

CHAPTER THREE

ALTERNATIVES

Council on Environmental Quality (CEQ) Regulations state that "This section [Alternatives] is the heart of the environmental impact statement."¹ The regulations also state that the responsible agencies shall "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." In accordance with the Federal guidelines implementing the National Environmental Policy Act of 1969 (NEPA), CEQ Regulations, and agency orders, a range of reasonable alternatives has been identified that may accomplish the objectives of the proposed action.

As stated in **Chapter 2, Purpose and Need**, the proposed improvements are intended to:

- Address the projected needs of the Chicago region by reducing delays at O'Hare, and thereby enhancing capacity of the NAS.
- Ensure that existing and future terminal facilities and supporting infrastructure (access, landside, and related ancillary facilities) can efficiently accommodate airport users.

The primary purpose of this chapter is to describe the process used to identify reasonable alternatives meeting the purpose and need for the proposed action described in **Chapter 2**, and consists of the following sections:

3.1 Range of Alternatives Considered – This section describes the broad range of potential alternatives that were evaluated in relation to the identified purpose and need.

3.2 Initial Screening of Alternatives – This section describes the initial screening process, the evaluation of alternatives in relation to the needs stated in **Chapter 2**, and identifies the alternatives eliminated from further consideration.

3.3 Secondary Screening - Alternatives potentially meeting the stated needs were then evaluated with respect to considerations of feasibility and prudence. Some alternatives that would not meet the purpose and need individually were also considered in combination as a "blended" alternative that might meet the needs stated in **Chapter 2**. The blended alternative was also evaluated with respect to the secondary screening criteria.

3.4 Description of Alternatives Retained for Detailed Consideration – This section describes the physical development and operational characteristics of the alternatives retained for detailed consideration.

3.5 Summary Evaluation of Alternatives – CEQ Regulations state that alternatives should be presented in comparative form, "defining the issues and providing a clear basis for choice among options by the decision maker and the public." Accordingly, this section compares the

¹ Council on Environmental Quality Regulations, Section 1502.14

environmental consequences, operational, and economic factors considered for each of the alternatives retained for detailed consideration.

3.6 Evaluation of Derivatives – In response to comments received on the Draft EIS, the FAA has chosen to evaluate a number of derivative or variants of alternatives suggested by commenters. In addition, the FAA independently took a hard look at additional derivatives that the Agency had requested its staff to generate as a result of comments.

3.7 Preferred Alternative – The FAA has identified Alternative C as the preferred alternative in this Final EIS. The rationale for the identification of the preferred alternative is articulated in this section.

3.1 RANGE OF ALTERNATIVES CONSIDERED

NEPA and CEQ Regulations require that all reasonable alternatives to the proposed actions must be examined. The CEQ indicates that "reasonable alternatives" include "those that are practical or feasible from the technical and economic standpoint and using common sense". CEQ regulations also identify the following requirements.

- (1) The alternatives consideration shall "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment" – **Section 1502.1**,
- (2) "The range of alternatives discussed in environmental impact statements shall encompass those to be considered by the ultimate agency decisionmaker" – **Section 1502.2(e)**,
- (3) Agencies shall "Rigorously explore and objectively evaluate all reasonable alternatives..." – **Section 1502.14(a)**,
- (4) Agencies shall "Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits." – **Section 1502.14(b)**,
- (5) Agencies shall "include reasonable alternatives not within the jurisdiction of the lead agency" – **Section 1502.14(c)**, and
- (6) Agencies shall "include the alternative of no action" – **Section 1502.14(d)**.

The needs identified in **Chapter 2, Purpose and Need**, encompass a number of specific problems. A broad range of potential on- and off-site alternatives were considered to meet these needs.

The following sections present alternatives that were considered in three general categories: (1) no action, (2) Non-Airfield alternatives, and (3) airport development alternatives.

3.1.1 No Action (Alternative A)

NEPA, as well as CEQ and FAA regulations require consideration of a No Action Alternative. CEQ Regulations, Section 1502.14, states that the alternative of no action must be included, but gives no guidance on the nature of the No Action Alternative. The CEQ did provide guidance through publication of *The Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations* in the Federal Register on March 23, 1981. Question 3 pertains specifically to the No Action Alternative as follows:

No-Action Alternative. What does the "no action" alternative include? If an agency is under a court order or legislative command to act, must the EIS address the "no action" alternative?

