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

	Surface Waters[a] Impacts (acre)[b]				Water Basin[a, c] Impacts (acre)[b]			
Watershed	**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.

---

[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.

---

[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

---

[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.