will be fully restored after the construction is completed. Coordination with the Official with Jurisdiction will be completed during Tier Two to ensure these criteria are satisfied.

The Salt Creek Greenway Trail is also located on an east-west alignment parallel to the proposed eastbound frontage road between Prospect Avenue and Mittel Drive. A portion of the trail (approximately 600 feet or 0.2 acre) would require a shift to the south to allow for the construction of the frontage road. Available information indicates that the Salt Creek Greenway Trail in this location is on property owned by IDOT.

4.6.3.3 North Central DuPage Regional Trail

The North Central DuPage Regional Trail is co-located along Plum Grove Road across the Elgin O'Hare Expressway. The trail could be temporarily disrupted during the proposed widening of the Elgin O'Hare Expressway and lengthening of the Plum Grove Road bridge in order to accommodate the widening. During Tier Two, efforts will be made to satisfy the temporary occupancy exception requirements pursuant to 23 CFR 774.13(d). Specifically, it is anticipated that any disruption to the trail at this location will be less than the time needed to construct the project. In addition, there will be no change in ownership to the land; the scope of the work affecting the trail will be minor and the change to the Section 4(f) property will be minimal; there are no anticipated permanent adverse physical impacts and the trail continuity will be maintained or re-routed during construction; and the land will be fully restored after the construction is completed. Coordination with the Official with Jurisdiction will be completed during Tier Two to ensure these criteria are satisfied.

4.6.4 Avoidance Alternatives

The No-Action Alternative would avoid impacts to Section 4(f) properties; however, this alternative does not meet the purpose and need for the project. The following is a description of site specific avoidance alternatives that have been identified to determine if feasible and prudent adjustments to the proposed improvements could avoid the Section 4(f) properties. The option of no action was considered but dismissed because it does not meet the purpose and need.

4.6.4.1 Medinah Wetlands Forest Preserve

The Medinah Wetlands Forest Preserve would be impacted on the north side of the property by widening the Elgin O'Hare Expressway to five lanes in each direction. It would also be impacted on the east side of the property from the widening of Medinah Road from two to three lanes in each direction.

Shifting the mainline of the Elgin O'Hare Expressway to the north and the interchange to the east would avoid impact to the property, but would cause the displacement of approximately five residences and one industrial business in the northeast quadrant. Two industrial businesses in the southeast quadrant would be displaced. Further, it would cause the mainline to encroach on the 0.2 acre of wetlands on the north side of the Elgin O'Hare Expressway east of Meacham Road.

4.6.4.2 Salt Creek Greenway Trail

The Salt Creek Greenway Trail could be temporarily disrupted while planned improvements to Thorndale Avenue and Mittel Boulevard/Mittel Drive are being constructed. Again, Section 4(f) impact to this property could be avoided if the disruption is temporary, trail continuity is maintained, and the trail is reinstated in the same or better condition. Trail continuity could be maintain in one of two ways, either reroute the trail along alternate roadways during construction, or stage construction such that one lane of Mittel Boulevard/Mittel Drive could be kept open at all times, thus allowing continued trail operation along the existing route. The trail operation would also be disrupted by the proposed eastbound frontage road between Prospect Avenue and Mittel Drive. Shifting the alignment of the freeway and frontage road cross-section to the north was evaluated. However, the shifted alignment would encroach approximately 50 feet onto another potential Section 4(f) property, the Salt Creek Golf Club (under the jurisdiction of the Wood Dale Park District), and impact approximately 1.5 acres. The frontage road could be shifted to the north to make it closer to the eastbound lanes of the mainline, but this would require a retaining wall.

4.6.4.3 North Central DuPage Regional Trail

The North Central DuPage Regional Trail could experience temporary disruption while the proposed improvements to the Elgin O'Hare Expressway and Plum Grove Road bridge are being constructed. Section 4(f) impact to this property could be avoided if the disruption is temporary, trail continuity is maintained, and the trail is reinstated in the same or better condition. Trail continuity could not be maintained with staging construction because the trail is on a bridge that would be out of service while being reconstructed to accommodate improvements to the Elgin-O'Hare Expressway. It is likely that users will be rerouted during construction, and all of these conditions would be met.

4.6.5 Measures to Minimize Harm

During Tier One, measures were taken to minimize harm to Section 4(f) properties. Alternatives with greater impacts to Section 4(f) resources were eliminated from consideration during the process. Further, even though the build alternatives are at a conceptual level of detail in Tier One, measures were taken to minimize impacts to Section 4(f) properties. During Tier Two, considerable refinements to the roadway design will occur and a full range of minimization measures will be evaluated. The following subsections describe minimization measures identified in Tier One for further development and consideration in Tier Two.

4.6.5.1 Medinah Wetlands Forest Preserve

Multiple opportunities exist to minimize adverse impacts to the Medinah Wetlands Forest Preserve. The design already includes a retaining wall along the mainline to minimize the angle between the mainline and the eastbound exit ramp, which would limit the

improvements' footprint. This angle cannot be reduced further to minimize impact to the forest preserve and remain consistent with IDOT and AASHTO design standards.

Several options exist to avoid impact to the north side of the property. A retaining wall could be implemented on the south side of the proposed improvements and avoid wetlands, thereby minimizing impacts to the property. Another option could be to redesign the eastbound exit ramp as a loop in the southeast quadrant. However, two industrial buildings would be displaced, parking at a third industrial building would be removed, and loading access at a fourth industrial building would need to be altered. Alternatively, the eastbound exit ramp could be eliminated, resulting in a partial access only interchange. This solution would impair the functionality of the interchange and cause out-of-direction travel. This is inconsistent with the project's purpose of improving travel efficiency, and adds to travel inefficiencies in the area caused by too many interchanges with only partial access.

To minimize right-of-way required on the north side of the property, a guardrail could be implemented on the south side of the proposed improvements. This would avoid wetlands and reduce impacts to the property.

Opportunities to avoid impacting the property along Medinah Road exist as well. Realigning approximately ½ mile of Medinah Road to the east would avoid the east side of the forest preserve, but it would result in the displacement of a business along Medinah Road. Narrowing the median along Medinah Road would avoid impacting the forest preserve at this location, but it would be incompatible with lane configuration of the eastbound ramp intersection to the north.

Along Medinah Road, the median could be narrowed slightly to minimize encroachment onto the forest preserve property. Impact to the forest preserve along Medinah Road could also be minimized by deferring median channelization until closer to the eastbound ramp intersection and then increasing the rate of channelization above design standards. However, this would compromise safety because it would not provide motorists with an adequate distance to shift before the median is introduced.

4.6.5.2 Salt Creek Greenway Trail

It is FHWA's policy to minimize disruption to the continuity of existing and designated trails. All reasonable efforts would be made to maintain the continuity and operation of the trail. During the construction of the improvements to Thorndale Avenue and Mittel Boulevard/Mittel Drive, it is reasonable to assume that users would be rerouted onto nearby public roads. However, if at least one lane of Mittel Boulevard/Mittel Drive can stay open during construction, the trail can remain in use on its existing alignment. It is likely that the portion of the trail located along the proposed eastbound frontage road between Prospect Avenue and Mittel Drive could be reconstructed to the south before the frontage road is constructed. The trail would be replaced in the same or better condition. If this were to occur, trail continuity could be maintained and trail users would not experience a disruption in use or degradation in the facility. Another option could be to incorporate the trail alongside the frontage road. Reasonable efforts would be made to limit disruption to the trail and reinstate it in the same or better condition.

4.6.5.3 North Central DuPage Regional Trail

FHWA's policy is to limit disruption to the continuity of existing and designated trails. It is reasonable to assume that trail continuity could be maintained during construction by temporarily rerouting users onto nearby public roads. Reasonable efforts would be made to limit this disruption and reinstate the trail in the same or better condition.

4.6.6 Potential Future Section 4(f) Resources in the Study Area

Four properties along the build alternative corridors are not currently considered Section 4(f) resources but could potentially qualify as Section 4(f) properties in the future (see Exhibit 4-8). These include the Legends of Bensenville Golf Course owned by the Village of Bensenville, a parcel to the west of the Medinah Wetlands Forest Preserve, the O'Hare Cup Site owned by MWRDGC and leased to the MPPD in the southwest quadrant of the interchange at I-90 and Elmhurst Road, and the Majewski Athletic Complex owned by MWRDGC and leased to the MPPD in the northeast quadrant of the interchange at I-90 and Elmhurst Road. Alternative 203 could affect all of the potential future Section 4(f) resources, and Alternative 402 would affect all but the Majewski Athletic Complex property.

The Legends of Bensenville Golf Course is located on the northwest corner of County Line Road and Grand Avenue and is currently owned by the Village of Bensenville. Its previous use was a public golf course, but it is no longer in operation and the Village has been marketing the sale of the property. Because the property has no public recreational use, it no longer qualifies as a Section 4(f) resource. However, there is a possibility that Bensenville could return the property to recreational use, thus qualifying the property as a Section 4(f) resource. Currently, proposed improvements to reconstruct County Line Road and Grand Avenue adjacent to the Legends of Bensenville Golf Course property would be entirely within existing right-of-way limits. However, if added roadway features at this location would result in direct impacts to this property and the property had been returned to a public recreational use, then the prudence and feasibility of avoidance alternatives would be analyzed in the Tier Two documents.

The FPDDC is currently in the process of completing the purchase of the 34-acre parcel west of the Medinah Wetlands Forest Preserve. The parcel is expected to be in FPDDC ownership by May 2010. The FPDDC will expand the Medinah Wetlands Forest Preserve to include this parcel; therefore, this property would qualify as a Section 4(f) resource. The proposed improvements adjacent to this property include lane additions to the Elgin O'Hare Expressway that would be contained within the existing right-of-way and no impacts are anticipated from the proposed improvements.

MWRDGC owns a property on the south side of I-90 and west of the Elmhurst Road interchange, known as the O'Hare Cup Site. It is leased to the MPPD. The conditions of the lease state that MWRDGC can terminate the lease with 30-days' notice. No recreational amenities currently exist on the property, but the Park District has indicated interest in constructing recreational facilities on the property in the future. The property does not currently serve a recreational purpose. Because the property currently does not serve as a recreational area or public park and the short term nature of the existing lease, the property does not qualify as a Section 4(f) resource. If MPPD develops recreational facilities and provides access to the property, and the length of the lease term was changed allowing a long-term use, it would likely become a Section 4(f) resource. At this level of detail, the

improvements for I-90 would require a narrow strip of land from the north side of the property. If Section 4(f) were applicable, the property could be avoided if a retaining wall was implemented rather than a sloped embankment. Shifting the alignment of I-90 to the north was also considered as an avoidance measure, but it would cause the displacement of numerous commercial and industrial buildings on the north side of I-90.

MWRDGC owns a property in the northeast quadrant of the interchange at I-90 and Elmhurst Road and leases it to the MPPD (the Majewski Athletic Complex). A 0.78 acre strip take from the south side of the property adjacent to I-90 would be required to accommodate the installation of a collector-distributor facility to link freeway movements between the proposed O'Hare West Bypass/I-90 system interchange and the proposed full Elmhurst Road/I-90 service interchange. No amenities would be affected; the land that would be transferred to transportation use is grassland along the edge of the property. The alignment of the collector-distributor could not be shifted south without compromising roadway design standards. The proposed roadway cross-section is required to maintain acceptable LOS along the roadway; reducing the cross section would lower LOS to unacceptable levels.

4.6.7 Least Overall Harm Analysis

As stated in §774.3(c)(1), if there are no feasible and prudent avoidance alternatives, an analysis must be completed to identify the alternative that results in the least overall harm to Section 4(f) resources. The least overall harm is determined by balancing the following list of factors:

- Ability to mitigate adverse impacts to each Section 4(f) resource
- Relative severity of the remaining harm, after mitigation, to the protected activities and attributes or features
- Relative significance of each Section 4(f) property
- Views of the Officials with Jurisdiction over each Section 4(f) property
- Degree to which each alternative meets the purpose and need
- After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)
- Substantial differences in costs among alternatives

Based upon the information examined in Tier One, the build alternatives (Alternatives 203 and 402) emerged from an exhaustive analysis of many alternatives that all impacted Section 4(f) properties to varying degrees. Alternative 203 and 402 (build alternatives) were among the least impactive to Section 4(f) resources, and with additional engineering efforts in the latter stages of Tier One, the Section 4(f) impacts were reduced to the same three properties for each alternative with a total impact of about one acre. The impacts consist of a 0.75 acre impact to Medinah Wetlands Forest Preserve, an approximate 0.2 acre impact to the Salt Creek Greenway Trail, and temporary disruption to the Salt Creek Greenway and North Central DuPage Regional Trails across Thorndale Avenue and the Elgin O'Hare Expressway, respectively, during construction. The effect on the Medinah Wetlands Forest Preserve involves the displacement of a narrow strip of land that would directly impact a wetland

resource no more than 0.5 acres, which is less than one percent of the resource. The effect to the trail resources would be temporary, and use can be maintained throughout construction.

Properties that have the potential to become future Section 4(f) properties were examined in Section 4.6.6. A total of four resources were identified with one affected by Alternative 402 and two properties affected by Alternative 203. The property affected by both alternatives is an undeveloped parcel of land leased by the MWRDGC to the MPPD (the O'Hare Cup Site). Alternative 203 could potentially affect an additional property, the MWRDGC property leased to the MPPD for the Majewski Athletic Complex. If these properties qualified as Section 4(f) resources, Alternatives 203 and 402 would impact the O'Hare Cup Site the same (about three acres). Additionally, Alternative 203 would require a 0.78 acre strip along the south side of the Majewski Athletic Complex property. The Legends of Bensenville Golf Course and the property to be added to the FPDDC would not be impacted by the build alternatives.