A. Section 1502.14(d) requires the alternatives analysis in the EIS to "include the alternative of no action." There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated. The first situation might involve an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases "no action" is "no change" from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. Consequently, projected impacts of alternative management schemes would be compared in the EIS to those impacts projected for the existing plan. In this case, alternatives would include management plans of both greater and lesser intensity, especially greater and lesser levels of resource development.

The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis. For example, if denial of permission to build a railroad to a facility would lead to construction of a road and increased truck traffic, the EIS should analyze this consequence of the "no action" alternative.

In light of the above, it is difficult to think of a situation where it would not be appropriate to address a "no action" alternative. Accordingly, the regulations require the analysis of the no action alternative even if the agency is under a court order or legislative command to act. This analysis provides a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives. It is also an example of a reasonable alternative outside the jurisdiction of the agency which must be analyzed...

For purposes of defining the No Action Alternative for this EIS, any development that would require a new FAA environmental approval pursuant to NEPA would not be consistent with either of the two interpretations of "no action" discussed above.

The No Action Alternative is therefore defined as the existing O'Hare facilities with only limited improvements that have already been planned, approved by FAA, and for which the NEPA process has been completed. The No Action Alternative does not include modifications that would materially affect the ability of the Airport to accommodate additional activity. However, anticipated minor airport improvements are reflected in the No Action Alternative as shown in the Project Listing Matrix in **Table E-19 in Appendix E, Alternatives**. Existing O'Hare facilities

are shown in **Exhibit 1-2 in Chapter 1, Introduction and Background**, and in **Appendix A, Background**.

As discussed previously in **Chapter 1**, the FAA issued a Record of Decision (ROD)² in June 2002 for proposed terminal improvements at O'Hare, referred to as the World Gateway Program (WGP). Components of the WGP have since been modified, and are now included as a part of the overall plan to modernize O'Hare considered within this EIS. The improvements contained in the recent WGP ROD are not included in the No Action Alternative, except for some roadway improvements, as noted in **Section 5.3, Surface Transportation**, so that the updated projects can appropriately be assessed against the proposed alternatives. Relevant portions of the WGP improvements have been included as a part of the O'Hare Development alternatives as outlined in **Table E-19 in Appendix E**.

The No Action Alternative is retained as Alternative A through the remainder of this EIS. It consists of six runways configured in pairs in three different orientations. This configuration provides three concurrent arrival and departure streams in some good weather conditions. In adverse weather, it is not possible to provide three independent arrival streams. The terminal, surface access, and support facilities for this alternative are essentially unchanged from the existing facilities. See **Section 3.4.1, Alternative A – No Action** for greater detail on the No Action Alternative.

3.1.2 Non-Airfield Alternatives

The following five categories of Non-Airfield alternatives were identified for consideration. These alternatives do not require airfield development and include neither new runways nor new terminals.

3.1.2.1 Other Modes of Travel or Communication

It may be possible to reduce congestion and delay by reducing demand at O'Hare if passengers and cargo use surface modes of transportation (car, bus, or rail) or telecommute to achieve the purpose of their travel. Thus, alternative modes might provide options to accommodate some portion of the demand forecast for O'Hare. This category of alternative includes consideration of the following:

Conventional and High-Speed Rail. Conventional rail includes passenger trains, such as Amtrak. High-speed rail might be a long-term alternative to air travel in markets within up to 500 miles of Chicago if tracks are located along high population density corridors.

Highway Travel. Inter-city travel by automobile or bus is a commonly used alternative to air travel, especially for trips that are relatively short or less time sensitive.

Telecommunications. Rapidly emerging technology, video-conferencing, and collaborative computing could potentially satisfy at least some of the demand for air travel for business

² FAA Record of Decision, World Gateway Program, June 2002.

purposes. Considerable progress in the reliability and speed of voice and data communication has been made in the last decade.

3.1.2.2 Use of Other Airports

The timing and need for improvements at O'Hare might also be reduced or eliminated by operations and/or passengers using other airports. This category of alternative included consideration of:

Increased Use of Regional Airports. Because of their geographic location and current level of service, development and use of one or more regional airports was considered as an alternative to meet or partially meet the purpose and need. The following airports would be best able to accommodate additional commercial passenger service: Chicago Midway International, Gary/Chicago International, Northwest Chicagoland Regional Airport at Rockford, Milwaukee General Mitchell International, and a proposed South Suburban Airport.

