

- On the south leg, community connections would be improved substantially with local roadway enhancements in the vicinity of the Bensenville Yard and intermodal facility. These proposed improvements would include the Taft Avenue Connector and the connection of Franklin Avenue/Green Street to Irving Park Road over the Bensenville Yard. This improvement would create a new connection and travel access between the industrial areas north and south of the rail yard.

3.3.3 Indirect and Cumulative Land Use Impacts

The cumulative effects of the proposed improvements would be expected to bring about land use changes in the project area. Generally, fully access-controlled roadways can lead to modernized land uses. The proposed tollway would dramatically increase traffic volumes passing by adjacent properties that would improve the visibility of these lands. These changing conditions would spur investment in private development. As detailed in subsection 3.2, approximately 5,000 acres (560 potential sites representing approximately 3,200 land parcels) are estimated to be redeveloped over the 30-year period as a result of the proposed roadway improvements. Exhibit 3-5 displays locations where this is forecasted to occur. The communities west of O'Hare Airport (along what are now Thorndale Avenue and the existing Elgin-O'Hare Expressway) could be transformed into a modern employment and business center that includes corporate offices, hotels, business parks, and retail uses. These uses would replace a portion of the current industrial uses that presently exist. The transformation under the Build Alternative would result in a more diverse, higher-quality, and higher-value economic base that is in alignment with long-term economic trends and the potentials associated with proximity to a major airport. Comparing the Build Alternative to the No-Build Alternative, it is estimated that almost nine million square feet of new office, retail, and industrial space, and almost 1,400 additional hotel rooms would be developed as a result of the improvements. This increase in new development would correspond to 41,000 more jobs by the 2040 (see subsection 3.2.3.2).

3.3.4 Measures to Minimize Harm and Mitigation

3.3.4.1 Land Use Planning/Ordinances

Thoughtful land use planning and ordinance implementation encourage organized and meaningful development. The proposed improvements, especially when considered with other notable projects in the area (such as the OMP), are expected to attract businesses and residents. The proposed improvements combined with the other attributes of the area are a prescription for facilitating new and diverse economic development. Community action, either individually or collectively, which includes the use of cutting edge land use planning tools and ordinances, would provide private investors with the confidence that their investment would be part of development that is organized and of quality.

3.4 Special Land Uses

Special land uses are those that have unique characteristics that required particular attention during the design of the proposed improvements. They include public and private lands.

3.4.1 O'Hare Airport

As proposed, approximately 3.6 linear miles of the West Bypass corridor would be located on the western edge of O'Hare Airport's property. The location would be on the extreme

western edge of the airfield (see Exhibit 3-7), but outside the Airfield Operations Area (AOA) and would be located to avoid existing and planned runways, taxiways, perimeter roads, and be compatible with navigational aids. Under the OMP, an extensive multi-billion dollar modernization of the airfield has been under construction since 2005. When the OMP is complete, O'Hare Airport will have a total of eight runways (six east-west parallel runways and two crosswind runways). Additionally, the Airport Layout Plan (ALP) proposes a new passenger terminal on the west side of the airport. Six runway ends would be along the western edge of the airfield, and one existing diagonal runway (14R-32L) extends to the western edge. In anticipation of the need for a major transportation facility on the west side of O'Hare Airport property, the CDA designated a 300-foot corridor on the west side of the airport as a transportation corridor in its *O'Hare Airport Master Plan Update* (CDA, 2005). Additionally, there are proposed roadway improvements within the approaches of Runway 14L on the north side of the airport and Runway 4R on the south side of the airport. A primary objective of the Tier Two EIS is to evaluate in detail the impact of the West Bypass corridor against airport operations and ensure its compatibility with the airport. Results of these analyses are expected to further refine the design of the West Bypass corridor to mitigate any conflicts found. As discussed in the following subsections, the process is to understand the existing and future airport land uses, the special restrictions that apply to the airport environment, justify and request the use of airport property to FAA, determine whether conflicts exist for the West Bypass corridor, and if conflicts do exist, define appropriate mitigation measures.

3.4.1.1 Affected Environment

Land uses along the western side of the airport are a mix of runways, taxiways, navigational equipment, roadways, waterways, earth berms, and other facilities. Beginning at the north end of the airfield, Runway 9L-27R was commissioned in 2008 and is the newest runway. This runway required a substantial amount of land acquisition for the construction of the west end. Site preparation required the movement and placement of millions of cubic yards of material across the runway and within the RPZ, an area located beyond the ends of a runway intended to protect aircraft operations. The RPZ at the west end of the runway is occupied by the existing CP and UP railroads. In the future, the West Bypass corridor would be located in the RPZ, immediately west of the railroad alignment. The roadway in this location would be outside the AOA. Common to all the RPZs along the west side of the airfield are Approach Lighting with Sequenced Flashers II (ALSF-II) systems extending from the runway threshold across the existing railroads and to the western limit of the RPZ. The ALSF-II light plane is in an area that must remain clear of objects at and above the ALSF lights. Because the proposed West Bypass corridor would cross the ALSF light plane, adjustments to the light plane would be required in terms of heights and spacing that are compliant with FAA requirements and fully inspected and flight checked by the FAA. Additionally, any alterations to accessing the ALSF light bars would require a plan to have continuous access for long-term maintenance.

Other land use features along the west side of the North Airfield include Guard Post One, the airfield fuel farm, airline hangars, and navigation equipment. Guard Post One is the north entrance to the airfield, serving employees and vendors. It is newly constructed under the OMP, and the access road to the guard post would require relocation under the proposed plans for the West Bypass corridor. The fuel tank farm is the central fuel storage facility for the airlines. From this location, jet fuel is distributed throughout the airfield. The

West Bypass corridor would be located west of this facility, and the project-related construction would require modifications to the supply lines bringing fuel to the tank farm. The airline maintenance hangars are also in this vicinity, but are far enough to the east of the West Bypass corridor to avoid any conflict.