In another comparison of the two build alternatives, Alternative 203 offers better travel performance than Alternative 402, in every category (i.e., regional travel efficiency, reduced congestion on secondary roads, improved travel times and speed, and improved access to freeway connections), and therefore, better meets the project's purpose and need. For the two alternatives, natural resource impacts only differ by a few acres, approximately three acres for wetlands, surface waters, and floodplains combined. Communities favor Alternative 203 because it would preserve businesses and jobs, improve traffic flow, focus traffic to major roads, and preserve existing land use patterns. The location of Alternative 203 on the western edge of O'Hare Airport property avoids conflict with the proposed OMP improvements and minimizes displacement of valued industrial and commercial properties in Elk Grove Village, City of Des Plaines, Village of Bensenville, and Village of Franklin Park. Both alternatives have the potential to create a total economic effect that is greater than the initial roadway investment. However, the spending and consumption of project investment dollars would be greater under Alternative 203 with an added value to the regional economy of $1 billion over Alternative 402. Short-term and long-term job creation is also greater under Alternative 203 as a result of the higher initial roadway investment. Alternative 203 would provide 5,000 more jobs than Alternative 402 during the three-year construction period of the project. In 2030, Alternative 203 is expected to have added 13,500 jobs in the study area over those created by Alternative 402.

Based on the information provided above, Alternatives 203 and 402 result in the least harm to actual or potential future Section 4(f) resources. Because the remaining two alternatives cause the same degree of harm to Section 4(f) properties either alternative could be selected. When balancing other factors into the decision, however, Alternative 203 would result in the least overall harm because it better addresses the project purpose and need, results in comparable adverse impacts to non-Section 4(f) resources, and has substantially greater economic benefits and land use compatibility.

The identification of Alternative 203 as the preferred alternative has included all possible planning to minimize harm at the level of detail afforded by the Tier One process. As this alternative advances to Tier Two of the process, design details will be examined in a Section 4(f) Tier Two analysis to determine further means to avoid or reduce harm to Section 4(f) properties. In the event that there are no prudent or feasible alternatives for complete avoidance of Section 4(f) properties, a least harm analysis will be prepared addressing the more detailed design measures used to reduce impact.

The preliminary Section 4(f) approval would be subject to a re-evaluation if new or more detailed information becomes available in Tier Two. The final Section 4(f) approval may be made in the Tier Two Final EIS.

4.7 Non-Section 4(f) Special Lands and Section 6(f) and OSLAD Considerations

As mentioned in Section 4.6, the Elk Grove Detention Pond is noted as a special land, but does not qualify as a Section 4(f) property. The property would be impacted by the proposed improvements included in Alternative 203, but is avoided by Alternative 402. The mainline alignment of Alternative 203 (O'Hare West Bypass, north section) is located diagonally across much of the southeastern part of the detention pond, with part of the northwest corner of the pond remaining. The size of the potential impact is 2.0 acres.

Section 6(f) of the Land and Water Conservation Fund Act (LWCFA) also provides protection to properties purchased with LWCFA funds. No properties affected by the proposed improvements were purchased with funds allocated by the LWCFA (Nation, 2009a; 2009b); therefore, no Section 6(f) involvement exists in this project.

Additional protection is provided for properties purchased with OSLAD Act funds, a program overseen by IDNR. A review of relevant data showed that one property purchased with OSLAD funds (Medinah Wetlands Forest Preserve) could be affected by the proposed improvements (Nation, 2009a, personal communication; Nation, 2009b, personal communication).

4.8 Noise

4.8.1 Traffic Noise Impact Analysis

As noted in subsection 2.10.1, noise modeling to determine existing and design-year dBA at noise sensitive receivers was not undertaken during Tier One but will be during Tier Two. Rather, residential areas that could approach, meet, or exceed the NAC were identified using available information on the property types along the corridor. Noise-sensitive non-residential noise receptors within 500 feet of the proposed improvements, such as churches, schools, or parks, were also identified (see Exhibits 4-1A through 4-1E, Exhibit 4-9, and Table 4-24).[31] Of the 49 noise-sensitive residential areas and 30 noise-sensitive non-residential receptors identified in the study area, 43 noise-sensitive residential areas and 26 noise-sensitive non-residential receptors were identified along Alternative 203. Alternative 402 has relatively fewer noise–sensitive residential areas (39) and noise-sensitive non-residential receptors (24) adjacent to the proposed footprint. These areas include both single- and multi-family residences, churches, and parks. Roselle, Des Plaines, Elk Grove Village, Medinah, Schaumburg, and Mount Prospect have the highest number of noise-sensitive residential areas for Alternatives 203 and 402. Schaumburg, Itasca, and Elk Grove Village have the greatest number of noise-sensitive non-residential receptors along both proposed corridors.

[31] Other potential noise receptors near the proposed improvements include wildlife species (e.g., migratory birds). Refer to subsection 4.5.2.

TABLE 4-24
Noise-Sensitive Residential Areas and Non-residential Receptors per Build Alternative

	Noise-Sensitive Residential Areas		Noise-Sensitive Non-residential Receptors[a]	
Community	**Alternative 203**	**Alternative 402**	**Alternative 203**	**Alternative 402**
Arlington Heights	1	0	1	1
Bensenville	0	0	1	1
Des Plaines	7	5	2	1
Elk Grove Village	5	5	4	4
Hanover Park	2	2	0	0
Itasca	3	3	6	6
Medinah	5	5	3	3
Mount Prospect	5	3	1	0
Roselle	11	11	3	3
Schaumburg	5	5	4	4
Wood Dale	2	2	1	1
Total	**43[b]**	**39[c]**	**26**	**24**

[a] Non-residential sensitive receptors include parks, schools, and churches.
[b] The number is fewer than the total number of noise-sensitive residential areas per community because three noise-sensitive residential areas are within multiple communities.
[c] The number is fewer than the total number of noise-sensitive residential areas per community because two noise-sensitive residential areas are within multiple communities.

Most of the noise-sensitive residential areas and non-residential receptors along Alternatives 203 and 402 are located along the Elgin O'Hare Expressway/Thorndale Avenue corridor. Additional noise-sensitive areas and non-residential sensitive receptors are located along the Elmhurst Road connection to I-90 included in Alternative 203 and along I-90 improvements included in Alternatives 203 and 402.

Six noise–sensitive residential areas and three non-residential sensitive receptors were identified along Option A (see Table 4-25). These include one concentration of single-family residences south of Green Street and east of York Street, two concentrations of single-family residences on the west side of County Line Road, three concentrations of single-family residences south of I-294, and three parks (Redmond Recreation Complex, Creekside Park, and Maywood Sportsman's Club) on the west side of County Line Road. The one concentration of single-family residences south of Green Street and east of York Street and three concentrations of single-family residences south of I-294 would also be considered noise-sensitive residential areas under Option D. In addition, one park on the west side of County Line Road (Maywood Sportsman's Club) would also be considered a non-residential sensitive receptor under Option D.

TABLE 4-25
Noise-Sensitive Residential Areas and Non-residential Receptors per South Bypass Connection Option

South Bypass Connection Option	Noise-Sensitive Residential Areas	Noise-Sensitive Non-residential Receptors
Option A	6	3
Option D	4	1

4.8.2 Traffic Noise Abatement Strategies

This subsection discusses traffic noise abatement strategies commonly applied to roadway projects. A comprehensive traffic noise impact analysis will occur in Tier Two, which will identify traffic noise impacts and evaluate the feasibility and reasonableness of mitigation measures using the FHWA Traffic Noise Model. Several proven traffic noise abatement strategies, both structural and nonstructural, could be used in combination to reduce the impacts of traffic noise. Traffic noise abatement strategies are discussed below, and traffic noise mitigation techniques are described in subsection 4.13.11. The construction of noise walls is a common method for mitigating traffic noise impacts in urban and suburban areas. Noise walls can absorb or reflect noise. Walls tall enough to break the line of sight from the noise source to the receptor usually are generally capable of achieving a five-dBA reduction in traffic noise levels.

Earth berms are effective for traffic noise mitigation, but they often require much larger areas of land (additional right-of-way) for construction than noise walls. Berms covered with grass, shrubs or small plants are more affective at attenuating traffic noise than harder surfaces.

Traffic noise abatement options must be feasible and economically reasonable. To be considered feasible, IDOT's noise policy requires that traffic noise abatement measures achieve at least an eight-dBA traffic noise reduction. Certain environmental conditions, such as frequent openings for driveways, access roads, recreational trails, or stream crossings, can limit the effectiveness and feasibility of a noise abatement structure. The traffic noise abatement measures must also be cost-effective to be considered economically reasonable. IDOT considers a cost of $24,000 per benefitted receptor a reasonable cost. A benefitted receptor is any sensitive receptor that receives at least a five-dBA traffic noise reduction from the traffic noise abatement option.

Nonstructural traffic noise abatement methods include traffic management plans and comprehensive land use planning. Traffic management plans can limit travel speeds, traffic volumes, types of motor vehicles in use, and time of operation. Traffic noise abatement is not often the primary concern of a traffic management plan, but it is a common ancillary benefit. An efficient and effective traffic noise abatement strategy is to implement an integrated and comprehensive land use plan through local communities and jurisdictions. Land use plans should include noise compatible concepts so that noise sensitive land uses are not located adjacent to highways or are developed so as to minimize traffic noise impacts.

4.9 Visual Resources

4.9.1 Visual Resource Analysis

The analysis of potential impacts to visual resources caused by construction or operation of the proposed improvements was completed based on FHWA's Visual Impact Assessment for Highway Projects (1981). The following criteria were used to assess the visual impact of the build alternatives:

- What are the visual characteristics of the site and the proposed project site/alternative?
- How would implementation of the project affect the visual character of the study area?

- Would the project substantially damage scenic resources, such as trees, wetlands, woodlands, or other landscape features?
- Would the project substantially degrade the visual character or quality of the surrounding areas?
- Would the project create a new source or substantial light or glare that would adversely affect day or nighttime views in the area?
- What major groups (e.g., neighborhoods, vehicle passengers) are likely to see the project? How would the major groups be affected by the various alternatives?

Visual resources are aspects of the environment that determine the physical character of an area and the manner in which it is viewed. Visual resources include scenery viewed at various distances, as well as cultural manmade modifications, vegetation, and other landforms.

4.9.2 Visual Impact Assessment

The study area is generally developed with the exception of protected lands (e.g., forest preserves, parks, etc.). The original landscape has been fully altered and contains suburban/urban development (primarily industrial uses) accompanied by supporting infrastructure (roads, parking lots and driveways), intermixed with urban landscaping, open space (including old fields), or limited forested cover. Much of Thorndale corridor and the western edge of the O'Hare Airport is industrial in nature and characterized by large-scale industrial buildings and warehouses. Similarly, most of the O'Hare West Bypass corridor (both north and south sections, and for both Alternatives 203 and 402) is either industrial or airport-related. One exception is on the north section of Alternative 203, which contains a residential area (east of York Road/Elmhurst Road near IL 72/Touhy Avenue). Most undeveloped lands in the area are surrounded by development and consist primarily of urban open space (e.g., mowed lawn and old field successional areas) and to a lesser extent degraded woodlands. The area is exposed to the scale of transportation development represented by the proposed build alternatives. Thus, its character is somewhat resilient to more hardened manmade features, such as major highway and transit corridors.

The proposed build alternatives generally would maintain the character of the area without creating unusual contrast in landscape, land use, or developed features. Roadway and transit improvements in the Thorndale corridor or on the western edge of O'Hare Airport would be seemingly appropriate and do not give rise to something that does not fit the scene of the study area.

Key locations where the roadway structures will be elevated and visible from nearby areas include I-90 and the north section of the O'Hare West Bypass (both alternatives); the Elgin O'Hare Expressway and the O'Hare West Terminal Interchange (both alternatives); and south bypass connection options and I-294 (both Options A and D). Generally, the viewsheds in the study area are short, with truncated sightlines. The viewsheds would not differ under either alternative, the typical view being largely industrial and commercial development to the other side of the roadway. The exception would be the O'Hare West Bypass (for Alternative 203, both the north and south sections; for Alternative 402, the south section), where vehicle passengers (not necessarily drivers) would have a closer view of airport operations, which tend to fascinate some people.

Overall, the proposed transportation improvements bring more of the same to the study area without causing a major visual disruption to community centers, neighborhoods, or recreational areas. There are some locales for which design treatment are warranted to lessen visual or other human disturbance. For those areas, specific mitigation may be evaluated and addressed in Tier Two of the process.

4.10 Special Waste

Various databases were examined to locate known or potential contamination from regulated substances near the build alternatives. Information used for this analysis was obtained from known federal, state and local environmental databases, which are described below. The databases represent historical records of known special waste sites, spills, or enforcement actions. A Special Waste Assessment (SWA) will be completed in Tier Two to better characterize the likelihood of involvement with special waste sites and determine whether a Preliminary Environmental Site Assessment (PESA) is required. Because right-of-way may be acquired and building demolition and utility relocation would be required, a PESA most likely would be required in Tier Two.

A broad risk assessment was applied to the types of sites encountered. Risks to human and environmental health and estimated cleanup costs were considered. Special waste sites were placed in the following categories:

- **High Risk.** Active Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) sites and Toxics Release Inventory (TRI) sites using volatile organic compounds (VOCs) and engaged in enforcement action or that formerly had hazardous waste processing activity onsite.
- **Moderate Risk**. Archived CERCLIS sites (except those with a No Further Remediation Action Planned designation); RCRA large-quantity generators; leaking UST (LUST) sites not reclassified as non-LUST; Site Remediation Program (SRP) sites; TRI sites using VOCs with no known violations; UST sites; and landfills.
- **Low Risk.** CERCLIS sites with No Further Remediation Action Planned designation; RCRA small-quantity or conditionally exempt generators; LUST sites redesignated as Non-LUST sites; and other TRI sites with no enforcement action.

The database search revealed that each alternative could potentially encounter special waste sites during construction. The potential impacts each build alternative and south bypass connection option would have on such sites are described in the following subsections and shown in Exhibit 4-10.

4.10.1 Hazardous Waste Sites

One active CERCLIS site within the footprint of Alternatives 203 and 402 is considered a high risk site. Two archived CERCLIS sites are within the footprints of Alternatives 203 and 402. They have received a "No Further Remediation Action Planned" status and are characterized as low risk. An archived CERCLIS site is within the footprint of both Options A and D. The site has a "No Further Remediation Action Planned" designation and is characterized as low risk. Nine additional active CERCLIS sites are located within one mile of Alternative 203, and

eight are within one mile of Alternative 402. Nineteen additional archived CERCLIS sites are within one mile of Alternatives 203 and 402. One additional Active CERLIS site is within one mile of Options A and D. Nine more archived CERCLIS sites are within one mile of Options A and D.