Use of Other Mid-Continent Airports. Accommodating some passenger activity at other mid-continent airports (outside of the immediate region) was also considered as an alternative to meet or partially meet purpose and need. Since domestic connecting passengers – passengers who used the airport to transfer between U.S. flights – account for about 51 percent of the passenger traffic at O'Hare, it is possible that connecting passengers could be routed through alternative connecting hubs, thereby reducing the delay experienced at O'Hare. A number of large mid-continent airports might accommodate connecting passengers that would otherwise use O'Hare, including airports in: St. Louis, Minneapolis-St. Paul, Kansas City, Detroit, Cleveland, and Cincinnati.

3.1.2.3 New Air Traffic Control and Navigation Technologies

Implementation of currently available or reasonably foreseeable future air navigation technology and/or changes to the airspace might achieve the needs of the Chicago region by enhancing the capabilities of the existing infrastructure. Improvements in air traffic control and aircraft navigation technologies are expected to reduce the uncertainty regarding aircraft location with respect to established approach and departure procedures, other aircraft, and surrounding obstacles. These new technologies could ultimately reduce or eliminate the additional spacing required between aircraft for operations under instrument flight rules (IFR), thereby bringing IFR arrival and departure rates closer to the visual flight rule (VFR) rates for a given airport. New technologies may also permit more simultaneous operations at airports and result in reduced flight times under VFR operations. Both the 1991 and 2001 O'Hare Delay Task Force (DTF) studies identified a number of airspace and air traffic control improvements. The DTF initiatives were examined as part of the formulation of this alternative. For more information on the DTF studies, see **Appendix A, Background**.

3.1.2.4 Congestion Management

The primary objective of congestion management is to balance the demand for airport access with available airport capacity via some means of achieving more efficient scheduling of aircraft

operations. Administrative and market-based approaches have frequently been cited as measures to accomplish this goal. Administrative approaches rely on mechanisms such as grandfathering and lotteries as a means to allocate capacity. Market-based approaches, congestion pricing or auctions, use price as the mechanism to allocate capacity. Congestion management measures may facilitate the ability of airports to accommodate some portion of the future demand for air service.

Congestion management alternatives could relieve congestion and delay if they were to produce results such as spreading activity over longer periods, increasing passengers per aircraft operation, or increasing the utilization of other airports within the region. Such options could achieve certain delay reduction benefits. Accordingly, this analysis examines the potential of congestion management at O'Hare as a Non-Airfield alternative.