Progressing south along the west side of the airfield from Runway 9L-27R, the West Bypass would intersect six other runway RPZs (three existing and three proposed). In each case, the ALSF-II systems would be crossed by the roadway, and modifications to the ALSF light plane would be required. As the new runway facilities are advanced under the OMP, existing Runway 14R-32L would be decommissioned as one of the last phases of the program. There is a likelihood that the West Bypass corridor would be constructed prior to the decommissioning; therefore, airspace restrictions may dictate certain design requirements in this area. Thus, close coordination with the OMP is necessary. The area south of the fuel farm to Runway 14R is under construction with a new taxiway, guard post and perimeter road, and relocation of Willow Creek. Most of the area on the western edge of the airfield between Runway 14R and Runway 10L is open land. Other than the occasional navigational aid, the only other land use features are remnants of airport construction (e.g., excess soil stored in this area). The proposed West Terminal is planned in this area between Runway 9R-27L and Runway 10L-28R, and close coordination between IDOT, Illinois Tollway, and the OMP has been extensive to provide for the eventual access needed from the West Bypass corridor improvements into the west side of the airfield.

Moving south from the proposed West Terminal complex, the West Bypass corridor would intersect the RPZs for Runway 10L-28R (existing), Runway 10C-28C (under construction), and Runway 10R-28L (enabling projects under construction). The area along the western edge, between 10C and 10R, was recently acquired under the OMP, and demolition of homes and businesses was completed in 2010. Numerous construction projects related to the OMP are occurring in this area, including the relocation of the UP railroad tracks, Irving Park Road, and the Bensenville Ditch (all completed in 2012). Other projects include the grade separation of the CP railroad tracks at York Road and Irving Park Road, and by the year 2013, the construction of Runway 10R-28R would commence, with a scheduled completion in the fall of 2015.

While the proposed West Bypass corridor would cross the extended runway centerline of Runway 14L-32R and Runway 4R-22L and work would be within the extended approach areas of Runways 14L and 4R, the improvements are outside the RPZ.

Other existing features along the western edge of the airfield include numerous aircraft navigational aids, such as low-level wind sheer alert system (LLWAS), remote transmit and receivers (RTRs), Airport Surveillance Radar (ASR-9), Airport Surface Detection Equipment (ASDE-X RU) and Instrument Landing Systems (ILS) consisting of localizers, glideslopes, and ALSF-IIs. Additionally, airfield maintenance roads and major waterways (i.e., Willow Creek, Higgins Creek, and Bensenville Ditch) are present. The *O'Hare Airport Master Plan Update* (CDA, 2005) recognized the potential for the West Bypass corridor and reserved a corridor on the western side of the airport for its eventual implementation. Other planned uses, in addition to the proposed West Terminal complex, include future surface parking and future aviation development that would support airfield operations. As part of the West Bypass corridor implementation, a relocated security fence would need to be constructed

along the edge of the AOA to separate the airport from the proposed roadway corridor on the western side of the airport.

3.4.1.2 Requirements in an Airport Environment

Airport Land Use Restrictions

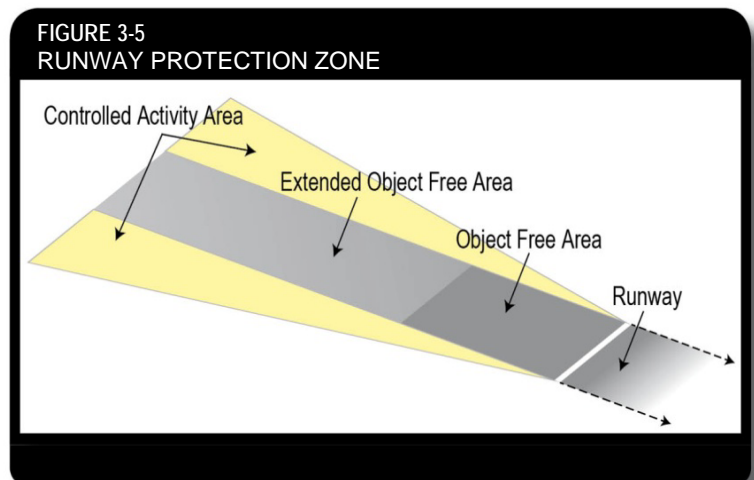
In addition to working within the framework of the existing and future airport land uses, runway imaginary airspace surfaces, RPZs, Object-Free Areas, related navigational aids, and other airfield facilities introduce a number of considerations in the engineering design of the West Bypass corridor. In this regard, ongoing coordination has been underway for several years between IDOT, FAA, CDA, and OMP. A priority issue is compliance within the RPZs because the West Bypass corridor would pass through six RPZs on the west side of the airport. Land uses within an RPZ are severely constrained and are defined in FAA's Airport Design Advisory Circular (AC) (AC 150/5300-13, current revision is Change 16, dated January 3, 2011).

The RPZ is a trapezoidal shape extending from the end of each runway at O'Hare Airport at a distance of 2,500 feet, beginning 200 feet after the end of the runway. Within the trapezoid

are several layers of restricted areas (see Exhibit 3-7). First, an Object-Free Area, extending 1,000 feet from the end of the runway, prohibits the presence of any objects. Second, the center portion of the RPZ, extending from the beginning to the end of the RPZ, is fully controlled. Lastly, the area to the sides of the center portion, but beyond the Object-Free Area, is activity controlled (see Figure 3-5). In this latter area, some uses are permitted that would neither attract wildlife

nor violate height restrictions within the RPZ, including such areas as storage facilities and covered stormwater detention basins. Uses that are not permitted include residences, fuel storage facilities, and places of public assembly, such as churches, schools, office buildings, and shopping centers. For the purpose of controlling land use, it is preferable that the land area encompassed by the RPZ be owned and controlled by the airport. However, at O'Hare Airport, some portions of the RPZ are not owned by the City of Chicago and, in some of these instances, commercial and industrial uses exist. As necessary, applicable navigational easements have been put in place to control land use, and these buildings do not violate relevant air space regulations as defined in 14 CFR Part 77.