4.10.2 Nonhazardous Sites

Alternatives 203 and 402 could affect nonhazardous waste sites in each of the categories listed in Table 4-26, many of which are common to both alternatives. Table 4-26 lists the number of nonhazardous waste sites within the footprints of both alternatives. Alternatives 203 and 402 would involve the same number of high risk sites. Alternative 203 would affect one more RCRA large-quantity generator and four more USTs than Alternative 402. Alternatives 203 and 402 would affect the same number of LUST, TRI, and SRP sites and landfills categorized as moderate risk. Both alternatives would affect the same number of low-risk sites. Although Alternative 203 would affect one more RCRA small quantity or conditionally exempt generator than Alternative 402, Alternative 402 would affect one more LUST site reclassified as non-LUST than Alternative 203. Another 177 LUST sites are within 1,000 feet of Alternative 203; 123 LUST sites are within 1,000 feet of Alternative 402. The preliminary review of readily available special waste information for the alternatives found that Alternative 203 would have slightly greater involvement of special waste sites than Alternative 402.

Options A and D would also potentially involve non-hazardous waste sites, many of which are common to both options. The number of non-hazardous waste sites within the footprints of Options A and D are identified in Table 4-26. Neither option impacts a high risk site. Option A would affect three more moderate risk LUST sites than Option D. Option D would affect ten more USTs than Option A. Option D impacts two TRI sites categorized as moderate risk and one SRP site, whereas Option A does not impact any. Option D would impact four more low risk sites than Option A, specifically three more low risk RCRA sites and one more low risk LUST site. Forty-two additional LUST sites are within 1,000 feet of Option A; 42 additional LUST sites are within 1,000 feet of Option D. The preliminary review of the available special waste data for the area found that Option D potentially impacts more special waste sites than Option A (i.e., ten more moderate risk sites, four more low risk sites). Regardless of the option selected, further evaluation will take place in Tier Two.

TABLE 4-26
Nonhazardous Waste Sites within the Build Alternative and South Bypass Connection Option Footprints

	Alternative 203	Alternative 402	Option A	Option D
High Risk Sites				
TRI sites using VOCs and undergoing enforcement action or formerly had hazardous waste processing activity on site	2	2	0	0
Moderate Risk Sites				
RCRA large-quantity generators	2	1	0	0
LUST sites not reclassified as non-LUST	19	19	12	9
TRI sites using VOCs but not engaged in enforcement action	5	5	0	2
USTs	100	96	21	31
Landfills	1	1	0	0

TABLE 4-26
Nonhazardous Waste Sites within the Build Alternative and South Bypass Connection Option Footprints

	Alternative 203	Alternative 402	Option A	Option D
SRP sites	1	1	0	1
Low Risk Sites				
RCRA small quantity or conditionally exempt generators	49	48	15	18
LUST sites reclassified as non-LUST	1	2	0	1
Other TRI sites not engaged in enforcement action	1	1	2	2

4.11 Construction Impacts

Construction impacts generally would be of short duration and end shortly after project completion. The expected short-term construction impacts associated with the build alternatives are identified below.

4.11.1 Transportation

Access to all properties would be maintained by staged construction, temporary access roads, or other appropriate means. Traffic may be stopped for short periods, temporarily inconveniencing motorists and businesses while construction equipment is moved on or across the highway. Emergency service routes and access for emergency vehicles would be maintained.

Road construction activities would involve lane closures and detours. These activities interrupt normal traffic flow and generally impede travel nearby. Construction on existing roadways would cause greater traffic delay than construction on new alignments. Motorists may experience noise and fugitive dust associated with construction/demolition related activities. These impacts would be temporary and of relatively short duration (i.e., most likely two to three years). Refer to subsections 4.11.3 and 4.11.4.

4.11.2 Water Resources

Construction typically associated with bridges, culverts, and roadway approaches would involve grading, filling, and excavation. These activities increase the erosion potential by the reduction in vegetative cover resulting from soil disturbance by heavy equipment. Placement of structures in streams may increase turbidity (suspended solids) and sedimentation and temporarily alter downstream hydraulics and substrate conditions.

Increased sedimentation during construction could cover natural substrate, thereby affecting habitat for some species of fish, mussels, and macroinvertebrates. The degree of impact would vary based on site-specific conditions, such as the type of crossing structure, stream substrate, stream depth, and stream velocity. To help reduce the release of sediment into the study area streams during construction, the IDOT *BDE Manual,* Chapter 59, Landscape Design and Erosion Control, would be implemented. Compliance with Section 280 of the IDOT *Standard Specification for Road and Bridge Construction*, adopted January 1, 2007, would also be met. Soil

erosion and sediment control measures would be installed in areas of active construction, in particular, near stream crossings, wetlands/waters of the U.S., and drainageways. Disturbance of streamside vegetation would be kept to a minimum. To minimize soil loss and subsequent sedimentation, an erosion and sediment control plan would be prepared as part of the contract documents. Areas of special concern, where erosion and sediment control would be needed, would be identified during subsequent studies.

The project would be subject to the requirements of IEPA's NPDES permit for construction site stormwater discharges. NPDES permit coverage is required when a construction project disturbs one acre or more of total land area, or is part of a larger common plan of development that ultimately disturbs one or more acres of total land area. See subsection 4.14, Permits/ Certifications.

As required by the NPDES permit, a SWPPP would be prepared that identifies soil erosion and sediment control practices to be used throughout the construction process to reduce the discharge of pollutants to receiving waters. Appropriate soil erosion and sediment controls would be implemented onsite and be modified to reflect the current phase of construction. All temporary erosion and sediment control measures would be inspected, maintained, and repaired/replaced, as necessary, to maintain NPDES compliance. The following is a list of BMPs that could be used to improve water quality, reduce soil erosion, and limit the amount of dust created in association with construction activities for the project:

- Storm drain inlet protection
- Stone aprons at flared end sections
- Stabilized construction entrances
- Temporary stabilization (mulching, seeding)
- Rolled erosion control products (erosion control blankets or mats)
- Permanent seeding
- Silt fence barrier
- Temporary ditch checks
- Sedimentation basins
- Diversion dikes/channels
- Preservation of existing vegetation

4.11.3 Air Quality

Demolition and construction can result in short-term increases in fugitive dust and equipment-related particulate emissions in and around the study area. Air quality impacts will be short-term, occurring only while demolition and construction are in progress and local conditions are appropriate. Fugitive dust emissions typically are associated with building demolition, ground clearing, site preparation, grading, stockpiling of materials, onsite movement of equipment, and transport of materials. The potential is greatest during dry periods, periods of intense construction activity, and high wind conditions.

IDOT's *Standard Specifications for Road and Bridge Construction*, Article 107.36, includes provisions on dust control. Under these provisions, dust and airborne dirt generated by construction work would be controlled through dust control procedures or a specific dust control plan, when warranted. The contractor and IDOT would meet to review the nature and extent of dust-generating activities and would cooperatively develop specific types of control

techniques appropriate to the specific situation. Techniques that may warrant consideration include minimizing track-out of soil onto nearby publicly traveled roads, reducing speed on unpaved roads, and covering haul vehicles.

During construction, blowing dust from areas cleared or excavated for access or construction purposes can be minimized by applying water to unpaved areas. The effectiveness of watering for fugitive dust control depends on the frequency of application. Street cleaning would also be used to control dust, as necessary. Paved areas that have soil on them from the construction site would be cleaned as needed, using a street sweeper or some alternative method.

Other construction-related air quality control practices that could be used during construction include diesel emission reduction strategies, such as idling restrictions, diesel engine retrofits for construction equipment, and using clean fuels (ultra-low sulfur diesel, emulsified diesel, compressed natural gas). Equipment-related particulate emissions could also be reduced if construction equipment is well-maintained. With the application of appropriate measures to limit emissions during construction, the project would not cause significant, short-term particulate matter air quality impacts.

4.11.4 Construction Noise

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 proposed improvements would, at some time, experience perceptible construction noise from implementation of the project. To minimize or eliminate the effect of construction noise on receptors, mitigation measures have been incorporated into IDOT's *Standard Specifications for Road and Bridge Construction*, Article 107.35.[32]

The construction of the proposed project could result in temporary noise and vibration increases within and adjacent to the study area. The noise and vibration would be generated primarily from trucks and heavy machinery used during construction and demolition. Any anticipated noise and vibration impacts likely would be confined to normal working hours, periods generally considered to be tolerant of noise and vibration. No adverse noise and vibration impacts are expected during construction.

4.11.5 Solid Waste

The contractor would dispose of grass, shrubs, trees, old pavement, miscellaneous debris, and other solid wastes generated during demolition and construction in accordance with state and federal regulations, as necessary. Waste disposal would follow IDOT's *Standard Specifications for Road and Bridge Construction*, Article 202.03. Nonhazardous and uncontaminated construction and demolition debris would be salvaged to the extent practical.

Solid waste including trash, construction debris, and other items would be collected and disposed of offsite by the contractor. The contractor would be responsible for acquiring the permit required for such disposal. Onsite burning would not be permitted. No solid materials, including building materials, would be discharged to surface waters or wetlands, except as

[32] For example, engines and engine-driven equipment used for hauling/construction are to be equipped with mufflers. Construction within 1,000 feet of an occupied residence, motel, hospital, or similar receptor is restricted to the hours of 7 A.M. until 10 P.M. for most work (excluding operation/maintenance of safety and traffic control devices, construction of an emergency nature, etc.).

authorized (e.g., Section 404 CWA permit, IWPA, etc.). All waste would be collected and stored in approved receptacles. Liquid wastes would not be deposited into dumpsters or other containers that may leak. Receptacles with deficiencies would be replaced as soon as possible, and appropriate cleanup would take place if necessary. Construction debris would not be buried onsite. Waste disposal would comply with all local, state, and federal regulations. Proposed borrow areas, use areas (e.g., temporary access roads, staging/storage areas), and waste areas would follow IDOT's *Standard Specifications for Road and Bridge Construction*, Article 107.22.

Onsite special waste storage, including hazardous waste, would be minimized and would employ labeled, separate special/hazardous waste containers. Nonhazardous waste would be segregated and handled separately. Special and hazardous wastes would be disposed of in the manner specified by local, state, and federal regulations.

Concrete waste or washout would not be allowed to reach a stormwater drainage system or watercourse. Concrete washout would be contained and completed in a designated location. Washout containment facilities would be of sufficient volume to contain all liquid and concrete waste materials, including enough capacity for anticipated levels of rainwater.

4.11.6 Utility Services

Construction work would be coordinated with public utilities to avoid conflicts and minimize planned interruptions of service. When service interruptions are unavoidable, every effort would be made to limit their duration, and every effort would be made to give the public lengthy fair warning of any planned occurrence of service interruption.

4.11.7 Energy

Construction of the proposed improvement would require indirect consumption of energy for processing materials, construction activities and maintenance for the lane miles to be added within the project limits. Energy consumption by vehicles in the area may increase during construction due to possible traffic delays. The number of improvements and the time required to complete them would have a corresponding affect on the fossil fuels consumed. However, in the long term, post-construction operational energy requirements will offset construction and maintenance energy requirements and result in a net savings in energy usage.

4.12 Indirect and Cumulative Impacts

4.12.1 Approach

Potential indirect and cumulative impacts are defined as follows:

> *Indirect effects* are "caused by an action and are later in time or further removed in distance but are still reasonably foreseeable" (40 CFR 1508.8).
>
> *Cumulative effects* "result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (40 CFR 1508.7).

The basis for this analysis is the recognition that while a project has various direct impacts on social and environmental resources, it may also have indirect and cumulative impacts

attributable to the proposed improvements. Regarding the analysis of cumulative impacts, it is recognized that while the impacts of many actions may be individually small, the cumulative effects of past, present, and reasonably foreseeable actions on population or resources can be considerable.

A review of the project-related impacts concluded that the resource analyses for indirect and cumulative impacts are similar to one another. The period for both analyses extends through 2030. The same resources will be discussed for both indirect and cumulative impacts, including effects on regional growth, development patterns and spinoff job creation as well as water quality, wetlands, and biological resources (Table 4-27). The geographic extent of these analyses varies with the resource: socioeconomic effects will be both local (study area) and regional; water resources are evaluated in the context of the study area and relevant watersheds; and wetlands and biological resources are analyzed in terms of local and regional value.

The analysis of indirect impacts considers the effects of the proposed build alternatives, whereas, the analysis of cumulative impacts considers the affects of other past, present, and reasonably foreseeable future actions. Two major projects in the study area are either nearing completion or have been fully disclosed in a recent federal EIS. The projects are discussed briefly here, but no further evaluation of them will be conducted. One major project in the study area is ISTHA's multi-billion dollar Open Road Tolling and Congestion-Relief Program. The project has been under construction for four years and is nearing completion. The program has constructed a system of open road tolling lanes throughout the system that use electronic tolling to minimize the travel delay caused by coin-operated toll plazas. Other improvements include mainline rehabilitation and widening. The remaining elements will be completed in late 2009 and early 2010.

In 2001, the City of Chicago announced the multi-billion dollar modernization of O'Hare Airport. The OMP includes placing six runways in an east-west orientation consisting of four new runways and the extension of two existing runways. Supporting the new runway configuration would be numerous enabling projects consisting of relocating roads, railroads, cargo buildings and utilities, and constructing new navigation aids, utilities, electrical vaults, stormwater detention, air traffic control towers, and others. The program includes a new terminal on the west side of the airfield that would include connecting transportation improvements, such as extension of the people mover, CTA Blue Line, and access to local roads and the proposed O'Hare West Bypass and Elgin O'Hare Expressway. Construction of the OMP EIS began in 2005. Thus far, most of the Phase I projects have been completed, including two new runways, a runway extension, a new air traffic control tower, relocation of a road and guard post, relocation of a railroad and two waterways, three new stormwater detention basins, new electrical vaults, and numerous utility and navigation aid improvements. Design work has begun for the second half of the program (Completion Phase), and the overall program is expected to be completed within five years.