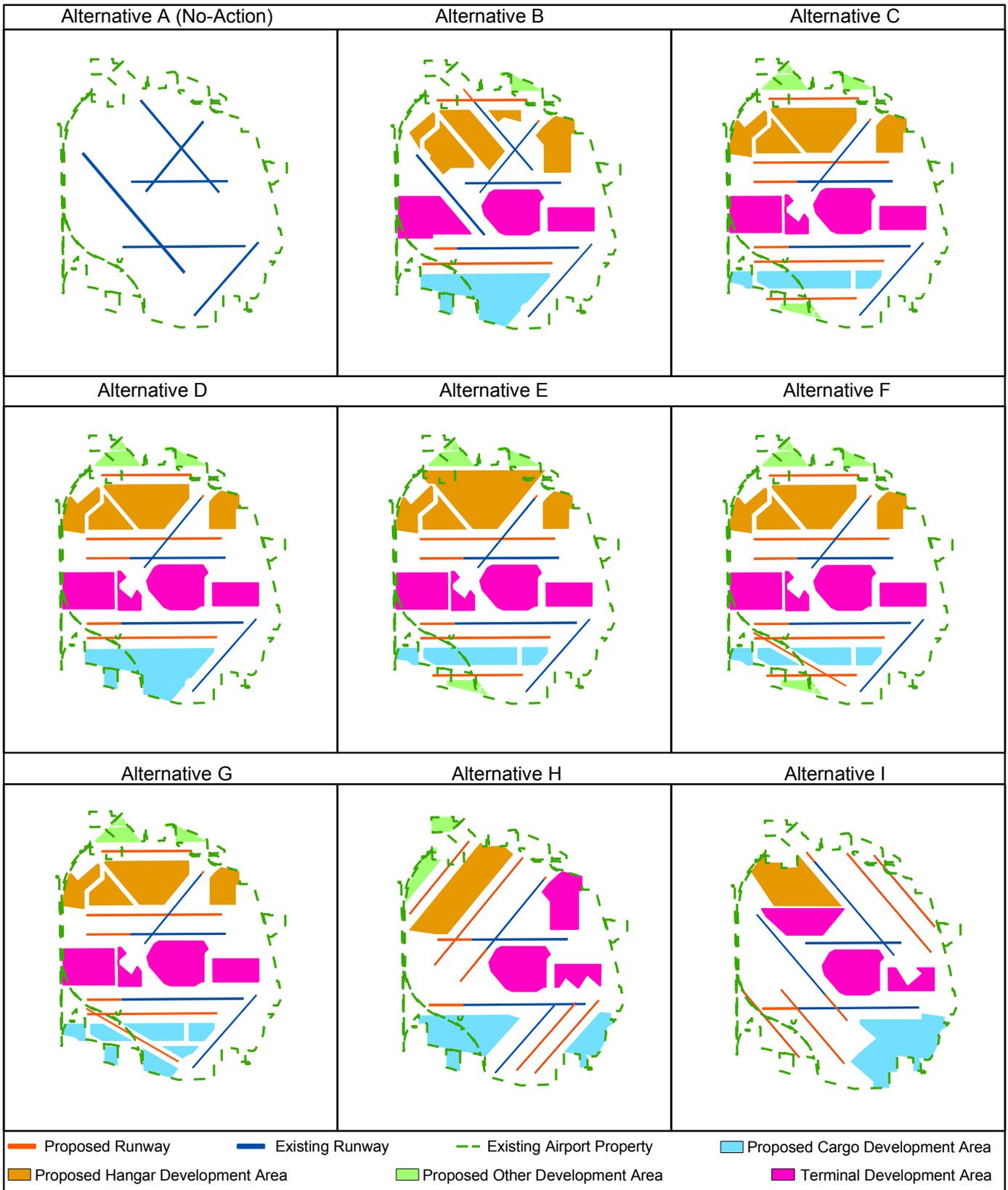
3.1.2.5 Airspace Improvements

Modifications to the airspace and/or air traffic control procedures were evaluated to determine if they might achieve the stated needs without physical development at the Airport. As discussed in **Chapter 2, Purpose and Need** a number of airspace improvements have been under study in and around the Chicago region. As part of the ongoing National Airspace Redesign (NAR) effort, a number of airspace and air traffic control improvements have been identified to increase the efficiency of air traffic control in and around the Chicago region.

3.1.3 O'Hare Development Alternatives

This section summarizes the potential O'Hare Development alternatives. **Appendix E, Section E.2, Airport Development Parameters** describes the airport planning principles that guided development of O'Hare Development concepts that might be able to satisfy the purpose and need. A total of eight O'Hare Development alternatives were identified for consideration. The eight alternatives (plus the No Action Alternative for reference) are shown on **Exhibit 3-1**. These alternatives include a subset of those evaluated by the City of Chicago in the course of developing its proposed O'Hare Modernization Program (OMP), as well as other alternatives identified by the FAA to examine other possible airport configurations. For more information on the OMP, see **Chapter 1, Section 1.6, Description of the Sponsor's Proposed Projects**. The alternatives illustrated on **Exhibit 3-1** are shown in more detail in **Appendix E, Section E.4, O'Hare Development Alternatives – Layouts with Land Use Delineation**.

The major site constraints that were considered in the development of the airfield alternatives include the interstate highway system (I-90, I-190, and I-294) located along the north and east perimeters of O'Hare, and York Road and Thorndale Avenue located on the Airport's western perimeter. The interstate highway system was identified as a constraint because alternatives requiring the extension of airport development across these transportation corridors would result in extensive impacts to the regional highway network. Proximity to York Road and Thorndale Avenue were identified as constraints because of the potential future corridors for the possible development of the West O'Hare Bypass and the extension of the Elgin-O'Hare Expressway, respectively. Encroaching upon existing and proposed major transportation corridors would have substantial implications for the Chicago region.



Source: Environmental Science Associates [TPC], 2003. Ricondo and Associates [CCT], Existing and Future ALP Drawing Set, 2004.