In addition to the RPZ requirements, FAA enacts regulation and policy pertaining to the protection of the public investment in the national airport system. In their administration of these regulations and policies, the FAA studies existing and proposed objects and activities, both on and off public-use airports with respect to their impacts upon the safe and efficient use of the airports and safety of persons and property on the ground, as defined in 14 CFR



Part 77. Based on these analyses of airspace issues, the FAA may issue an advisory recommendation in opposition to the presence of any off-airport object or activity in the vicinity of a public-use airport that is in conflict with an airport planning, design standard or recommendation. Within the airport environs, the FAA has full control in managing facilities and activities to ensure avoidance of air space conflicts. This would include the presence of the West Bypass corridor along the western edge of the airfield. In Tier One, a preliminary air space analysis was done to determine if the presence of the roadway in air space critical areas would cause conflicts. Based on that analysis, the location of the roadway did not impose any violations other than the height of signage and lighting. A second review by FAA was conducted during Tier Two using refined horizontal and vertical data for the roadway section. This review is described in subsection 3.4.1.3.

Right to Develop a Non-Aviation Use on Airport Property

Utilization of airport property for the West Bypass corridor is subject to FAA's land use release policy. In coordination with the FAA for this project, the FAA would agree for the City of Chicago to request a land use release of airport properties for non-aeronautical uses (e.g., roadway uses) only if it can be demonstrated that such use is not imperative to the core function of the airfield, and would serve a defined benefit. In general, the analysis has to demonstrate that approving the land for non-aviation uses would result in equal or greater benefit to the airport. In consideration of this decision, this document addresses a number of informational needs that are required to assist in FAA's decision of a land use approval. Among this documentation is a justification for the use of the property as a roadway, and consideration of other alternatives to the use of this land including the comparative benefit to the airport from the lease for a non-aviation use.

Justification of the Use of Airport Property

The proposal to develop the extension of the Elgin O'Hare and West Bypass corridors has been considered for decades. In the context of the EO-WB project, stakeholders placed a high priority on improving the access to O'Hare Airport from the west. This priority was prompted by the expectation that a West Terminal complex was planned as part of the Master Plan and ALP update in 2005 (CDA, 2005). Economic analyses have been conducted as part of Tier Two, which have shown that development of the EO-WB project and the proposed West Terminal offer a very different future to the communities on the west side of the airport in terms of new development that would be of high quality and diverse, and that would create many new employment opportunities. Improved transportation facilities and access are the keys to these important changes.

In consideration of how to best satisfy the transportation problems in the area, much attention was devoted to analyzing many alternatives. Thus, the selected location of the West Bypass corridor that was determined in Tier One is the product of considerable analysis and evaluation of alternative locations. In Tier One, 15 transportation strategies were developed and evaluated. Nine of those strategies include the West Bypass corridor as an element in the vicinity of the western edge of O'Hare Airport. The others either included a portion of the bypass, or accomplished the north-south movement in the project area in some other way that did not involve the airport property. Through a series of technical analyses, the alternatives were reduced to two alternatives that were comparatively evaluated in the Tier One Draft EIS. One alternative had the full West Bypass corridor (Alternative 203D) and the other had only the south leg of the bypass (Alternative 402D).

Based on detailed technical analyses, cost, travel performance analyses, environmental impact studies, and stakeholder input, Alternative 203D was identified in the Tier One Final EIS as the preferred alternative. Among the reasons that resonated amongst stakeholders was the lack of community disruption presented by Alternative 203D. This alternative would not displace large numbers of commercial and industrial businesses that represented the economic base of neighboring communities, nor would it divide communities by creating a travel, social, or physical barrier. Maintaining the integrity of their economic base and their community cohesion were among the most important community objectives when considering better transportation for the area. Thus, the airport location for the West Bypass corridor provided the best solution to satisfy these objectives.

Based on the discussion above, the West Bypass corridor is located in the only open space available for such a sizable facility that is neither out of scale nor completely incompatible with surrounding uses. The proposed location provides the needed travel efficiency and access to important activity centers, has the potential to propel substantial development and redevelopment, and serves as a logical border between O'Hare Airport and nearby communities.

Federal Aviation Administration Concurrent Land Use Approval

Based on the justification above, the City of Chicago is involved in discussions with the Illinois Tollway and IDOT concerning conveyance or use of approximately 195 acres of O'Hare Airport property as a permanent easement by the Illinois Tollway for the construction and operation of the West Bypass corridor and proposed West Terminal interchange (see Exhibit 3-8). The extent of these discussions, which included the FAA, have determined that the underlying ownership of the required properties will remain in the ownership of the City of Chicago. Further, the type of land transfer to the Illinois Tollway has been discussed, and the Illinois Tollway has stated that a permanent easement would be necessary. Further deliberations will continue on the type of land transfer.

It is the responsibility of the City of Chicago to prepare and submit a concurrent land or land use release request. If the City of Chicago and the Illinois Tollway are successful in their negotiations regarding the lease and/or conveyance of a permanent easement for the construction and operations of the West Bypass corridor and the City receives approval from the Chicago City Council to convey such interests in the property, then the City plans to submit a land or land use release request to FAA following the Tier Two ROD (scheduled for December 2012).