Whereas ISTHA's Open Road Tolling Program is close to completion, and the indirect and cumulative impacts of the OMP are fully disclosed in that project's Final EIS (*O'Hare Modernization Final Environmental Impact Statement,* November 2005), those projects will not be evaluated further. The following major actions are planned to occur in the study area during the same period as or immediately following the EO-WB EIS:

- ISTHA's Congestion Relief Program (2012–2015)
  - Widening I-90 from its intersection with I-294 to Elgin Toll Plaza (just west of IL 31), with accommodation for the proposed Metra commuter rail STAR Line proposal. Roughly 12 miles of the project is within the study area; the remainder extends to the west.
  - Reconstructing the I-90/IL 53 system interchange with improved geometry and directional ramps to reduce congestion. The project is entirely within the study area.
  - Implementing the green lane concept on area tollways (devoting lanes to certain vehicles to encourage carpooling, using more environmentally responsible vehicles, and reducing emissions). Existing tollways within the study area are candidates for green lane implementation.
- The Metra STAR Line (2015-2018)—A new commuter rail project proposed in the I-90 corridor from Rosemont to Hoffman Estates with station locations throughout the route. About 12 miles of the route is within the northern part of the study area.

These actions are reasonably foreseeable, given their stage of planning and development. The cumulative effects of these actions are considered in this analysis.

In the analysis of indirect and cumulative effects, key resources are characterized in terms of their response to change; stresses imposed on them; their capacity to withstand these stresses; the pertinent regulations that may protect them, and their current status (baseline condition). This information is summarized in Tables 4-27, 4-28, and 4-29.

TABLE 4-27
Potential Cumulative/Indirect Effects

	Resources, Ecosystems, Human Communities	Potentially Important from Perspective of Cumulative or Indirect Effects
Land Use	a. Relationship between land use and transportation – consistency with local plans b. Socioeconomic c. Impacts to racial, ethnic, and special groups	a. Facilitate already established growth trends, consistency with plans of local communities and development patterns b. Population and employment growth, changing community cohesion, building displacements c. Environmental justice effects – Assess whether there would be disproportionate impact to minority and low income groups
Wetland resources	a. Wetlands	a. Degradation or loss (erosion/sedimentation, filling), fragmentation, increased volumes of water due to increased impervious areas, increased pollutant loads, and potential loss of biological resources
Water resources	a. Water quality	a. Sedimentation; pollutant loading (e.g., salt from deicing; oil, grease, heavy metals, suspended solids, and debris from demolition/construction activities, traffic operations, and maintenance); altered hydrology; potential impact to designated water uses

TABLE 4-27
Potential Cumulative/Indirect Effects

	Resources, Ecosystems, Human Communities	Potentially Important from Perspective of Cumulative or Indirect Effects
Biological resources	a. Flora and fauna diversity b. Habitat fragmentation c. Potential threatened and endangered species d. Intrusion into special lands (e.g., nature preserves, forest preserves) e. Tree loss during construction	a.–e. Habitat loss, degradation of habitats, and impacts to plant and animal populations from construction and/or ongoing operation/maintenance activities

TABLE 4-28
Cause and Effect for Resources, Ecosystems and Human Communities

Resource	Cause of Change	Potential Effect of Change
Land use/ socioeconomic	Growth, accompanied by new transportation, residential, commercial, industrial, and service-oriented development.	Within the study area, existing land use patterns are retained with updated features (i.e., aging development gives way to new industrial and commercial business model). Outside the study area, the economic vitality of the study area promotes infill or expansion of development into open land. This potential outward movement of development brings with it infrastructure demands necessary to support a growing population base.
Water resources and wetlands	New development, with increased impervious surface area. Stormwater runoff during construction and operation. Stream channel erosion. Salt spray and other nonpoint source pollution.	Degradation of surface and groundwater. Higher discharge of runoff. Stream channel erosion. Reduced groundwater recharge rates. Increased demand on water supply. Wetland degradation, fragmentation, and loss. Altered hydrology. Sediment transport and pollutant loading. Deterioration of recreational water bodies. Litter and refuse.
Biological resources	Highway and transit construction. Urban development.	Loss of open space and potential habitat. Wildlife mortality. Reduced biological diversity. Habitat degradation.

TABLE 4-29
Affected Environment

Resource	Response to Change	Stresses	Capacity to Withstand Stress	Regulatory Thresholds	Baseline Condition
Land use / socio-economic	Increase in development or redevelopment. Changes to population and employment.	Water resources, air quality, noise pollution. Employment changes due to business displacements or relocations.	Regulations and standards are used to minimize adverse effects. Municipal planners encouraging infill growth and redevelopment, and growth near transportation.	County and municipal zoning and land planning ordinances. Long-range infrastructure planning provided by IDOT, ISTHA, county, and others, to improve transportation service.	Area is 90+ percent developed, so most change would result from redevelopment of older commercial or industrial areas. Municipalities have plans to take advantage of improved transportation access resulting from improvements. Most forecast population, household, and employment growth will occur regardless of major transportation improvements.
Wetlands	Direct impacts: loss of wetlands and habitat fragmentation. Indirect impacts: altered hydrology and degradation of plant communities.	Additional development and redevelopment may cause increased impervious area.	Mitigation for wetlands compensates for lost wetland acreage.	IDNR and USACE enforce wetland mitigation requirements for projects subject to federal and state jurisdiction.	3,828 acres of mapped wetlands in the study area. Wetland impacts have been compensated through mitigation (e.g., adjacent to the Elgin O'Hare Expressway, etc.).
Water resources	Increased hydrocarbon, chloride, and heavy metal concentrations in streams. Increased erosion and sedimentation from construction and operation, and from installation of associated infrastructure and utilities.	Increased impervious area results in increased salt use and stormwater runoff during construction and operation/ maintenance of proposed improvements.	The use of BMPs for all aspects of project development would minimize pollutant and sediment concentration in runoff. Project engineering plans must incorporate natural drainage measures and BMPs designed to reduce erosion, runoff, and pollutant loads.	All streams fall under the General Use Water Quality Standards. IEPA provides water quality certification under Section 401 of the CWA, which is mandatory for all projects requiring Section 404 CWA permits. Safe Drinking Water Act protects municipal water sources from contamination.	Stream quality has been steadily improving since implementation of the CWA, and enforcement by the USACE, USEPA, IEPA, and other local programs.
Biological resources	Impacts to vegetation, wildlife, and their habitats.	Development, redevelopment, and transportation improvements.	Design considerations that would modify the transportation system, thereby minimizing or avoiding resource impact. Streams/rivers would not be impeded and riparian corridors would not be fragmented, thereby allowing wildlife movement along waterway corridors.	Endangered Species Act; Migratory Bird Treaty Act (USFWS/IDNR).	Species are concentrated in protected areas.

4.12.2 Indirect Effects

This section evaluates the potential for indirect effects in the study area.

4.12.2.1 Socioeconomic Effects

Subsection 4.1.1 presents the changes in population, household, and employment forecast for each alternative. Subsections 4.1.2, Displacements, and 4.1.5.5, Tax Revenues, present the direct impacts associated with the relocation of residents and businesses, and the corresponding loss in tax base associated with the alternatives under consideration. Subsection 4.1.4, Environmental Justice, evaluates if any of the impacts disproportionately impact minority or low-income communities. Both build alternatives would induce additional growth in employment beyond what is forecast under the No-Action Alternative. Both build alternatives would also lead to slight increases in population and households, over the No-Action Alternative. As indicated in Table 4-1, in 2006, the study area population was 509,900, and there were an estimated 569,500 jobs in the study area (CMAP, 2006). This area within the metropolitan Chicago region has a vibrant economy containing established residential areas and a solid employment base. It is expected that the study area will continue to maintain its competitive position and serve an important role in the larger Chicago economy, in terms of both housing and jobs.

The employment forecasts for the study area reinforce the notion that the study area will continue to attract new businesses. Most growth in employment is forecast to occur regardless of the proposed project: the 2030 forecast under the No-Action Alternative expects an increase of 80,100 jobs (or a 14.1 percent increase over 2006 jobs). Under Alternative 203, there would be an additional 62,500 jobs (over baseline) in the study area, while under Alternative 402, there would be an additional 48,500 jobs (over baseline) in the study area.

Steady population and household increases are forecast over the 20-year period. The percentage increase in population and households is not expected to be as high as employment over the same period. This could be because as the area's industrial base is enhanced by improved transportation, residential use may no longer be the highest and best use for some properties in some areas, and conversion to other land uses may occur. Population between 2006 and 2030 under baseline conditions (i.e., regardless of this proposed transportation improvement) is forecast to increase in the study area by 27,720 people and 3,650 households. This translates to a 5.4 percent population increase and 1.8 percent increase in households. If Alternative 203 were to be constructed, an additional 3,170 people and 4,900 households are forecast to live in the study area, as compared to an additional 1,420 people and 4,300 households under Alternative 402.

Section 4.1.5.2 explains the direct economic effects from construction of the proposed alternatives. In addition to the direct effects, the transportation investment will indirectly benefit the economy and increase economic output throughout various economic sectors. Construction of the project will effect the roadway construction sector by increasing demand for locally produced materials needed for construction, such as concrete, wholesale and retail trade items, rebar, and other construction materials. This will affect suppliers of those products. Other sectors of the economy would be benefited by employees hired in the

highway construction industry who may increase their expenditures in restaurants, grocery stores, and shops.

In addition to the direct creation of jobs in the highway construction industry (an average of 9,200 per year for the three years of construction), Alternative 203 would indirectly lead to the creation of a total of 21,600 jobs per year for the three years of construction in other industries in the region. Alternative 402 would result in creation of 7,000 jobs per year in the highway construction industry, and would indirectly lead to a total of 16,600 jobs annually in the region.

The indirect effects of the proposed road improvements, and resulting improved transportation access, are anticipated to lead to increased population, households, and employment in the study area. While residential and business displacements would occur as a result of the project, the proposed roadway will spur development of remaining vacant parcels as well as redevelopment of underused parcels. Roadway construction itself will lead to indirect, or spinoff, jobs, and spending in the region.

4.12.2.2 Water Quality

The EO-WB study area is within the Des Plaines River Watershed, which is divided into seven smaller watersheds. Five streams that would be crossed by the build alternatives — Addison Creek, Higgins Creek, Salt Creek, Spring Brook, and Willow Creek—are 303(d) impaired streams (IEPA, 2008a). Impairment may be the result of chloride, fecal coliform, phosphorus, DO, or other signature highway runoff pollutants, such as heavy metals and TSS. The six core communities in the EO-WB study area comprise predominantly urban and built-up land with a high concentration of industrial and commercial use (Table 2-6). The built-up nature and use of the area has contributed to the degradation of its streams through various sources such as urban runoff, storm sewers, MPSDs, upstream impoundments, or channelization/streambank modification.

Increased traffic and impervious surfaces will result from recently completed transportation infrastructure improvements and from those proposed within the EO-WB study area over the next 20-year period. The increased traffic and impervious surfaces could result in additional pollutants being deposited on the roadways. Through normal operations, such as tire wear, vehicles contribute constituents to roadway surfaces. During storms, these constituents could be transported to receiving waters and cause an indirect effect on the aquatic ecosystem or designated uses of the creeks in the study area. Potential impacts from pollutants in roadway stormwater runoff include the following:

- Nutrient enrichment/eutrophication: High nutrient levels (nitrogen and phosphorous from atmospheric deposition and fertilizers) in lakes and slow moving creeks can cause excessive algal blooms, which can affect water quality, recreation, and aesthetics.
- Toxicity to aquatic life: Toxicants such as heavy metals, pesticides, and other organic compounds may affect aquatic organisms. Adverse impacts may result from chronic exposure and bioaccumulation of pollutants. Dissolved oxygen may be reduced to dangerous levels in the aquatic environment as a result of organic matter decomposition.

- Sediment contamination: Bottom substrates in the aquatic environment accumulate contaminated sediment that could interfere with the reproduction and feeding mechanisms of aquatic organisms, such as fish. Contaminated sediments may be toxic to some organisms because of elevated pollutant concentrations. Sediments can have a relatively high organic content, that when "broken down," exert an oxygen demand.
- Bacterial contamination: Following storms, water quality standards for fecal coliform bacteria frequently are exceeded in urban waters, including the streams in the EO-WB study area (see Table 2-15). This generally reflects the presence of a significant amount of animal or human waste in the water.
- Salt contamination: The use of salts for deicing may raise salt concentrations in receiving waters. High salinity levels may adversely affect sensitive floral communities, particularly wetland plants. Road salt runoff can stress wetland plant communities and may result in a reduction of native plant diversity and replacement by more salt tolerant plant species. Runoff-related salt concentrations in receiving waters usually are not high enough to kill fish and other aquatic organisms.
- Impaired aesthetics: Turbid water, trash, debris, and an oily sheen may reduce the visual appeal of waterways, affect recreational potential, and harm wildlife.
- Elevated water temperatures: Several factors can increase summertime water temperatures, such as the removal of overhanging vegetation, reduction of base flows, and runoff from impervious surfaces that have been heated by the sun. Higher temperatures can stress aquatic life and raise water quality issues.
- Impairment of water supplies: Pollutants have the potential to adversely affect surface and groundwater sources of water supply. See subsection 4.2.1 for a discussion on potential impacts to groundwater resources (USDA NRCS and IEPA, 2002).

Induced secondary development could take place in the same watersheds as the build alternatives, including adjacent to the creeks that would be affected by the collective transportation infrastructure improvements within the EO-WB study area. Additional development could indirectly add to potential impacts resulting from the construction, operation, and maintenance of the build alternatives.