07/06/2005



Chicago O'Hare International Airport

O'Hare Build Alternatives Key

O'Hare Modernization Environmental Impact Statement

► Exhibit 3-1

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3.1.3.1 Alternative B

Alternative B adds a widely spaced east-west parallel runway, 6,900 feet to the north of the existing Runway 9L/27R, as well as a closely spaced parallel runway, 1,265 feet south of the existing Runway 9R/27L. A total of eight runways would be available ranging in length from 7,500 feet to 13,000 feet, with five runways between 7,800 feet and 8,850 feet. Alternative B provides up to three independent arrival streams under most weather conditions, but only two concurrent departure streams during adverse weather conditions. Additionally, the number of crossing arrival and departure streams result in dependencies between the two types of operations even during good weather conditions.

Terminal development would occur west of the Runway 14R/32L and between the extended centerlines of the inboard east-west runways. Runway 14R/32L would remain in service, therefore passenger access between the two terminal areas would require tunneling under an active runway or circuitous routing of aircraft around the airport's perimeter. Also, aircraft traveling to and from the new west terminal would need to cross an active runway. Terminal area access to the dual closely spaced runways to the south would be available from both the existing and future terminal areas.

Support facilities would be developed in three zones to the north. Cargo development would occur in a single contiguous area to the south. For a detailed exhibit of Alternative B, see **Appendix E, Section E.4, O'Hare Development Alternatives - Layouts with Land Use Delineation.**

3.1.3.2 Alternative C

Alternative C represents the airfield configuration proposed by the City of Chicago, referred to as the O'Hare Modernization Program. This alternative provides a total of eight runways; six configured in an east west orientation and the remaining two configured in a 4/22 orientation.

This airfield configuration provides for four independent arrival and three independent departure runways in good weather conditions, see Exhibit E-19 in **Appendix E, Alternatives.** In adverse weather conditions, this alternative provides three independent arrival runways with departures on the closely spaced parallel runways coordinated with the arrivals. In other words, the number of departure operations is one-for-one with the arrivals, using all of the closely spaced parallel runways. This alternative provides runways varying in length between 7,500 feet and 13,000 feet, with four runways at least 10,800 feet in length. This alternative also provides closely spaced parallel east-west runways immediately north and south of the terminal area.

This alternative provides for two new terminals in the existing terminal area, as previously assessed in the World Gateway Program Environmental Assessment, and an additional new terminal west of the existing terminal area between the extended centerlines of the inboard east-west runways. Since the existing Runway 14R/32L is decommissioned in this alternative, moving between the two terminals would not require crossing an active runway. Nevertheless, providing a passenger connection between the two terminal areas would still require tunneling

under an active taxiway or circuitous routing of aircraft around the airport's perimeter. Terminal area access for aircraft to the dual closely spaced runways to the north and the south would be available from both the existing and future terminal areas.

Support facilities would be developed between the widely spaced runways to the north and cargo development would occur between the widely spaced runways to the south. For a detailed exhibit of Alternative C, see **Appendix E, Section E.4, O'Hare Development Alternatives - Layouts with Land Use Delineation.**

3.1.3.3 Alternative D

Alternative D provides seven total runways with five configured in an east west orientation and two in a 4/22 orientation. This configuration is identical to Alternative C without the widely spaced southernmost east-west runway. This alternative provides three independent arrival and departure runways in most weather conditions. However, unlike Alternative C, Alternative D could not provide four independent arrival streams in good weather conditions. As in Alternative C, runway lengths range between 7,500 feet and 13,000 feet, with four runways at least 10,800 feet in length.

Like Alternative C, this alternative provides for two new terminals in the existing terminal area, as previously assessed in the World Gateway Program Environmental Assessment, and an additional new terminal west of the existing terminal area between the extended centerlines of the inboard east-west runways. Since the existing Runway 14R/32L is decommissioned in this alternative, moving between the two terminals does not require crossing an active runway. Nevertheless, providing a passenger connection between the two terminal areas would still require tunneling under an active taxiway or circuitous routing of aircraft around the airport's perimeter. Terminal area access to the dual closely spaced runways to the north and the south would be available from both the existing and future terminal areas.

Support facilities would be developed north of the closely spaced parallel runways that are immediately north of the terminal area while cargo development would occur south of the closely spaced runways immediately to the south of the terminal area. For a detailed exhibit of Alternative D, see **Appendix E, Section E.4.**

3.1.3.4 Alternative E

Alternative E is identical to Alternative C without the widely spaced northernmost east-west runway. Similar to Alternative D, this alternative provides three independent arrival and departure runways in most weather conditions. However, unlike Alternative C, Alternative E could not provide four independent arrival streams in good weather conditions. As in Alternative C, runway lengths for this alternative range between 7,500 feet and 13,000 feet with four runways at least 10,800 feet in length.