Compatibility with the Airport

Most importantly, the development of the West Bypass corridor must be compatible with the adjacent airport operation. Through coordination by IDOT, the Illinois Tollway, and the CDA, numerous locational adjustments, roadway geometric revisions, profile adjustments, access requirements, and decisions whether to use bridges or tunnels have been made. In further definition of the facility design, the FAA has established guidelines to protect aviation safety through various land use restrictions. Among these restrictions are the following:

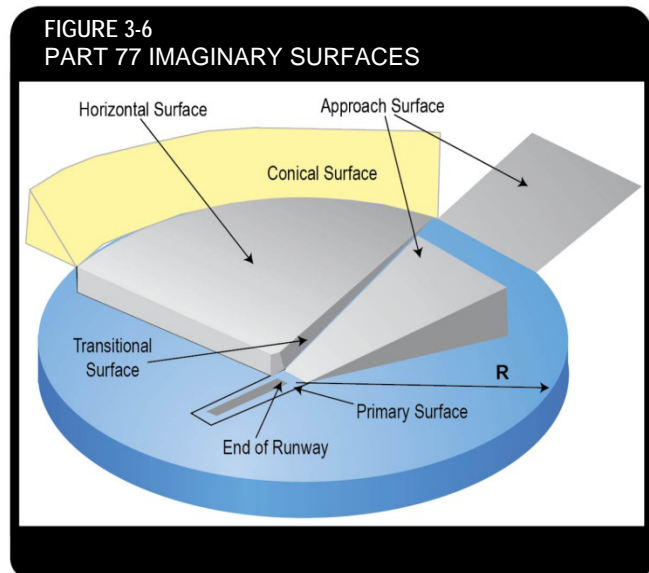
- **Imaginary Airspace Surfaces.** The FAA has established standards and requirements for objects affecting navigable airspace in 14 CFR Part 77 imaginary surfaces (Part 77), Terminal Instrument Procedures (TERPS), and to a lesser degree, the One Engine

Inoperative obstacle identification surface (OEI-OIS) used by air carriers to set maximum departure weights. These regulations are designed to protect an airport from objects that penetrate the defined imaginary airspace surfaces and vary depending on the use of the runways. The Part 77 imaginary surfaces are shown in Figure 3-6 and include the primary, transitional, horizontal, conical, and approach surfaces. The Part 77 inner approach surface (50:1 slope beginning 200 feet from the runway end) is the most restrictive surface that would affect the development

of the West Bypass corridor. Specifically, a minimum of 17 feet of vertical clearance must be maintained between the high (crown) point of the roadway and the approach surface. Although the OEI-OIS is technically more restrictive at 62.5:1 slope beginning from the runway end, it is not often practical to plan for it since many other factors also determine maximum takeoff weight. The FAA currently requires reporting any OEI surface impacts, not protecting the airport environment against them. The most critical impacts for airport operations at O'Hare Airport that would be reported by the FAA would be an Instrument Flight Rules (IFR) impact, which is a violation of the TERPS surfaces. Exhibit 3-9 shows an example of the runway surfaces (i.e., Part 77, TERPS, and one-engine inoperative) in greater detail in relation to the proposed West Bypass corridor. The preliminary roadway profiles, considered to date, confirm that the obstacle heights associated with the West Bypass corridor (17-foot permanent clearance for the highest vehicle, per 14 CFR Part 77 standards) would be below the imaginary airspace surfaces associated with the end of the runways. Additional exhibits can be found in the *Feasibility Study for Elgin O'Hare - West Bypass (EOWB) Tier Two Preliminary Engineering Phase Study* (CH2M HILL, 2011) that was submitted to and reviewed by FAA. The FAA provided a response and determination on December 14, 2011 (see Appendix B).

- **Runway Safety Zones.** As with the imaginary airspace surfaces, the FAA has established standards concerning specified safety zones immediately following the departure path at the end of a runway. The key safety areas that the FAA uses are the Runway Safety Area (RSA) and the RPZ. These standards are published in AC 150/5300-13.

The FAA describes the RSA as a “defined surface surrounding a runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or other excursion from the runway.” The RSA is a very restrictive area and is almost always on airport property. The West Bypass corridor would not impact any of the existing or future RSAs.



As discussed, the West Bypass corridor would be located within the RPZs, but is a permitted use provided it does not interfere with navigational aids and fits within the height restrictions set by the imaginary airspace surfaces above.

- **Aircraft Navigational Aids and Line of Sight.** It is imperative that the development of the West Bypass corridor not interfere with the navigational aids required to safely land aircraft. As previously discussed, the ALSF-II light plane is in an area that must remain clear of objects at and above the ALSF lights. The Tier Two EIS will analyze the impact of the West Bypass corridor on each component of the six runways' ILS, including the glideslope and localizer for signal interference and the ALSF-II for sighting considerations. Preliminary results are discussed in subsection 3.4.1.3.
- **Additional Compatible Land Use Guidelines.** Although the following guidelines are not regulatory, they provide recommendations in the interest of safety at O'Hare Airport and should be evaluated as part of the land release process.
 - *Lights, Glare.* Objects that project light upward or create glares, such as bodies of water or reflective surfaces, can be potentially hazardous because they can distract a pilot or create blinding glares. For the West Bypass corridor, roadway lighting near the final arrival approach may be misinterpreted as runway lights because they are arranged in a linear pattern and, therefore, should be designed to be downcast only with appropriate shielding. Open water surfaces (e.g., storm detention or retention facilities) and use of reflective building materials should not be used as part of the development of this site.
 - *Wildlife Attractants.* According to the FAA, wildlife/aircraft strikes have resulted in the loss of life and billions of dollars worth of aircraft damage worldwide during the past century. FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*, provides guidance on identifying incompatible land uses and minimizing or eliminating hazardous wildlife attractants in the vicinity of airports. Hazardous wildlife attractants could include solid waste landfills, open water stormwater management facilities, wetlands, woodlands, and landscaped areas. This AC applies to both O'Hare Airport and the Schaumburg Regional Airport in the project area. For O'Hare Airport, the effect of the regulation extends five miles from the airport boundary, and in the case of the Schaumburg Regional Airport, it extends 10,000 feet. As required by FAA, the proposed EO-WB project improvements will implement the AC. Extensive coordination is expected with the FAA and U.S. Department of Agriculture (USDA) to achieve compliance with the hazardous wildlife attractant AC. It has been agreed through agency consultation that engineering plan at 60 percent completion will be submitted to regulatory agencies for review and approval including the USDA.