Stormwater quality control would be accomplished through the NPDES Phase II General Permit No. ILR40, including incorporation of TMDLs to address impairments in affected watersheds, such as the Salt Creek Watershed. Parts of the build alternatives are within the Salt Creek, Addison Creek, or West Branch DuPage River watersheds, which have TMDLs for chloride and/or DO. In addition, a Stage 1 TMDL Report addressing chloride, DO, and fecal coliform has been prepared for Higgins Creek. A TMDL is also in the first stage of development to address fecal coliform in Addison Creek, Salt Creek, and the West Branch DuPage River.[33] Water quality would be managed through a combination of stormwater runoff and drainage collection facilities and the implementation of other post-construction BMPs in accordance with state and federal water quality goals of restoring water quality of the impaired/degraded

[33] In addition to fecal coliform, TMDLs are also being prepared for the following impairments associated with stream segments near the proposed EO-WB improvements: pH (Salt Creek); DO and manganese (West Branch DuPage River) (AECOM, Inc., 2009b).

streams. Refer to subsection 4.2.2.2 for discussion pertaining to water quality BMPs. As discussed in subsection 4.2.2.3, chlorides can stress wetland plant communities and may reduce native plant diversity. BMPs to reduce chloride loads could include storage and handling operations and consideration of alternative nonchloride products.

4.12.2.3 Wetlands

Most of the study area is developed land, and most of the wetlands in the study area are within special lands. There are more than 3,828 acres of mapped wetlands within the study area. Of that total, 71 percent are within special lands, such as forest preserves. Wetlands are protected by federal, state, and local (e.g., DuPage County) regulations. In the study area, loss of wetlands can generally be attributed to urban development. Wetlands filled for development purposes will be mitigated for as required under Section 404 of the CWA and other state and local regulations. Therefore, induced development is not expected to affect the total number of wetlands within the study area, since projects prompted by the proposed EO-WB improvements would tend to avoid or minimize wetland impacts to meet regulatory requirements and to keep from incurring compensatory wetland mitigation costs.

Indirect impacts could also include potential wetland degradation, as a result of point source and nonpoint source pollution. Pollution could adversely impact sensitive floral communities, particularly wetland plants. Polluted runoff may result in a reduction of wetland native plant diversity and establishment of adventive (nonnative) plant species.

4.12.2.4 Biological Resources

Land development usually displaces biological resources. Except for special lands, such as forest preserves and parks, the remaining biological resources in the study area generally are confined to isolated areas and would continue to be isolated from other habitat areas. Habitat fragmentation involves dividing larger continuous habitat (such as woodlands and old fields) into smaller habitat patches. Transportation projects and other development induced by the EO-WB improvements could cause additional fragmentation, loss of habitat and, increased competition in remaining natural areas. Fragmentation can reduce habitat function and value and may result in differences in predation, interspecific competition, and prey availability. Preservation of special lands can reduce fragmentation by protecting habitat resources.

While these indirect effects are likely with the EO-WB improvements, unlike wetlands, there is little regulatory protection for habitat types, such as wooded areas and old fields, unless they are jurisdictional wetlands, are located in special lands, or provide critical habitat for threatened or endangered species.

4.12.3 Cumulative Effects

4.12.3.1 Socioeconomic Effects

The potential for induced economic effects from construction of the proposed build alternatives is substantial for the region and is even more prominent when considering the combined, or cumulative, effects of the other reasonably foreseeable actions in the area. Cumulative economic effects were estimated using IMPLAN PRO and considered roadway improvements to be constructed between 2012 and 2015, transit improvements planned

between 2012 and 2027, the Tollway Congestion Relief Program to be constructed between 2012 and 2015, and the STAR Line Project to be constructed after the EO-WB and Tollway Program between 2015 and 2018. Table 4-30 details the results of the analysis. Alternative 203, with its higher investment in construction than Alternative 402, results in more value added, jobs created, and total output and taxes than Alternative 402.

TABLE 4-30
Cumulative Economic Impacts from Build Alternatives Construction per Year

	EO-WB, Tollway Program, and Transit Improvements Associated with a Build Alternative (2012–2015)		STAR Line Project and Transit Improvements Associated with a Build Alternative (2015–2018)		Transit Improvements Associated with a Build Alternative (2018–2027)	
	203	**402**	**203**	**402**	**203**	**402**
Construction costs per year	1.8B	1.5B	$170 M	$161 M	$29 M	$17 M
Total construction costs	$5.3 B	$4.5 B	$520 M	$480 M	$260 M	$150 M
Value added per year	$2.3 B	$2.0 B	$230 M	$210 M	$39 M	$22 M
Total value added	$7.1 B	$6.0 B	$670	$630 M	$340 M	$200 M
Direct jobs[a] created per year	13,300	11,000	1,300	1,200	200	130
Total jobs[b] created per year	31,400	26,200	3,000	2,800	500	300
Total output	$12.9 B	$10.7 B	$1.2 B	$1.1 B	$660 M	$370M
Total taxes per year	$560 M	$470 M	$53 M	$49 M	$9 M	$5 M

[a] These are jobs related to construction of the transportation improvement.
[b] These include jobs in all sectors of the economy that are created as a result of the initial investment.

Cumulative economic impact from construction of Alternative 203 combined with the Tollway Program and transit improvements would result in $1.8 billion per year in construction costs (or $5.3 billion over the three-year period 2012 to 2015). This would lead to a creation of 13,300 jobs per year in the highway construction industry directly and a total of 31,400 jobs per year in the region. These projects would cumulatively increase jobs in the region for the highway industry by 22 percent per year.

Total value added (the net measure of the economic contribution of an industry to the regional economy less the intermediate goods and services used) would be an estimated $2.3 billion annually and $7.1 billion over the three-year period. Estimated total sales volume, as measured by total output, would be $12.9 billion over three years.

Federal and non-education state and local taxes generated in the region from these projects are estimated to be $560 million per year or $1.7 billion over three years.

Alternative 402, combined with the Tollway Program and transit improvements, would result in $1.5 billion per year in construction costs (or $4.5 billion over the three-year period). This would lead to creation of 11,000 jobs per year in the highway construction industry and a total of 26,200 jobs per year in the region. These projects would cumulatively increase jobs in the region for the highway industry by 18.4 percent per year.

Total value added would be estimated at $2.0 billion per year, and $6.0 billion over the three-year period. Total sales volume as measured by total output would be $10.7 billion over three years. Federal and non-education state and local taxes generated in the region

from the project are estimated to be $470 million per year or $1.4 billion over the three-year period.

It is expected that the STAR Line Project would commence immediately following construction of either Alternative 203 with the Tollway project or Alternative 402 with the Tollway project. The combination of the STAR Line Project with transit improvements associated with Alternative 203 would have total construction costs of $520 million over the three-year period 2015 to 2018. This results in expenditures of $170 million per year and creates 1,300 jobs per year in the highway construction industry and 3,000 jobs per year in the region.

Total value added is estimated at $230 million per year and over $670 million over the three-year period. Total sales volume as measured by total output is $1.2 billion over the three-year period. Federal and non-education state and local taxes generated in the region from the project are estimated to be $53 million per year or $159 million over the three-year period.

The combination of the STAR Line Project with transit improvements associated with Alternative 402 would have total construction costs of $480 million over the three-year period 2015 to 2018). This results in expenditures of $161 million per year and creates 1,200 jobs per year in the highway construction industry and 2,800 jobs per year in the region.

Total value added is estimated at $210 million per year and over $630 million over the three-year period. Total sales volume as measured by total output is $1.1 billion over the three-year period. Federal and non-education state and local taxes generated in the region from the project are estimated to be $49 million per year or $147 million over the three-year period.

Transit Improvement Construction costs between 2018 and 2027 are estimated to total $260 million for Alternative 203 and $150 million for Alternative 402. This results in an expenditure of $29 million per year for Alternative 203 and $17 million for Alternative 402.

The Transit Improvement Costs for Alternative 203 are predicted to generate 200 jobs in the highway construction industry each year and 500 total jobs per year in the region between 2018 and 2027. Total value added is estimated to be $39 million per year for a total of $340 over the nine-year period 2018 to 2027. Total sales volume as measured by total output is $73 million per year or $660 million over the nine-year period. Federal and non-education state and local taxes generated in the region from the project are estimated to be $9 million per year or $81 million over the nine-year period.

The Transit Improvement Costs for Alternative 402 are predicted to generate 130 jobs in the highway construction industry each year and 300 total jobs per year in the region. Total value added is estimated to be $22 million per year for a total of $200 over the nine-year period 2018 to 2027. Total sales volume as measured by total output is $41 million per year or $370 million over the nine-year period. Federal and non-education state and local taxes generated in the region from the project are estimated to be $5 million per year or $45 million over the nine-year period.

The total construction costs for Alternative 203 including the Tollway Project, the transit improvements and the STAR Line Project are estimated to be $6.1 billion in 2009 dollars.

Total Value Added for the life of the construction project (2012–2027) is estimated to be $8.1 billion in 2009 dollars. Total sales volume as measured by total output is $14.8 billion. The maximum number of jobs created will be in the initial years with 13,300 in the highway construction industry and 31,400 within the regional economy and then taper off during the following two construction periods.

The total construction costs for Alternative 402 including the Tollway Projects, the transit improvements and the STAR Line Project are estimated to be $5.1 billion in 2009 dollars. Total Value Added for the life of the construction project is estimated to be $6.8 billion in 2009 dollars. Total sales volume as measured by total output is $12.2 billion. The maximum number of jobs created will be in the initial years with 11,000 in the highway construction industry and 26,200 within the regional economy and then taper off during the following two construction periods.

Potential cumulative effects to land use relate to the location of the proposed corridors relative to the development patterns within each community and consistency with the various communities' long-range land use plans. Other potential cumulative effects include creation of a physical barrier (real or perceived) through communities. Carefully planned roadway improvements can foster beneficial results, such as making the community more cohesive, and serving future growth and planning policies. Lack of careful planning, however, can have undesirable effects, and may even create barriers that would cause adverse travel and disadvantage the business connections within a community.

Extension of the Elgin O'Hare Expressway and construction of a West Bypass are consistent with local, county, and regional plans (see discussion of consistency with land use plans, Section 4.1.3.1). Combined, these plans sustain existing uses throughout the analysis area with a responsible level of open space preservation, as evidenced by the fact that nearly 20 percent of the land in the study area is preserved in forest preserve, park, and other open space uses. Further, the proposed alternatives have been located to avoid impact to those lands. The community plans have recognized and incorporated an upgraded facility type along Thorndale Avenue as well as a new high-type facility on the west side of O'Hare Airport that would connect between I-294 and I-90, and have planned for land uses that each community deemed would be compatible with a higher-type roadway in these corridors. These communities recognize the importance of industrial and warehousing uses as an essential component of their economic base, and their goals are to preserve these uses as well as enhance their competitive position through continued updates and upgrades. For example, the villages of Bensenville and Wood Dale have recently commissioned planning studies to further take advantage of the new roadway facility as it relates to their redevelopment opportunities. These studies have targeted areas within the communities that are ripe for redevelopment, the object being for those areas to take full advantage of improved access and the changing conditions.

Generally, higher type roadways can lead to higher type uses. A freeway can provide an improved entrance/image throughout a corridor compared to a non-freeway facility. Development seeking high visibility and superior access tends to be located adjacent to freeways to improve competitive position. Industrial facilities rely on good truck access with easy movement to and from freeways. Generally, industrial developments do not require a first tier location (i.e., directly adjacent to a freeway), but one that may be a property or two removed. Thus, a hierarchy of land use type occurs with development that

requires the highest visibility to be adjacent to a freeway type facility, and industrial uses located beyond. Thus, the new proposed freeway type facilities throughout the study area under either Alternative 203 or Alternative 402 would likely create a higher investment potential for properties adjacent to the freeway, and may lead to the conversion from industrial/warehousing uses to other business uses that benefit from good access and high visibility (such as office and commercial uses).

The potential for the proposed improvements to create the undesirable effect of a community barrier was examined for both alternatives and the south connection options. Under both alternatives, the westernmost part of the Elgin O'Hare Expressway (between Gary Avenue and I-290) is a freeway. Some of these lands were developed before the roadway was built, but for the most part, land uses have evolved to take into consideration the benefits of the freeway, including access and high visibility. The proposed improvements through this segment of the roadway would not lead to any further community barrier effects.

Under both alternatives, the Thorndale Avenue corridor (from I-290 to the O'Hare West Bypass) would be upgraded from an arterial to a freeway. Thorndale Avenue has always been a major east-west travel route and a heavily traveled roadway. Any barrier—actual or perceived—that the roadway presents will remain when the arterial is upgraded to a freeway. However, when upgraded, frontage roads and grade-separated crossings will provide for local access along and across the corridor. Thorndale Avenue is already a major transportation corridor, but development as a freeway will further define it as a transportation corridor. The potential barrier effects of the facility would be mitigated with local access along and across the facility to satisfy north-south travel and access to adjacent land uses, thus minimizing its effect as a barrier to existing conditions.

For the O'Hare West Bypass segment, the location of Alternative 203 is in the best possible location to avoid community barrier effects. Its location on the western edge of O'Hare Airport property avoids conflict with the proposed O'Hare Modernization Program improvements, and minimizes displacement of valued industrial and commercial properties in Elk Grove Village, Des Plaines, Bensenville and Franklin Park. Further, it is geographically on the edge of the airport and respective communities, and forms a logical boundary between the airport and communities. The location of the bypass also avoids alterations to community travel patterns that would impair emergency response, school bus routes or community travel to town and activity centers. In the case of Alternative 402 (an arterial improvement along York Road/Elmhurst Road), the boundary would be less defined. The north leg of the West Bypass as an arterial potentially leads to community uncertainty about further advances of airport development and potential incompatibility with community land uses.

Options A and D have distinct differences related to creating barrier effects. Option D would be less disruptive than Option A. Option D parallels a rail line through an industrial area that already imposes a north-south barrier. In some ways, Option D would actually reduce the barrier effects in the area, with improved local access to and from freeway facilities. Option A, which parallels County Line Road, would bisect industrial and residential developments that span both sides of the roadway. Whereas a barrier between less compatible uses (e.g., residential and commercial) may have some advantages, the proximity to residential development raises concern about noise and air quality impacts.