As in Alternatives C and D, new terminals would be developed in the existing terminal area and west of the existing terminal area between the extended centerlines of the inboard east-west runways. Runway 14R/32L would be decommissioned to permit movement between the two terminals without the need to cross an active runway. Nevertheless, providing a passenger

connection between the two terminal areas would still require tunneling under an active taxiway or circuitous routing of aircraft around the airport's perimeter. Terminal area access to the dual closely spaced runways to the north and the south would be available from both the existing and future terminal areas.

Support facilities would be developed north of the closely spaced parallel runways that are immediately north of the terminal area while cargo development would occur south of the closely spaced runways immediately to the south of the terminal area. For a detailed exhibit of Alternative E, see **Appendix E, Section E.4, O'Hare Development Alternatives - Layouts with Land Use Delineation.**

3.1.3.5 Alternative F

Alternative F is the only alternative with nine runways. This alternative is identical to Alternative C with an additional runway on the south airfield. This runway, configured in a 12/30 orientation crosses both of the southernmost east-west parallel runways. This runway would be used for departures only in an east flow operation to provide four independent departure streams in east flow. This alternative provides at least three parallel independent arrival streams in most weather conditions. Runway lengths for Alternative F range between 7,500 feet and 13,000 feet with four runways at least 10,800 feet in length.

Terminal development for Alternative F would occur west of the existing terminal area between the extended centerlines of inner east-west runways. Runway 14R/32L would be decommissioned allowing for movement between the two terminals without the need to cross an active runway. Nevertheless, providing a passenger connection between the two terminal areas would still require tunneling under an active taxiway or circuitous routing of aircraft around the airport's perimeter. Terminal area access to the dual closely spaced runways to the north and the south would be available from both the existing and future terminal areas.

Support facilities would be developed north of the closely spaced parallel runways that are immediately north of the terminal area while cargo development would occur south of the closely spaced runways immediately to the south of the terminal area. In this alternative, the existing cargo area would be significantly altered because of the proposed Runway 12/30. For a detailed exhibit of Alternative F, see **Appendix E, Section E.4.**

3.1.3.6 Alternative G

As a result of its ongoing discussions with Air Traffic specialists about modernization of O'Hare, the FAA elected to give careful study to a proposal generated by individuals with air traffic control expertise. This option became Alternative G. It is similar to Alternative F without the southernmost widely spaced parallel east-west runway, resulting in a total of eight runways and potential for three independent arrival streams and three departure streams in most weather conditions. However, unlike Alternative C, Alternative G could not provide four independent arrival streams in good weather conditions. Similar to Alternative F, runway lengths for this alternative range between 7,500 feet and 13,000 feet with four runways at least 10,800 feet in length.

Terminal and support facilities would be developed similarly to Alternative C and would occur west of the existing terminal area between the extended centerlines of Runways 9R/27L and 10L/28R. Runway 14R/32L would be decommissioned allowing for movement between the two terminals without the need to cross an active runway. Nevertheless, providing a passenger connection between the two terminal areas would still require tunneling under an active taxiway or circuitous routing of aircraft around the airport's perimeter.

Support facilities would be developed north of the closely spaced parallel runways that are immediately north of the terminal area while cargo development would occur south of the closely spaced runways immediately to the south of the terminal area. In this alternative the existing cargo area would be significantly altered because of the proposed Runway 12/30. For a detailed exhibit of Alternative G, see **Appendix E, Section E.4, O'Hare Development Alternatives - Layouts with Land Use Delineation.**

3.1.3.7 Alternative H

Alternative H has a total of eight runways and is the only alternative with 6 runways oriented in a northeast-southwest configuration and two runways in an east-west orientation. With this configuration, Alternative H would provide at least three independent arrival streams under most weather conditions. This alternative would also provide up to three departure streams. The longest runway would be 13,000' with the remaining seven runways ranging from 7,500' to 11,560'.

The terminal area would be developed to the northeast of the existing terminal area, adjacent to the approach end of existing Runway 22L and the approach end of existing Runway 27R. Runway 9L/27R would remain in service and therefore access between the two terminal areas would require tunneling under an active runway or circuitous routing of aircraft around the airport's perimeter. Given the locations of the areas available for terminal development, western access would not be practicable. Additionally, this option could not likely be developed without severely impacting the existing international terminal.