3.4.1.3 Measures to Minimize Harm and Mitigation

The FAA regulates airspace and obstacle clearance requirements near airport operations. Obstacle clearance requirements control the height of structures or objects in aircraft operating areas. As such, the FAA encourages early review of any proposed actions near airport operations and their possible conflicts with controlled air space. Early review is voluntary and is conducted with the objective of assisting in the development of design parameters such as the EO-WB's roadway profile, lighting and sign heights, construction means and methods, etc. Because of the project's proximity to the airport, early coordination

during Tier One was initiated to determine if there were airspace concerns. Although the FAA typically conducts airspace reviews (using Form 7460 and required information) for projects much further into design, it was agreed that a preliminary 7460 review would be beneficial to facilitate airspace related design constraints. The FAA conducted two airspace reviews, one during Tier One and the other during Tier Two. The Tier One review was based on a conceptual level of detail, and Tier Two was based on more advanced engineering information. The reviews are both summarized below (see Appendix B for the FAA responses that include Tier One review [March 6, 2009] and Tier Two review [December 14, 2011]).

Tier One Airspace Review

The FAA's Tier One review cited no major concerns resulting from the location of the Elgin O'Hare and West Bypass corridors on or near airport property (see Appendix B). Most airspace conflicts cited by the FAA relate to future highway signage and lighting, which will be adjusted during the detailed design. In one case, a potential airspace violation would result in major roadway design decision (i.e., tunnel versus bridge). The highlights of the Tier One review are briefly described below:

- Four locations were identified as having IFR impacts, which concern departing aircraft initial climb surfaces. Two locations of concern (points 9R-PT5 and 9R-PT6) are near the proposed Runway 9R, where the Elgin O'Hare corridor connects with the West Bypass corridor (also the location of the proposed West Terminal). The FAA noted that a reduction in the height penetration at these locations by two to seven feet would avoid IFR impacts. The height violations at these locations would result in a reduction of aircraft departure weights allowed by the carriers. The third location (point 4R"G"-PT3) was associated with a south West Bypass corridor alignment option that is no longer under consideration, and therefore, warrants no further discussion. The fourth location (point 14R-PT3) is located near Runway 14R, which is planned to be decommissioned with the future construction of Runway 9R-27L and Runway 9C-27C. The timeframe for decommissioning will dictate if the roadway design at this location is a bridge over the CP railroad or a tunnel under the railroad. The decommissioning of Runway 14R is pending further discussion by the airlines and CDA regarding the construction of new Runway 9C, and the extension of Runway 9R. Until the schedule for the decommissioning of Runway 14R-32L is known, the design solution at this location will remain open.
- The FAA also provided a table of critical points for Part 77 height restrictions. The points show where potential penetrations to Part 77 imaginary surfaces could occur. See FAA memorandum, dated March 6, 2009, in Appendix B.
- The FAA noted that highway light poles must be obstruction lighted (shielded) for aircraft safety.
- The FAA specified that as the project proceeds to design, a formal 7460 review would be required before actual construction may commence.

Tier Two Airspace Review

As engineering detail advanced in Tier Two, the FAA agreed to update the 7460 review when details became available. By mid-2011, reliable horizontal and vertical roadway

profile information was available to use in an updated 7460 air space submittal to FAA (July 2011). The FAA conducted the second review of the EO-WB project and issued a determination that is dated December 14, 2011. There are three main types of airspace results reported that include impacts to IFR, impacts to Part 77, and penetrations to both IFR and Part 77.

The highlights of the Tier Two airspace analysis are summarized below:

- Three locations were identified as having permanent IFR impacts caused by the roadway and associated vehicle traffic on the roadway. Table 1, in the technical memorandum, "Summary of FAA 7460 Review - Tier Two," (CH2M HILL, 2012) identifies the evaluation points (EOWB- PT 137, EOWB- PT 138 and EOWB- PT 139) that show IFR impacts. Although the points are located near Runway 14R, which would be decommissioned in the future as part of the OMP, uncertainty regarding the construction schedule for the OMP improvements has altered some prior assumptions. As such, the decommissioning schedule of Runway 14R may occur after the West Bypass corridor development. In this case, the bridge that is currently planned to cross the CP/UP railroad tracks would penetrate the Part 77 approach surface (including the 14R TERPS arrival surface), light plane for 14R approach lighting system, and the 32L TERPS departure surface (including the OEI-OIS). If Runway 14R-32L is decommissioned after the development of the West Bypass corridor, alternative design methods, such as tunneling the roadway under the CP/UP railroad tracks (as opposed to bridging over the tracks), may need to be explored to remain compatible with the runway operation.
- Fifteen locations were identified as having potential permanent IFR impacts caused by the signage and light poles associated with the roadway. At two locations, points Q1 PT 2 and Q1 PT 3, near the proposed Runway 9R extension where the Elgin O'Hare corridor would connect with the West Bypass corridor, alternate locations for signage and lighting would avoid permanent airspace impacts. At the other thirteen locations, the evaluation used conservative elevation inputs to the FAA analysis. The FAA chose to use existing ground elevation as opposed to final roadway grade, which represented a conservative evaluation approach. Thus, at these locations, there would actually be no IFR impact realized once the proposed grading changes are made to cut existing ground.
- The FAA evaluated the airspace concerns related to Part 77 height restrictions. With respect to Part 77, the goal is to have no penetrations, if possible. Table 2, in the technical memorandum, "Summary of FAA 7460 Review - Tier Two," (CH2M HILL, 2012) identifies where potential Part 77 impacts in the permanent condition could occur. Again, the FAA used the conservative ground evaluation inputs (i.e., existing ground elevation rather than the final roadway elevation), thus, there would be few actual impacts as noted in Table 2.
- The FAA offered the following additional comments in its response, to be considered as the design/planning process proceeds:
 - There is preliminary evidence that electronic I-PASS devices used by Illinois Tollway users may cause interference with some portions of the ILS, particularly the localizer or glideslope signals. Further research is required to ensure no disruption to the localizer and glideslope operations.