The cumulative effects of these projects are expected to affect land use change in the study area. The effects would be most prominent near the improvements where maximum travel benefit is derived. Whereas the combined development of projects would displace residences and businesses, they would also spur investment in private development. Industrial and commercial land uses alike recognize the intrinsic value and competitive advantage of better transportation and access. Therefore, underused or underdeveloped properties in the area would be candidates for reinvestment, with greater employment opportunities and tax base to the affected communities. Continued increases in employment in the study area are the most likely scenario, and population growth stimulated by these foreseeable actions would most likely occur elsewhere in the region. Because the area is the location of extensive commercial and industrial development, it is expected that existing land use patterns will remain the same with the development of more modern facilities, replacing aging structures.

4.12.3.2 Water Quality

The transportation infrastructure improvements that have recently been completed or are proposed within the EO-WB study area over the next 20 years may affect land uses in the study area and could potentially result in cumulative water quality impacts. Most of the six core communities in the EO-WB study area have predominantly urban and built-up land uses. Exceptions include preserved open space associated with forest preserves and municipal parks. Additional development through infilling and selective redevelopment of vacant land is expected to occur. Areas that are unprotected open, underdeveloped, or underused space may be developed to take advantage of better transportation and access. These effects would be most noticeable in close proximity to the improvements. Additional impervious surfaces may be constructed as part of the anticipated development. When undeveloped land is converted to impervious surfaces, the stormwater runoff typically increases and infiltration decreases. Operation and maintenance of additional impervious surfaces would result in the deposition of additional pollutants. Pollutant concentrations are highly variable and can be affected by numerous factors, such as construction, operation, maintenance, weather, and adjacent land uses. Pollutants that accumulate on impervious surfaces could be transported to receiving waters in runoff.

Increased development patterns affect water quality of streams by contributing increased stormwater runoff and wastewater discharges. Most of the assessed surface waters in the study area are impaired or degraded, are inhabited by relatively pollution tolerant species, have been channelized or modified, and are surrounded by developed or mowed overbanks, with forest preserve areas generally being an exception.

If the trends of the past continue, water quality in the study area watersheds (and the region) may continue to degrade, and as more streams are assessed for water quality impairments, the 303(d) list of impaired waters likely will grow. The biological integrity and diversity of streams in the larger Des Plaines River Watershed would continue to decline. For example, the Salt Creek Watershed, in both Cook and DuPage counties near the center of the EO-WB study area comprises roughly 44 percent its total acreage. Rapid urbanization of the Salt Creek Watershed started around the 1950s. In the years that followed, human activities (land development/construction, land use, etc.) placed an overwhelming strain on the watershed. Several factors, such as increased impervious area, floodplain encroachment, loss of natural

storage area, channel modification, and pollutant discharges resulted in increased stormwater runoff, flooding, and stream degradation.

Since the 1970s, various environmental regulations (at the federal, state, and local levels), flood control projects, and public awareness/activism have played a role in improving water quality and flooding. Various federal, state, and local regulations, such as the federal CWA and the DuPage County Countywide Stormwater and Flood Plain Ordinance, are controlling the effects of development upon water resources.[34] For waterways located proximate to the EO-WB build alternatives, a TMDL has been prepared for the Salt Creek Watershed[35] and for the West Branch DuPage River (CH2M HILL, 2004b). TMDLs by themselves will not lessen future degradation, but with regulatory oversight and implementation of BMPs, water quality in subwatersheds and the larger Des Plaines River Watershed should improve.

For example, in response to the Salt Creek and West Branch DuPage River TMDLs, an active watershed group was formed. The watershed group continues to develop recommendations and actions to improve water quality in Salt Creek and the West Branch DuPage River. In addition, segments of four waterways in the study area—Addison Creek, Salt Creek, West Branch DuPage River, and Higgins Creek—are in the first of three stages of TMDL development to address additional impairments, such as fecal coliform (IEPA, 2008a). If appropriate BMPs are implemented and properly applied, water quality throughout the influence area may improve, even with more development.

Development can also result in an increase in the rate and volume of stormwater runoff and a reduction in groundwater recharge. Stormwater typically is managed on a project-by-project basis. Stormwater controls function independently and primarily reduce peak storm flow rates for larger storms (some allowable release rates account for smaller, more frequent storms), or potential impacts associated with the total storm volume may not be accounted for. If not managed appropriately, this could result in increased flooding, streambank erosion, and higher, more frequent storm-related flows, and lower and longer duration low flows in streams as a result of cumulative urban development. The increased runoff rates and high channel velocities may result in excessive bank erosion or channel downcutting. Stream substrates and bottom-dwelling/benthic organisms can be scoured away by frequent high flows/velocities. Pollutants may concentrate during periods of lower flow. Extended periods of low flow may also result in higher in-stream temperatures during the summer that could affect fish or other aquatic wildlife (USDA-NRCS and IEPA, 2002).

Detention would be provided to compensate for the increase in impervious area associated with the EO-WB build alternatives and other planned infrastructure projects in the study area, as necessary. To minimize cumulative impacts, BMPs to consider in the Tier Two environmental studies would allow for a watershed approach to stormwater management that integrates both water quantity and quality control, as practicable. BMPs would be designed to reduce the occurrence of flow control problems or minimize the chances of problems becoming worse. BMPs would be designed to incorporate TMDLs or to treat other

[34] The Metropolitan Water Reclamation District of Greater Chicago is preparing a countywide watershed management ordinance for Cook County.

[35] The Salt Creek TMDLs address segments of the following waterways within the study area: Salt Creek, Addison Creek, Spring Brook, Meacham Creek, Busse Woods Lake (CH2M HILL, 2004a).

pollutants that have been identified as stressors of concern to reduce effects of water quality impairment sources, such as chlorides, in the respective watersheds (National Research Council, 2008).

Several forest preserves within the study area are located in the floodplain or were purchased by forest preserve districts for flood control/stormwater quantity and quality improvements. This was accomplished through floodplain acquisition, construction of reservoirs and stormwater facilities, preservation of wetlands and riparian habitat, and public education and awareness opportunities. BMPs could also minimize the cumulative impacts of development.

Of the major transportation projects proposed in the next 20 years within the study area, the EO-WB project is expected to break ground first. As such, it could be used as a model to develop stormwater quantity and quality BMPs that could be applied to other infrastructure projects in the larger Des Plaines Watershed or northeastern Illinois. As part of the EO-WB improvements, a BMP manual that incorporates the stormwater BMPs could be developed. The BMP manual would be applied to the Tier Two design and construction phases of the EO-WB improvements and could serve as a prototype for other transportation projects to minimize cumulative water quality impacts in the EO-WB study area and to the downstream environment. Mitigation measures would be provided to compensate for acknowledged unavoidable impacts and to minimize cumulative effect (see subsection 4.13).

4.12.3.3 Wetlands

Suloway and Hubbell (1994) estimated that more than 90 percent of Illinois' original eight-million acres of wetlands have been destroyed by human modification. Wetlands once covered more than 23 percent of Illinois. Wetlands and deepwater habitats now make up less than five percent of Illinois land. Wetland degradation in Illinois and the study area historically was associated with agriculture, but recent degradation is attributed to urban development.

From a broader perspective, it is expected that the cumulative loss of wetland acreage to development in Cook and DuPage counties will slow in the future. Past wetland loss due to urban and agricultural development has lead to a reduction in the overall acreage of remaining wetland areas. The few remaining wetland areas are subject to strict wetland regulations at the federal, county, and municipal levels, thus promoting the continued preservation of localized wetland areas and thus a reduction in future wetland losses. In addition, more aggressive wetland regulations require higher mitigation ratios. Under the protection granted to wetlands (Section 404 of the CWA), mitigation guidelines require that wetland losses greater than 0.10 acre be replaced at a ratio of 1.5 to one or greater (depending on the type and quality of wetland affected, the mitigation ratios may be higher). Thus, in many cases more wetlands are being created than destroyed by individual projects. In-kind replacement has been elevated as an objective, lessening the potential for changing wetland composition in the area. These mitigation requirements are applicable to both private and public projects.

The Illinois Interagency Wetland Policy Act of 1989 (applicable to state/state pass-through funded projects) also provides protection to wetlands and requires mitigation for all wetland impacts regardless of size. Overall, this legislation has been effective for mitigating the loss of wetlands from public projects that receive state/state pass-through funding,

which has helped to slow total wetland loss across the state. DuPage County has developed a wetland protection ordinance to fill potential gaps in state and federal regulations, and Cook County is preparing a watershed management ordinance that includes wetland protection.

Land management is another mechanism that can minimize the potential conversion of special resources. Examples are park districts, forest preserves, state parks and natural areas that provide long-term protection to special resources within their boundaries.

These practices minimize wetland losses from the build alternatives, as well as to direct the effects of urban development, and slow or stop the rate of wetland loss in the study area and consequently, the overall cumulative effect. The percent of wetland loss for each of the build alternatives represents a small fraction of the total wetland acreage found in the study area and local region. The long-term viability of wetland resources will likely be sustained through mitigation and an increase in larger wetland complexes (via wetland mitigation banks), which are preferred by regulators.

4.12.3.4 Biological Resources

Most of the study area is urban and built-up land, and contains limited areas of prime wildlife habitat. Higher quality vegetation and wildlife species in the study area tend to be concentrated within the special lands. Important vegetative cover types for wildlife in the study area are the forested lands, old fields and wetlands. Wetland habitats include emergent, wet old field, sedge meadow, scrub-shrub, and wooded wetland.

The large percentage of urban development, habitat fragmentation, and transportation infrastructure throughout the study area limits wildlife movement. Large contiguous areas of open space are generally located within special lands or are adjacent to waterways. Wildlife use linear corridors, such as riparian environments, greenways, rights-of-way, and fence rows, for movement, dispersal, and to access habitat that has been divided by roads, rail, or other types of development. The largest contiguous open space habitat types within the study area are the Ned Brown Preserve, a system of forest preserve properties along the Des Plaines River in Cook County, and a cluster of forest preserves and other special lands in DuPage County along Salt Creek/adjacent to I-290. The preserved open space and Salt Creek provide connectivity among the DuPage County Forest Preserves and may allow wildlife movement between those areas.

In general, the large contiguous open space habitats within the study area correspond with the "recommended resource protection areas" depicted in the Chicago Wilderness Green Infrastructure Vision for Northeastern Illinois (Northeastern Illinois Planning Commission, 2004). The green infrastructure represents interconnected upland and aquatic habitats (e.g., large complexes of remnant woodlands, prairies, wetlands, lakes, riparian corridors) that support biodiversity and allow diverse native plant and animal communities on a regional scale. Green infrastructure may also include adjacent buffer areas. The recommended resource protection areas and green infrastructure provide the location for regional biodiversity protection and ecosystem restoration opportunities. These areas are not intended to be precise protection or restoration areas; instead, their purpose is to create awareness and opportunity for protection and restoration. Impacts to these areas have been avoided or minimized by the build alternatives.

The build alternatives and future development have the potential to create additional edge effect at the perimeter of larger preserved open space and to displace isolated habitat areas (old fields or small wooded lots) that are not within special lands. The extent of habitat area affected by edge effect could continue to move inward due to the cumulative effect of other developments/projects in the area. Additional developments could further reduce the number and size of remaining open space and available habitat. In time, as animals move away from affected areas to undeveloped areas, urban tolerant species could create additional competition for less tolerant species residing in protected areas or for other urban tolerant species inhabiting scattered, remnant open space.

4.12.4 Conclusion

A substantial investment in transportation infrastructure is required to address severe congestion in one of the Chicago metropolitan area's major transportation and employment areas. Investment of this type often spurs related land use growth, but in an already developed area such as in the study area, the basic patterns of land use would be expected to be maintained. It is expected that change in land use would instead occur in the form of rehabilitation or redevelopment for those commercial and industrial areas needing modernization (e.g., those with aging or obsolete buildings, numerous access drives, and awkward access for today's larger semi-trucks). The boundaries of industrial and commercial areas are reasonably set and encroachment upon established residential areas is unlikely. Thus, land use response to transportation investment would be expected to be in the form of private sector investment in the commercial and industrial areas that would benefit from an improved transportation system through improved competitive position in the marketplace. As stated earlier, the regional economic effects of the proposed improvements combined with other major projects planned in the study area are sizable. Most of the growth in population spurred by the investment would be expected to occur outside of the study area. Growth will result in several possible population change scenarios, including a shift or redistribution of population in the metro area, infill development, or new development. Depending on the type of employment resulting from industrial or commercial redevelopment, all these scenarios could occur. For some, affordable housing and access to public transportation is important. Most likely those requiring such amenities already live in areas that have them. Expansion of housing into the fringes of the metro area will occur as long as there is a need for additional affordable housing. This pattern of expansion tends to impose new stresses on natural and societal resources (e.g., development of open space, water quality effects, displacement of natural habitat, and requirements for costly new infrastructure).

Regarding natural resources, wetlands and other biological resources (flora/fauna, habitat fragmentation, threatened and endangered species, tree loss, and special lands) in the study area remain relatively stable. Water quality has the greatest potential for impact because of development. Most of the remaining wetlands and biological resources within the study area are in publicly managed/protected lands. Biological and wetland/water resources within the study area but outside the managed lands have been affected by an urbanized development pattern. The highest quality resources in the study area are also located in protected lands (e.g., forest preserves). Biological resources outside protected lands have limited diversity and have shifted toward species tolerant of urban development. Surface waters within the study area are largely impaired or degraded, but their water quality will improve because of watershed studies or actions and regulatory action. Notably, the

implementation of regulatory controls and increasing consideration of sustainable policies has shown benefits to water quality and biological resources. With the implementation of these management tools, the deteriorating quality of these resources has subsided and has shown signs of improving.

Overall, the cumulative effects of the proposed improvement and other major projects in the area would be manageable with diligent adherence to managed growth and regulatory controls protecting and preserving natural resources in the area. Communities and resources agencies affected by the proposed transportation improvements have been substantially involved in the planning process for these planned facilities. They have helped to guide the proposed improvements in ways that are compatible with community goals and objectives, and with the policies of resource agencies. Thus, the planning process has measurably addressed and planned for improvements that reflect the values of the affected communities and agencies. As the process advances toward implementation, these same values could be incorporated into the project specific mitigation, interagency agreements, ordinances, and regulations pertaining to the area.