Cargo development would occur in two separate areas to the south and support facilities would be developed between the widely spaced parallel runways on the north airfield (Runways 4L/22R and 4C/22C). For a detailed exhibit of Alternative H, see **Appendix E, Section E.4.**

3.1.3.8 Alternative I

Alternative I includes six runways oriented in a northwest-southeast configuration and two runways oriented in an east-west configuration. In this alternative, Runway 14L/32R and 14R/32L remain. This alternative would also allow for the potential to have three independent arrival streams in most weather conditions. It would also provide for up to three departure streams. The runway lengths match those in Alternative H with one runway at 13,000' and the remaining seven runways ranging from 7,500' to 11,560' in length.

The terminal area would be developed in two areas, one to the northwest of the existing terminal area, north of the approach end to existing Runway 9L and one area directly east of the existing terminal area and north of existing Runway 27L. Runway 9R/27L and existing Runway

14R/32L would remain in service so access between the terminal areas would require tunneling under an active runway or around the airport's perimeter. Given the size and configuration of the area available for terminal development on the western perimeter of O'Hare, it is not possible to provide reasonable access, curbside and parking facilities. Consequently, western access would not be practicable.

Cargo development would occur to the southeast of existing Runway 9R/27L and the support facilities would be developed between the widely spaced parallel runways on the north side of the airfield between existing Runways 14R and 14L. For a detailed exhibit of Alternative I, see **Appendix E, Section E.4, O'Hare Development Alternatives - Layouts with Land Use Delineation.**

3.2 INITIAL SCREENING OF ALTERNATIVES

The first step in considering alternatives, referred to as the initial screening, focused on the ability of the alternatives to satisfy the purpose and need described in **Chapter 2, Purpose and Need.** This section describes the initial consideration of alternatives as follows.

3.2.1 Initial Screening Criteria

The following sections describe the criteria used to evaluate the ability of alternatives to meet the stated needs of the proposed action.

3.2.1.1 Criterion 1 – Address the projected needs of the Chicago region by reducing delays at O'Hare, and thereby enhancing capacity of the NAS

This criterion provides a standard for evaluating the ability of alternatives to meet the capacity enhancement/delay reduction needs described in **Chapter 2, Purpose and Need.** The following sections describe the factors considered in determining if alternatives would meet this criterion.

1A: Reduce delays, especially under adverse weather conditions

This factor addresses the following elements:

Are average annual delays substantially reduced relative to other alternatives in 2018? Exhibit 2-3 in **Chapter 2** presents average delays at O'Hare for the period 1998 to 2003 using Aviation System Performance Metrics (ASPM). The average delays per operation analyzed in three separate metrics (delay relative to schedule, delay relative to flight plan, and delay calculated as excess travel time³) were all in excess of 10 minutes and have grown increasingly worse between 2002 and 2003. A closer look at these same delay metrics for the months of October 2003 to September 2004, as presented in **Table 2-4** of **Chapter 2**, revealed a continuing increase in average delay per aircraft operation. Both a short-term and long-term solution to this growing problem are needed. The average annual delays of each alternative were

³ See **Appendix A, Background, Section A.5** for further discussion of delay relative to schedule, delay relative to flight plan, and delay calculated as excess travel time.

compared relative to one another for screening purposes. Those alternatives that were clearly superior relative to other alternatives were retained for secondary screening.

Is the disparity between good and adverse weather acceptance and release rates reduced?

When the IFR capacity of an airfield is substantially less than the VFR capacity (typically measured in hourly acceptance and release rates), significant delays occur during adverse weather. As part of the 2004 Airport Capacity Benchmark Report,⁴ FAA noted that during good weather conditions, O'Hare can accommodate between 190-200 operations per hour. During adverse weather, the airport can accommodate approximately 136-144 operations per hour, an approximate 28 percent reduction. Because O'Hare serves a major origin and destination market and is also a significant connecting hub airport, the volume of flights subject to delay caused by adverse weather near the Airport spread through the entire National Airspace System (NAS) and create a ripple effect of delay at other airports. Therefore, alternatives must reduce the negative imbalance between IFR and VFR hourly acceptance and release rates to accommodate forecast demand at acceptable levels of delay.