- Commercial signage (i.e., rotating/moving billboards) that may be installed along the proposed West Bypass corridor must exclude the new LED lighting. The lighting has been reported to provide distractions to pilots on final approach. Additionally, it was recommended that no moving signs, no flashing signs, no significant color change, no pulsing intensity, etc., be allowed. Signs that include steady state lighting and are positioned exactly parallel to the runway centerline are preferred.
- Glideslope facilities may be affected by the proposed West Bypass corridor (Runway 9L, 10, 9C, 9R, 10C, and 10R). These facilities must be studied and modeled on an individual basis. CAT III Flight Inspection Tolerances must be modeled. These modeling efforts are already underway, as discussed in the next subsection. A request was made that topographical information for the proposed contour out to 3,000 feet from the approach end of each potentially affected runway be provided for additional review.
- The agency requested that future project evaluations would analyze the potential effects of the project on existing and planned navigational facilities for the airport (e.g., ASDE-X RU, ALSF-II, and ASR-9 facilities).
- In response to the request above, a preliminary review of the existing navigational aid conflicts was conducted in the summer of 2012 and is summarized below:
 - Project improvements at the proposed north leg of the West Bypass and Touhy Avenue are in close proximity to LLWAS #20 and ASDE Remote Unit #14. Roadway improvements would require consideration of potential modifications to avoid conflict with these navigational aids.
 - Project improvements at the end of 14R (assuming the runway is active at the time of roadway construction) would require consideration of potential design options to maintain service of the Far Field Monitor associated with Runway 14R-32L and the ALSF light plane.
 - The proposed roadway alignment, immediately south to the airport's fuel farm, would be in conflict with the ASDE-X remote Unit #13, and would require the relocation of the unit. Further coordination with the FAA will be required to reposition the unit.
 - The proposed interchange improvements near the proposed West Terminal site would displace LLWAS #17 and ASDE Remote Unit #12. Further coordination with the FAA will be required to reposition the unit.
 - The proposed roadway alignment crosses through the RPZ of 10L and 10C, impacting the ALSF light plane and ALSF maintenance bridges, and crossing the UP railroad. Modifications of the ALSF light planes and maintenance bridges will be coordinated with the FAA and CDA as necessary.
- As the project proceeds to design, a formal 7460 review would be required before actual construction may commence.

Overall, the FAA cited no major concern resulting from the location of the proposed roadway on or near airport property except for its potential conflict with Runway 14R-32L. The other airspace conflicts described above relate to future highway signage and lighting, which can be adjusted during the final design.

Glideslope/Localizer Analysis

Ohio University was tasked with modeling the effects of the various structures and terrain surrounding the EO-WB project on the ILS of existing and proposed east-west configuration runways (i.e., the impacts on existing Runway 9L-27R, existing Runway 10L-28R, future existing Runway 10C-28C, proposed Runway 10R-28L, proposed Runway 9C-27C, and the proposed extension of Runway 9R-27L).

An ILS is made up of two main components including a glideslope antenna, which provides vertical guidance and a localizer antenna array that provide horizontal guidance to the runway for arriving aircraft. An ILS system requires the area surrounding the equipment to be relatively smooth and free of objects that might reflect signals and produce errant guidance to approaching aircraft.

The glideslope analysis is broken into two main components, an object model and a terrain model. The localizer analysis consists solely of an object model. The Ohio University ILS models used in this analysis are the Ohio University Navigation and Landing Performance Prediction Model and the Ohio University Glide Slope Model (Windows Version). The scattering algorithm in the computer codes is based on the Physical Optics theory and the Uniform Theory of Diffraction, respectively. These two techniques are used to estimate the amount of signal degradations caused by multipath from structures and undulations caused by terrain variations.

Preliminary results, to date, indicate that the glideslopes for four of the six runways will not incur any negative impacts from the EO-WB project. The localizer analysis also indicates that the performance of four of the six runways will be well within tolerance limits. Systems that are appreciably impacted by the West Bypass corridor are currently being analyzed further.

Approach Lighting System

As detailed analysis continues during Tier Two, preliminary analyses show that the West Bypass corridor crosses the approach lighting system of all seven (existing and proposed) runways. The ALSF-II light bars are spaced approximately every 100 feet extending 2,400 feet from the end of the runway. For the most part, the West Bypass corridor is proposed to pass the runway ends approximately 1,600 feet to the west at a width of 200 to 300 feet. This typically disrupts the placement of two to three light bars, depending on the roadway configuration. The preliminary analyses confirm that the ALSF-II light plane can be maintained above the obstacle heights associated with the West Bypass corridor (17-foot permanent clearance for the highest vehicle, per 14 CFR Part 77 standards) using the two percent maximum slope allowed from the end of the runways. Conceptual modifications to the Approach Lighting System were provided in Exhibits 1 to 6 in the *Feasibility Study for Elgin O'Hare - West Bypass (EOWB) Tier Two Preliminary Engineering Phase Study* (CH2M HILL, 2011) that was submitted to and reviewed by the FAA. These exhibits depict the overall environment in the vicinity of the runway threshold end point for both approach and departure considerations. The exhibits include the approach light plane that is coincident with the elevation of the approach lighting system. The exhibits also include the Part 77, TERPS departure and one-engine inoperative Imaginary Airspace Surfaces discussed above. The FAA provided a response and determination on December 14, 2011 (see Appendix B).

Tower structures supporting the light bars over the West Bypass corridor and UP railroad tracks would be required. Where typical low impact-resistant tower structures cannot be directly fixed to ground-based foundations, it is expected that a cantilever or bridge structure for the light bars would be required to span the West Bypass corridor improvements. Tower heights are planned to be 40 feet or less. Further details would be developed for the operation of the ALSF lighting system during both construction and operation of the facility in later stages of design.

Conformance with the FAA Wildlife AC will be monitored by the USDA through an IGA between the Illinois Tollway, City of Chicago, and the USDA. The USDA and the Illinois Tollway will develop an overall strategy for the use of practices that would minimize the attraction of birds and wildlife to roadway features specifically detention/retention basins and compensatory storage areas, roadway landscaping within five miles of O'Hare Airport, and 10,000 feet of Schaumburg Airport. The USDA will receive 60 percent complete design plans and will review new open water features of the project and landscape features for compliance. The USDA will advise the Illinois Tollway of any design refinements related to minimizing bird and wildlife attraction.