4.13 Mitigation Concepts and Commitments

Mitigation measures are provided to compensate for unavoidable impacts. The following are proposals and concepts for mitigating resource losses or managing short- and long-term social effects. Detailed mitigation strategies will be developed during Tier Two environmental studies.

4.13.1 Traffic

A traffic management plan will be required during the construction period. The purpose of the plan is to maintain traffic flow and reliable access to residences, businesses, community facilities and services, and local roads during construction. There would be coordination with fire, police, and emergency services to minimize delays and response times during construction.

4.13.2 Land Use

Land use mitigation will consist of maintaining or enhancing connectivity, and incorporating roadway design considerations for developed areas. Continued coordination with communities at each successive design level would be conducted on issues such as: identifying opportunities to expand transit, bicycle, and pedestrian movement across or along planned roadway improvements; reviewing alignment details and resultant community impacts; and incorporating roadway design considerations, such as landscaping, buffer areas, and roadway lighting sensitive to adjacent land uses in order to minimize community impacts.

4.13.3 Relocations

IDOT will offer relocation assistance, in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended, and IDOT's *Land Acquisition Procedures Manual*, to all occupants of buildings they would purchase and remove. Those policies provide for relocation assistance services to homeowners, renters, and businesses.

Participation under the state and federal policies is without discrimination. IDOT will pay property owners the fair market value for all private property purchased, and relocation assistance.

4.13.4 Water Quality and Hydrology

Measures to mitigate water quality impacts are described conceptually here. They will be detailed in Tier Two environmental studies as to type, extent, and location of mitigation.

BMPs would be implemented that minimize the volume of stormwater runoff discharge and result in physical, chemical, or biological pollutant load reduction, increased infiltration, and evapotranspiration. Proper soil erosion and sediment control measures would be used to minimize erosion and sedimentation for any build alternative. These measures are a condition of Section 404 CWA permits, prescribed in design and construction guidance by IDOT, and would be coordinated with the local Soil & Water Conservation District (SWCD). Erosion control measures consist of applying mulch, straw, soil tackifiers, polymers, erosion control blankets, and vegetative soil stabilization. Vegetative soil stabilization includes temporary and permanent seeding, sodding, ground cover, and dormant seeding. Disturbance of streamside and riparian vegetation would be kept to a minimum. In-stream construction and soil disturbing activities near streams would be conducted during low or normal flow periods. Discharge points would be protected with rock (or an alternative measure) to minimize scour and erosion.

Perimeter sediment control devices would be installed before commencing soil disturbing activities, as necessary. Perimeter silt fence, stabilized construction entrances, drainage inlet protection, ditch checks, diversions, sediment traps, and other appropriate BMPs would be used to control sediment and runoff, and to protect receiving waters during construction.

Stream crossings and structure sizing would be performed in accordance with state and federal guidelines regarding floodplain encroachment and hydraulic capacity. All new structures would comply with these guidelines. Waterway crossings would be bridged, enclosed in a culvert, or otherwise designed to accommodate expected high water flows, to allow movement of aquatic biota, and not to impede low water flows. Drainage systems, including ditches, would be maintained and restored so as not to impound water (unless designed to do so for a water quality benefit). Compensatory storage and stormwater detention facilities will be analyzed in the design phase of Tier Two and would be considered in accordance with local stormwater ordinances. The requirements for compensatory storage are discussed in subsection 4.4, Floodplains, and for detention in subsection 4.2, Water Resources and Quality. Stormwater facilities and discharges will be monitored and managed during and following construction in accordance with the requirements of the General NPDES Permit No. ILR40.

Other stormwater control practices may be needed to mitigate water quality impacts. In addition to detention facilities, other practices, such as vegetated basins/buffers, infiltration basins, and bioswales, would be evaluated to minimize transport of sediment, heavy metals, and other pollutants. Deicing management practices, such as anti-icing chemicals and additives, can minimize salt application quantities. These practices will be evaluated further in Tier Two environmental studies.

Accidental spills of hazardous materials and wastes during construction or operation of the transportation system require special response measures. Occurrences would be handled in accordance with local government response procedures. The first response typically is through the fire department and emergency service personnel to ensure public safety and to prevent harm to the environment. Depending on the nature of the spill, the Illinois Emergency Management Agency (IEMA), and as necessary, IDNR or IEPA, would be notified to provide additional instruction regarding cleanup. Refueling or maintenance of construction equipment would not be allowed within 100 feet of wetlands or water bodies to avoid other accidental spills.

4.13.5 Wetland Mitigation

Measures to mitigate wetland impacts,[36] conceptually defined here, will be detailed in Tier Two. As required by USACE and IDNR regulations, final design of the preferred alternative will incorporate wetland avoidance and minimization objectives prior to the development of the project mitigation plan. Much has been done in the Tier One study to coordinate with the USACE and IDNR to avoid and minimize impact**s** on wetlands. Unavoidable wetland impacts will require compensatory wetland mitigation. The compensatory wetland mitigation design will establish and implement wetland compensation objectives, apply established ratios for compensation commensurate with required impacted wetlands, identify locations for wetland compensation sites, site engineering and development, and plans for long-term monitoring and maintenance of the mitigation wetlands.

4.13.5.1 Wetland Impact Avoidance and Minimization

Recognizing the conceptual engineering detail of the build alternatives, further efforts will be made in future phases of work for the preferred alternative to avoid and minimize additional wetland impacts beyond the efforts in Tier One. Avoidance and minimization can be accomplished in the following ways:

- Alignment shifts of roadways
- Narrower roadway cross-section with the use of:
  - Narrower center median
  - Narrower shoulder
  - Retaining walls
  - Steeper roadway embankments
  - Enclosed drainage systems
  - Bridging critical wetland resources

Avoiding and minimizing impacts to wetland resources may be constrained by other critical resources or local issues. When a choice must be made between wetlands and other critical resources, some resources or project issues may be afforded priority over wetland loss. For example:

- Avoidance of public recreational lands protected under Section 4(f)
- A disproportionate amount of residential and business relocations
- Maintenance of minimum safety requirements

[36] Jurisdictional wetland and other waters of the U.S. impacts will require compensatory mitigation under Section 404 of the CWA.

4.13.5.2 Compensatory Wetland Mitigation

Objectives for mitigation will be established in consultation with regulatory and resource agencies on the following major issues:

- Purchase of mitigation credits from a commercial wetland bank
- Type of compensatory wetland mitigation
- In-kind replacement
- Functional replacement
- Ratio of wetland mitigation replacement
- Location of wetland mitigation replacement

The State of Illinois, in the IWPA, has established compensatory wetland mitigation ratios for all state-funded projects. The established ratios generally are more stringent than those established by the USACE. The highest mitigation ratio of 5.5:1 will apply for wetland impacts in the following cases:

- Alteration of wetlands that contain state- or federal-listed threatened or endangered species
- Wetlands that contain essential habitat for state- or federal-listed species
- Presence of an INAI site
- A mean C-value of 4.0 or more (Swink and Wilhelm, 1994)
- Individual wetlands with a Floristic Quality Index (Swink and Wilhelm, 1994) of 20 or more

The compensation ratios shown in Table 4-31 represent the current compensation guidelines required for wetland impacts in Illinois by the IWPA; however, DuPage County and the USACE have identified certain wetland resources (e.g., critical wetlands in DuPage County; High Quality Aquatic Resources, etc.) requiring elevated compensatory wetland mitigation as well. Compensation ratios for impacts to High Quality Aquatic Resources will be developed with the regulatory agencies on a case-by-case basis during Tier Two.

TABLE 4-31
IDNR Wetland Compensation Ratios

Degree of Adverse Impact	Onsite	Offsite	Out-of-Basin
Minimal alteration	1.0:1[a] / 1.5:1[b]	1.5:1	2.0:1
Significant alteration	1.5:1	2.0:1	3.0:1
Destruction	2.5:1	4.0:1	5.5:1

[a] This ratio applies to all other types of wetland vegetation, substrate, or wetland type except those wetlands that have woody vegetation, subject to USACE approval.
[b] This ratio applies if the vegetation of the affected wetland is woody.

Location of the compensatory wetland mitigation sites would be determined following agreement on the wetland replacement ratio and other mitigation objectives. Appropriate environmental studies would be conducted for the selected mitigation sites, including an evaluation of the environmental features of the site, existing resources, suitability for wetland resource creation and restoration and potential effects of mitigation creation at the selected location. The environmental studies would include historic/archaeological surveys, biological surveys, and potential for threatened and endangered species.

Preferences for mitigation are as follows:

1. Wetland mitigation banking within a USACE-approved bank.[37]
2. Onsite—within the same hydrologic unit and less than one mile from the project site.[38]
3. Offsite, within basin—the same hydrologic unit but more than one mile from the project site.
4. Offsite, out of basin—compensation not provided within the watershed of affected wetlands.

The following compensatory wetland mitigation strategies may be used with the above preferences:

- One overall compensation site
- Larger sites (as opposed to scattered smaller sites), to facilitate long-term management for a composite of desired wetland functions, values, and biodiversity
- Sites with no impediments to immediate design, permitting, and construction
- Sites that provide a high plant ground cover and diversity, contain minimal invasive species, provide wetland functions, and improve the quality of the resource
- Sites providing in-kind replacement of impacted wetlands and streambank ecosystems
- Sites supporting a diverse ecosystem with hydrologic/ecologic connections to other ecosystems and associated riparian areas
- Sites that have a high likelihood of success
- Restoration and enhancement of existing wetlands
- Participation in wetland creation programs (e.g., FPDCC)
- Acquisition/land protection

4.13.6 Floodplain Mitigation

Floodplain impact mitigation will be based on IDOT guidelines in conjunction with the Illinois Department of Natural Resources-Office of Water Resources (IDNR-OWR), as well as local ordinances for floodplain management and mitigation.

Examples of mitigation measures to be considered during Tier Two of the study include:

- At locations where a longitudinal floodplain encroachment would occur, practicable alternatives such as shifting alignment, lowering profile, constructing structures, etc. would be explored to avoid or minimize encroachments on the floodplain.

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[37] The option most preferred is mitigation bank credits. See the *Compensatory Mitigation for Losses of Aquatic Resources; Final Rule* (April 10, 2008).

[38] Mitigation site selection will consider the potential to attract waterfowl and other bird species that might pose a threat to aircraft. FAA Advisory Circular, *Hazardous Wildlife Attractants On or Near Airports*, (Advisory Circular No: 150/5200-33B) recommends that wetland mitigation projects that may attract hazardous wildlife be sited at least 10,000 feet from the air operations area of an airport serving turbine-powered aircraft, 5,000 feet from the air operations of an airport serving piston-powered aircraft, and five statute miles if the attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

- At locations where a transverse floodplain encroachment would occur, the proposed roadway should span over the floodplain to greatly reduce encroachments.
- Designs of embankment slopes and roadway profiles would be considered to reduce filling of the floodplain.
- Retaining walls would be considered in an effort to reduce potential floodplain impacts.
- Compensatory storage would be provided to comply with regulation requirements. Table 4-18 and Table 4-19 provide an estimated compensatory storage volume for each alternative.

Effort would be made to minimize open water surfaces within 10,000 feet from the end of runways at O'Hare Airport. Measures to mitigate floodplain impacts will be further identified and refined during the Tier Two environmental studies.

4.13.7 Biological Resources

Mitigation of upland forested areas will comply with guidelines established by the IDOT for habitat replacement. Tree replacement will be in accordance with IDOT's Tree Removal and Replacement Policy. Guidelines for tree and vegetation replacement include:

- Replacing losses of forest habitat associated with large wooded tracts (10 acres or more):
  - Replacing existing native hardwoods
  - Replacing non-native species with native hardwoods
  - Replacing indigenous understory
- Replacing losses for other tree and vegetation material:
  - Replacing scattered landscape material per IDOT's *Guidelines for Use of Landscape Items*
  - Replacing trees and vegetation on Section 4(f) lands to be coordinated with the agency having jurisdiction over the subject property

An attempt will be made to minimize and mitigate impacts to wildlife. The alternatives primarily include improvements to existing roadways. These roadways are already, for the most part, barriers to wildlife movement.

As streams provide avenues of wildlife movement, bridges or culverts can be installed where practical to provide additional corridors of movement.

Roadside barriers, such as fences and jersey walls, may restrict wildlife from entering roadways. They can also trap wildlife on the roadway, allowing no means of escape. In areas where large numbers of wildlife are present, such as forest preserves, fencing and other barriers would be limited to areas necessary for public safety. For project sections that are new roadways or alignments, features to facilitate wildlife movement and reduce vehicle/wildlife collisions would be incorporated into the plans where possible.

For sensitive wildlife areas, such as forest preserves and critical wetlands, large box culverts can be installed where practical to serve as avenues for wildlife movement. Culverts combined with low barrier walls along the roadway would provide a safer means of crossing the roadway. Short barrier walls in sensitive areas would be designed mainly to restrict the

movement of small animals, including reptiles, amphibians, and smaller mammals. The walls would not limit the movement of larger mammals in order to prevent them from being trapped within the roadway.

As part of Tier Two, additional studies will be conducted to determine the potential presence of threatened and endangered species. If threatened or endangered species are encountered that have not yet been recorded, a plan would be developed to avoid affecting that species. If avoidance is impractical, a mitigation plan would be developed and coordinated with the USFWS or IDNR through the formal consultation process.

Plans for staged construction may be incorporated into the final plans for a preferred alternative to minimize disruption of breeding seasons for sensitive species. During Tier Two, coordination with USFWS and/or the owners of adjacent natural areas (e.g., forest preserve districts) will take place as necessary to obtain input on best practices and available mitigation strategies to avoid or minimize potential wildlife impacts. Detailed mitigation strategies will be developed during Tier Two environmental studies.

4.13.8 Special Lands

If it is determined in Tier Two that implementation of the Preferred Alternative requires the use of Section 4(f) properties, IDOT would coordinate with FHWA and the Section 4(f) entity affected or the IDNR to determine appropriate mitigation measures where avoidance and minimization measures are not feasible or prudent. IDNR requires the substitution of replacement property having equal fair market value and comparable outdoor recreational usefulness, quality, and location in order to convert property purchased with OSLAD funds to transportation uses. These mitigation measures would be documented in a Memorandum of Agreement signed by IDOT and IDNR.

4.13.9 Visual Resources

The following general principles will be considered during Tier Two project design to mitigate for visual impacts:

- Provide a smooth transition to existing topography at grading limits
- Consult with stakeholders on noise barrier and retaining wall design to soften the contrast with the adjacent land uses/environment
- Design stormwater management facilities to be functional and aesthetically pleasing
- Consider directional street lighting to minimize light pollution
- Preserve vegetation or stabilize disturbed parts of the right-of-way with vegetation using native plant species, where appropriate
- Reduce median widths at creek crossings to minimize disturbance of vegetation and terrain, providing motorists with the opportunity to become aware of these resources

Construction of the build alternatives would result in the loss of wooded areas. Replacement trees would be required as mitigation measures in accordance with the IDOT's Policy D&E-18, *Preservation and Replacement of Trees*. Replacing trees on Section 4(f) lands will be coordinated with the agency having jurisdiction over the subject property, and may

require more restrictive tree replacement requirements. Planting a variety of native trees rather than a single species would mitigate, to some degree, the tree impacts, while helping to offset the contrast of fill slopes or cuts. The installation of native trees, shrubs, grasses, and forbs could minimize right-of-way maintenance. Visual discontinuity associated with approach slopes to bridges could be softened by installing groups of trees and shrubs, helping to blend these features into the surrounding environment.

Given the relatively flat terrain in the study area, the most visually apparent features of the project would generally be bridges and interchanges. The appearance of typical overpass structures with steep approach slopes could be enhanced through structures, earthwork, and landscape design. Bridges would be designed to appear unified and to present a cohesive image for motorists passing through the area, and for others within the viewshed.

These principles would be considered and specific design elements developed and refined during Tier Two environmental studies or the final design. Stakeholder input could continue as part of the context sensitive design.

4.13.10 Air Quality

Construction will occur during Tier Two. Construction will be required to comply with applicable state and local air quality regulations.

4.13.11 Noise

All construction equipment would be required to have mufflers constructed in accordance with the manufacturers' specifications. Mufflers and exhausts must be maintained in good working order. Daily operating hours for construction would coincide with the construction schedule needs, unless otherwise specified.

Tier Two noise abatement measures for reducing traffic noise levels to residential and other properties will be evaluated for reasonableness and feasibility, and follow the guidance provided by the FHWA policies and procedures, 23 CFR 772; IDOT's *BDE Manual Section 26-6* (2002a); and IDOT's *Highway Traffic Noise Assessment Manual* (2007a).

Measures to reduce traffic noise, including traffic management measures, comprehensive land use planning, shifting the roadway location, and noise barriers will be examined during the Tier Two environmental studies.

4.13.12 Special Waste

Each build alternatives and south bypass connection option might encounter special waste sites. The extent and nature of materials requiring special handling will be the focus of further studies in Tier Two. A PESA will be completed to determine areas with recognized environmental conditions. A response to the PESA will be required to determine sites that require a Preliminary Site Investigation (PSI). The PSI will determine soil and environmental impacts, special waste handling requirements, and construction worker safety considerations. The areas of contamination would be managed in accordance with federal and state laws and regulations and in a manner that would protect human health and the environment.

4.13.13 Borrow and Disposal

The requirements for borrow and disposal of unused excavated material have not been determined in Tier One. The borrow and disposal requirements for the project will be determined as part of Tier Two. The amount and location of borrow cannot be ascertained until preliminary engineering design has been fully developed and refined in final design. Borrow sites would be identified and a site plan prepared, including an excavation plan, haul route plan, and end use plan. Appropriate environmental studies would be conducted for the borrow areas, including an evaluation of the environmental features of the sites and their potential environmental effects.

To the extent possible, materials cut from the project corridor with the proper engineering properties would be used for fill. The contractor would dispose of unusable excavated material in accordance with state and local regulations and other special provisions to ensure protection of wetlands and other waters. All waste and demolition material from the project would also be disposed of in accordance with applicable regulations.

4.14 Permits / Certifications

Regulatory permits would be required for any build alternative. Regulatory agencies, such as the USACE, are not being requested to consider issuing permits at this time; however, a general coordination approach is taking place. Detailed studies would be required as part of formal permit applications and consultations, which will be completed in Tier Two. Such studies would include formal wetland delineations, biological surveys, or searches for threatened and endangered species for the selected alternative. Issuance of regulatory permits would require detailed engineering plans for the preferred alternative.

This study does not include developing detailed engineering plans for any alternatives. Submittal of permit applications to pertinent regulatory agencies would not take place until after selection of a preferred alternative and development of final engineering plans in Tier Two. Avoidance and minimization strategies required to obtain permits would be developed at that time.

Permits could include at least the following:

- Section 404 of the CWA from the USACE
- Section 401 of the CWA Water Quality Certification from the IEPA
- NPDES permit from the IEPA
- IDNR-OWR permits for impacts to regulatory floodways and stream crossings
- Coordination with the North Cook County and/or Kane/DuPage County SWCD for soil erosion and sediment control review

The build alternative will have impacts on surface waters and wetlands. The discharge of dredge or fill materials into jurisdictional waters of the U.S., including wetlands, is subject to the requirements of Section 404 of the CWA. The permitting process for the preferred alternative would vary, depending upon implementation as a single project or a phased project. If the preferred alternative is implemented as a single project, an individual permit most likely would be required from the USACE–Chicago District for all jurisdictional wetland impacts associated with the project. If the preferred alternative is phased or

implemented over time as several projects, the likely regulatory scenario would be Section 404 Permits for each stand-alone improvement. For some projects, however, wetland impacts may be minimal, and qualify for the Regional Permit Program.

The Section 404 permit is contingent upon receipt of 401 Water Quality Certification from the IEPA. IEPA provides water quality certification pursuant to Section 401 of the CWA. The preferred alternative would be subject to the requirements of Section 401 Water Quality Certification. IEPA has granted Section 401 Water Quality Certification for projects that qualify for the USACE Regional Permit Program.

A cooperative agreement between the USACE and the local SWCDs requires a detailed review of erosion and sediment control in conjunction with Section 404 permitting. In North Cook County, review would be conducted by the North Cook County SWCD, whereas in DuPage County, the review would be conducted by the Kane/DuPage County SWCD. During Section 404 permitting, a soil erosion and sediment control plan for the build alternative would be prepared and submitted to the appropriate SWCD office for confirmation that the plan meets technical standards. The soil erosion and sediment control plan would require installation, maintenance, repair, and inspection of soil erosion and sediment control BMPs throughout the construction process.

The preferred alternative will be subject to the requirements of an NPDES permit for stormwater discharges from the construction site in Tier Two. NPDES coverage is required when a construction project disturbs one acre or more of total land area, or is part of a larger common plan of development that ultimately disturbs one or more acres of total land area. Permit coverage will be obtained either under the IEPA general permit for stormwater discharges from construction site activities, or under an individual NPDES permit. Permit requirements would include preparation of an SWPPP. The SWPPP would identify potential sources of pollution and would describe or identify practices to be used to reduce the discharge of pollutants associated with construction site activity. The permit would require the installation, maintenance, repair, and inspection of BMPs and reporting.

The IDNR-OWR issues floodway construction permits for work within regulatory floodways and for the crossing of streams with more than 640 acres of drainage area. Each preferred alternative would require issuance of this permit. The involvement of stream floodways and floodplains for each alternative are described under subsection 4.2, Water Resources and Quality, and subsection 4.4, Floodplains.

4.15 Relationship of Short-Term Uses versus Long-Term Productivity

This subsection examines short-term costs and long-term gains for the build alternatives. The short-term use refers to immediate consequences of the project; long-term use refers to direct or indirect effects on future generations.

Short-term consequences of the build alternatives include the following:

- Relocation of residences and impacts on businesses
- Removal of private properties from tax rolls, thereby reducing the property tax base

- Losses of employment
- Conversion of floodplain and wetland to transportation use
- Inconvenience to residents, business owners, suppliers, and employees during construction

Long-term benefits to be realized from the either build alternative include the following:

- Improved access throughout the study area
- Improved travel on local and regional roads
- Better connectivity between automobile and transit modes of transportation
- Improved transit opportunities for area residents and employees of businesses in the area
- Economic benefits that would result in the creation of additional jobs and spending:
  - Construction of Alternative 203 would create an estimated 9,200 jobs per year in the highway construction industry, and 21,600 jobs per year in all sectors in the region. Total value-added (the additional value of a commodity produced over the cost of commodities used to produce it) per year would be an estimated $1.6 billion and $4.8 billion over the three-year construction period.
  - Construction of Alternative 402 would create an estimated 7,000 jobs per year in the highway construction industry, and 16,600 jobs per year in all sectors of the region. Total value added per year would be an estimated $1.3 billion and $3.9 billion over the three-year construction period.
- Improvement of the competitive position of the area by promoting private investment in the redevelopment of underused properties, thus growing employment opportunities in the area to new levels
- Substantial economic benefits when considering the cumulative effects of other reasonably foreseeable actions such as the following:
  - The total construction costs for Alternative 203 including the Tollway Projects, the transit improvements and the STAR Line Project are estimated to be $6.1 billion in 2009 dollars. Total value added for the life of the construction project (2012–2027) is estimated to be $8.1 billion in 2009 dollars. Total sales volume as measured by total output is $14.8 billion. The maximum number of jobs created will be in the initial years with 13,300 in the highway construction industry and 31,400 within the regional economy and then taper off during the following two construction periods.
  - The total construction costs for Alternative 402 including the Tollway Projects, the transit improvements and the STAR Line Project are estimated to be $5.1 billion in 2009 dollars. Total value added for the life of the construction project (2012–2027) is estimated to be $6.8 billion in 2009 dollars. Total sales volume as measured by total output is $12.2 billion. The maximum number of jobs created will be in the initial years with 11,000 in the highway construction industry and 26,200 within the regional economy and then taper off during the following two construction periods.

The build alternatives are based on comprehensive transportation planning that considers the need for present and future traffic movement within the context of existing and future land use development and the environment. Therefore, the local short-term impacts and use of resources by the proposed action is consistent with the maintenance and enhancement of long-term productivity.

4.16 Irreversible and Irretrievable Commitments of Resources

The build alternatives would involve committing a range of natural, physical, human, and fiscal resources. Land acquired for constructing the proposed project is considered an irreversible commitment during the period the land is used for highway purposes. Right-of-way requirements would convert land from residential, commercial, and natural environmental resource uses. Both alternatives generally are compatible with land use patterns within the study area, and adjacent land uses will remain consistent.

Fossil fuel, labor, and highway construction materials, such as steel, cement, aggregate, and asphalt, would be required during construction. Considerable labor and natural resources would be used in construction. Those resources generally are irretrievable (although they can be recycled somewhat), but their use overall would not adversely affect continued availability.

The build alternatives would require irretrievable federal, state, and local funding. Land converted from private to public uses would displace local tax revenues.

Resources are committed based on the concept that residents in the study area, region, and state would benefit from the improvements brought about by the proposed project. Improved access to commercial and industrial areas, reduced travel times, and increased economic development are expected to outweigh the commitment of resources in the long term.

4.17 Summary of Environmental Consequences

Table 4-32 summarizes the environmental effects of the No-Action Alternative and the build alternatives in combination with South Bypass Connection Options A and D. The effects would be minimized to the extent possible by using appropriate design techniques and considerations, construction methods, and mitigation measures as discussed in this document and companion technical reports.

TABLE 4-32
Summary of Environmental Consequences

	Alternative 203		Alternative 402	
	Option A	**Option D**	**Option A**	**Option D**
Length (miles)[a]	25.0	23.3	24.6	22.9
Right-of-way (acres)	1,910	1,895	1,600	1,585
Roadway construction costs	$3,061M	$2,987M	$2,405M	$2,331M
Roadway right-of-way costs	$563M	$648 M	$388 M	$473 M
Total roadway costs	$3,624M	$3,635M	$2,793M	$2,804M
Transit cost[b]	$430M	$430M	$250M	$250M

TABLE 4-32
Summary of Environmental Consequences

	Alternative 203		Alternative 402	
	Option A	**Option D**	**Option A**	**Option D**
Socioeconomics				
Population (2030)	540,790	540,790	539,040	539,040
Households (2030)	207,400	207,400	206,800	206,800
Employment (2030)	712,100	712,100	698,100	698,100
Residential displacements	18	11	18	11
Commercial structure displacements	4	12	3	11
Industrial structure displacements	40	28	37	25
Employees directly displaced	1,000	1,277	837	1,114
Tax revenue loss	$3.09M	$4.47M	$2.18M	$3.56M
Natural Resources				
Wetlands (acre)[c]	38.8	39.1	36.2	36.5
Stream crossings (total number)	22	22	20	20
Surface waters (acre)[c]	18.2	18.1	15.2	15.1
Floodplain encroachments (acre)	24.7	24.7	27.2	27.2
Threatened and endangered species	0	0	0	0
Noise				
Noise-sensitive residential areas	49	47	45	43
Noise-sensitive, non-residential receptors (churches, schools, parks)	29	27	27	25
Cultural Resources, Section 4(f) Resources, and Non-Section 4(f) Public Lands				
Historic structures	0	0	0	0
Archaeological sites	0	0	0	0
Acres of impacts to Section 4(f) resources (number of properties affected)[d]	0.95 (3)	0.95 (3)	0.95 (3)	0.95 (3)
Acres of impacts to non-Section 4(f) public lands (number of properties)	2.0 (1)	2.0 (1)	0	0
Special Waste				
High-risk sites	2	2	2	2
Moderate-risk sites	161	171	156	166
Low-risk sites	68	72	68	72

[a] Includes new freeway/tollway as well as arterial widening where one or more lanes are added. Does not include turn lanes around existing interchanges.
[b] Transit cost represents only transit infrastructure improvements co-located in proposed roadway improvement corridors (e.g., Elgin O'Hare Expressway, north leg of O'Hare West Bypass).
[c] Totals include impacts to potentially jurisdictional areas, such as stormwater facilities. Subject to regulatory review, several manmade stormwater facilities may be exempt from regulation.
[d] One property purchased with OSLAD funds may be affected.