3.4.2 Bensenville Yard

3.4.2.1 Affected Environment

The CP railroad's Bensenville Yard is a Railroad Freight Classification Yard south of O'Hare Airport and is bound by Metra's Milwaukee West line on the north, Franklin Avenue/Green Street on the south, York Road on the west, and Mannheim Road on the east. A Classification Yard is a set of tracks where rail cars are sorted, segregated, or grouped according to type, contents, or destination.

The Bensenville Yard is the CP railroad's largest rail yard in the Chicagoland area and the third largest behind the Belt Railway of Chicago's Clearing Yard and UP railroad's Proviso Yard. The Bensenville Yard is 3.8 miles long and has an area of 376 acres. It processes approximately 60 million gross tons of freight per year (1,476 cars per day). The east part of the rail yard contains 34 classification tracks, an arrivals yard, a departures yard, storage tracks north of the departure yard, an intermodal facility located at the southeast corner with five loading and unloading tracks, and a machine shop for car repair. The western part of the yard contains a local rail yard, a locomotive turntable, and an area leased to the hostler of the yard.

The trains arrive at the arrival tracks from the east, west, and north. The trains are broken down using the "hump" located in the middle of the yard and sent to one of the 34 classification tracks. Trains are built-up on the classification tracks and sent to the storage tracks or the departures tracks, where they are then dispatched from the yard.

The CP railroad anticipates substantial traffic increases from the west to the yard due to its acquisition of the Dakota, Minnesota, and Eastern Railroad.

3.4.2.2 Environmental Consequences

The proposed project would require approximately 30 acres of the Bensenville Yard for location of the roadway. The location of the road was coordinated with CP railroad to avoid long-term operational consequences and to optimize future opportunities. Displacement of two major facilities occurs with the project, including the locomotive turntable and a

machine shop. The relocation of these two facilities would allow for a more optimal placement that would add greater efficiency over existing conditions.

In addition, the proposed project would improve expressway access to the yard that currently requires circuitous routes to an interstate connection. The CP railroad anticipates a growing operation at this location because of recent acquisitions, as well as the prospect of improved access to the yard. With the prospect of growing the Bensenville Yard operations, the CP is mindful of its present configurations and the ability to expand in the future.

Coordination with CP railroad has identified numerous concerns and conditions that would require careful planning and implementation. Among the most critical is maintaining full operation of the yard with only minimal disruption or impacts to train operations and speed during the construction of the proposed roadway. These issues are most applicable to the roadway construction that would cross under the west end of the yard in the vicinity of the lead tracks. A preliminary staging plan has been developed to demonstrate that the yard operations would be maintained during all phases of construction.

3.4.2.3 Measures to Minimize Harm and Mitigation

Coordination with the CP railroad has been ongoing for over two years with the primary focus on the development of a construction staging concept for the west end of the Bensenville Yard. The concept shows the sequencing of roadway construction across the yard with the goal of uninterrupted operations of freight movement. Four stages of construction define the concept showing a well-orchestrated series of temporary track alignments and permanent railroad structures that would maintain full operation of the yard during construction and full flexibility for future track arrangements after construction by CP.

Coordination with CP has included the displacement and relocation of the Bensenville Yard turntable and machine shop. Both facilities would be required to be replaced and operational prior to the demolition of the existing facilities.

In addition to minimizing disruptions to railroad operations, specific safety procedures and regulations are required during construction near active railroads. Contractors are responsible for compliance with federal regulations (e.g., Railroad Workplace Safety [49 CFR 214] administered by the Federal Railroad Administration), Occupational Safety and Health Administration (OSHA) standards, as well as requirements specified by the applicable railroad. Prior to construction work on railroad property, right-of-way agreements and authorization must be obtained. Work must be coordinated with the appropriate railroad authority, and arrangements for flagmen may be necessary. Flagmen are employees designated by the railroad to direct or restrict the movement of trains, workers, or other on-track equipment for safety purposes.

Contractor employees would be required to be current on all railroad-related safety training and orientation courses. Contractors would be required to wear personal protective equipment, which includes hard hats, safety glasses, hearing protection, appropriate footwear (e.g., safety-toe boots), and high-visibility vests. Workers should not foul⁵ a track, except when necessary to perform their duties. All construction equipment must be in safe

⁵ Fouling a track occurs when an individual or equipment is located within four feet of a track, or could be hit by a moving train or on-track equipment.

operating condition and contractors must be properly trained in equipment use. Jobsites must be kept free from health and safety hazards. “Good housekeeping” must be practiced (e.g., material storage and proper disposal of litter, waste, and other debris), and tools, materials, equipment, or other objects should not be placed near the tracks (to avoid incidental contact with trains).

There would be situations when contractors would need to work on bridges over railroads or below grade under rail lines (e.g., at the southwest corner of the OMP, near the intersection of Green Street and York Road) for EO-WB project construction. Contractors must follow the applicable railroad, OSHA, and Federal Railroad Administration requirements for working on bridges and elevated structures, in confined spaces, or in below grade situations. Best practices may include fall protection when on bridges, respirators when in confined spaces or tunnels, and other measures to protect personnel and track structures during excavations. As appropriate, underground utilities shall be located prior to excavating. Hazardous materials, if encountered during construction excavation within railroad right-of-way, should be handled in accordance with applicable rules and regulations pertaining to Special Waste (see subsection 3.16).

3.4.3 Metropolitan Water Reclamation District of Greater Chicago Flood Storage Reservoirs

3.4.3.1 Affected Environment

Touhy Avenue Reservoir is an MWRDGC flood storage reservoir located south of I-90 and west of Mount Prospect Road. The reservoir consists of two deep “cells,” working in tandem to help control flood flows along Higgins Creek through the use of spillways, and a pump station that pumps detained water from the cells back to Higgins Creek, after floodwaters have receded. The two cells are hydraulically connected via two relatively large concrete pipes (diameters of 42 inches and 70 inches). The primary cell, which is the initial collector of stormwater at this basin, is located northwest of the secondary cell, which collects overflow from the primary reservoir. The Touhy Avenue runoff is released from the reservoir at a monitored rate toward O’Hare Airport. The MWRDGC coordinates with O’Hare Airport to determine a pumping rate after each flood event; therefore, there are no automatic pump set points at the Touhy Avenue Reservoir.

3.4.3.2 Environmental Consequences

The proposed West Bypass interchange with I-90 would cross the Touhy Avenue Reservoir. Specifically, the proposed improvements would cross the western edge of the secondary cell, displacing 171 acre-feet of capacity.

3.4.3.3 Measures to Minimize Harm and Mitigation

Coordination with MWRDGC has been undertaken to develop a construction phasing plan pertaining to impacts of the reservoir. The phasing plan will include the sequence of construction and the provision of replacement storage capacity that is equal to or greater than the existing capacity at all times during the construction period and after the proposed improvements are implemented. In general, the staging plan includes:

1. Constructing a third cell to provide the replacement capacity lost by constructing the proposed improvements and hydraulically connecting it to the other two cells,

2. Extending the pipe connecting the primary and secondary cell into the portion of the secondary cell that will remain after construction to ensure the secondary cell remains functional during and after construction,
3. Sectioning off the western edge of the secondary cell to be filled so that it does not receive stormwater during construction, and
4. Constructing the proposed improvements in the secondary cell.

The final configuration of the reservoir will consist of three cells, working in tandem to provide capacity equal to or greater than that which existed prior to implementation of the proposed improvements.

3.4.4 WBBM/CBS AM Radio Towers

3.4.4.1 Affected Environment

WBBM/CBS have two AM radio transmission towers located in the northwest quadrant of the Elgin-O'Hare Expressway/I-290 interchange. The main tower is 650 feet tall and is guyed for support. The other auxiliary tower is self supporting at 253 feet tall. WBBM AM (780 kilohertz) transmits from an omni-directional tower that broadcasts on a Class A clear-channel frequency (offering the greatest protection against interference from other radio stations). Radiating out from the center of the tower (every two degrees) are 650-foot-long, 10-gauge copper wires buried approximately two feet underground. The purpose of the wires is to reduce ground losses and improve overall efficiency of the vertical antenna. The wires are fragile, so the area in proximity to the tower is fenced off and is not used.

3.4.4.2 Environmental Consequences

Radio frequency (RF) energy emitted by transmitting antennas is used for telecommunication services (i.e., radio broadcasting). The amount of RF energy exposure depends on several factors, such as the type of station, power transmitted to the antenna, antenna design, antenna height, and distance from the antenna. Energy potentially absorbed by the human body can vary by frequency and intensity of the transmitted signal. Public access to the broadcasting antennas is restricted to minimize exposure to high-level energy fields. Workers are occasionally required to climb antenna structures for maintenance. Both USEPA and OSHA have reported possible exposure to high levels of RF energy if work is performed on an active tower or in areas immediately surrounding a radiating antenna. Therefore, precautions must be taken to minimize exposure to potentially dangerous RF fields. Blocking or shielding from RF electromagnetic radiation is referred to as RF shielding. The amount of reduction depends on the material used, its thickness, and the size of the shield.

These towers have high-voltage (50-kilowatt), electromagnetic fields that could injure workers if encroached during construction, maintenance, or operation of the proposed EO-WB project. The interchange at I-290 and the Elgin-O'Hare Expressway was designed so that it would not encroach into the area around the towers where there are safety concerns. The proposed improvements do require the southeast corner of the property for the southbound I-290 to westbound Elgin-O'Hare Expressway ramp and the westbound Elgin-O'Hare Expressway to southbound I-290 ramp; however, this is outside the area of concern. Nevertheless, certain considerations would need to be made, and specific requirements would need to be followed during and after construction. Safety precautions would be

developed with WBBM/CBS to be followed during construction. See subsection 3.4.4.3 for more detailed descriptions of safety precautions required during construction.

If the Illinois Tollway obtains roadway ownership in the vicinity of the antennas and vehicle-mounted transponders are used to collect tolls, there could be interference with the AM radio transmission. The transponders use Radio Frequency Identification (RFID) technology (RFID tagging). Interference could occur if the RFID tag frequency is the same as the AM radio broadcasting frequency.

Interference with the AM RF could also occur with RFID technology associated with social media through mobile devices, such as smart phones. Commercial and consumer products and marketers are evaluating the potential use of RFID technology to reach their market segment via cell phones. It is not clear at this time if this would interfere with the AM radio broadcast as mobile phones in vehicles pass by the AM antenna.

3.4.4.3 Measures to Minimize Harm and Mitigation

Construction personnel for this project are not anticipated to enter the perimeter of the transmitting antennas, which produce the high-energy RF fields. Coordination with WBBM/CBS would take place prior to construction in the vicinity of the antennas, as necessary, to confirm requirements. Potential safety considerations during the construction phase of the project are described below. All requirements may be assembled into a safety manual for use at the construction site.

- When working near the antennas, construction workers must be cognizant of land disturbance and vibration generated by heavy equipment. Because the buried 10-gauge copper wire is fragile, vibration monitoring may be required.
- Dust generated during construction and equipment noise should be minimized by implementing best management practices to reduce potential impacts.
- Safety measures, such as shielding construction equipment from the electromagnetic signals, would be used as necessary during construction to minimize potential for injury. Grounding and shielding requirements may include grounding metal, such as a chain-link fence installed at the roadway right-of-way with a separate electrode. However, because the fence would likely be located outside the radio transmission site, this may not be required.
- During construction, contractor radios may interfere with radio transmission, if the contractor RF is the same as the AM radio broadcasting frequency.
- If microwaves are transmitted from the tower, obstructions to the signal should be avoided. Microwaves work on a line-of-sight technology; therefore, signals would not penetrate through objects.

3.5 Public Facilities and Services

3.5.1 Affected Environment

The project corridor consists of well established communities with a full range of community facilities, including libraries, schools, and medical services. Following is a