1B: Efficiently accommodate existing and future aviation operating needs

The FAA forecasts that in 2018 aviation demand at O'Hare will comprise approximately 50.4 million enplanements and 1.2 million aircraft operations. In this context, Criterion 1B addresses the following elements:

Could forecast aviation demand be accommodated? Alternatives must be able to accommodate all existing and forecast aviation demand.⁵ The criterion does not preclude further consideration of alternatives that would reduce aircraft activity at O'Hare, which could include potential passenger shifts to other Chicago regional airports and potential passenger shifts to other Mid-Continent hub airports. Accordingly, this criterion was used to evaluate whether or not all forecast connecting and origin-destination passengers could be accommodated.

Could current and future runway length requirements be met? The current maximum runway length of 13,000 feet provided by Runway 14R/32L should be preserved. In addition, all runways should provide sufficient length to minimize the need to segregate aircraft by runway length requirements and the attendant inefficiencies of such operations. Accordingly, all new runways should be at least 7,500 feet in length for runways used primarily for landings. Runways used primarily for departures should have lengths greater than 10,300 feet where practicable. To maintain airfield efficiency, alternatives must provide sufficient runway length to permit most aircraft to accept any assigned runway, thus avoiding operational inefficiencies. The ability to meet this need was determined based on the ability to have at least one 13,000-foot runway, landing runways no shorter than 7,500 feet, and departure runways no shorter than the current departure runway lengths of 10,300 feet to meet these length requirements.

⁴ Airport Capacity Benchmark Report 2004, FAA.

⁵ A presentation of the forecast is provided in **Appendix B, Aviation Demand Forecast**.

3.2.1.2 Criterion 2 – Ensure that existing and future terminal facilities and supporting infrastructure can efficiently accommodate airport users

In addressing the needs of the terminal, landside, and support facilities, the following factors were used in the initial evaluation of the alternatives ability to satisfy the needs previously described in **Chapter 2, Purpose and Need**.

2A: Provide adequate terminal, gate, and apron areas

This factor addresses the following elements:

Are spatial facility requirements met in the terminal area? As a part of the *O'Hare International Airport Master Plan*,⁶ specific spatial requirements for aircraft gates, linear gate frontage, remain overnight stands, and Federal Inspection Services (FIS) facilities were identified based on the anticipated activity level in each of the planning horizons (2007, 2009, 2013 and 2018). The following identify elements of the spatial requirements that were considered:

As noted in **Chapter 2, Section 2.3, Purpose and Need for the Proposed Action**, alternatives must provide gates and/or ramp area to accommodate forecast growth in new large aircraft (NLA) and regional jet (RJ) activity. Analysis of gate requirements for 2018 indicates that, at a minimum, an aggregate of 232 gates would be required - an increase of 43 gates, or 23 percent from the existing 189 gates. Although the specific mix of gate types may be revised over time, the terminal complex should provide the passenger handling equivalent of the following mix of gates and/or ramp areas: (1) two NLA positions; (2) 42 jumbo (e.g. Boeing 747) positions; (3) 42 widebody positions; (4) 101 narrowbody positions; and (5) 45 RJ positions. For environmental evaluation, these gate and ramp requirements were translated into a land envelope that would accommodate these facilities.

In addition to the aircraft parking positions described above, alternatives must provide additional FIS accessible gates (international gates) and sufficient holdroom, public circulation, ticketing lobby, baggage claim, airline space, and concessions areas to accommodate the peak month, average day (PMAD)⁷ levels of activity forecast for 2018. In aggregate, these requirements amount to approximately 7.4 million square feet of terminal building space, an increase of approximately 2.6 million square feet, or about 55 percent.⁸ The difference in the percentage increase in space relative to gates is largely due to the much greater spatial requirement associated with international gates versus domestic gates. International facilities require greater spatial needs for FIS facilities and associated holdroom space. International gates and associated facilities represent a larger percentage of the future needs than of the current spatial profile at the airport. These terminal area requirements were added to the

⁶ O'Hare International Airport Master Plan, City of Chicago, February 2004.

⁷ The PMAD (peak month, average day) schedule is a flight schedule, which represents an average day within the busiest month of the year. The PMAD is used in airport planning to represent a high level of demand that nevertheless occurs frequently enough that facilities should be designed to accommodate that demand at acceptable levels of delay and congestion.

⁸ O'Hare International Airport Master Plan, Page IV-26, City of Chicago, February 2004.

gate/apron requirements to determine the ability of alternatives to provide the necessary land envelope.

Alternatives must have the following characteristics: (1) terminal area ingress and egress taxi routes with two-way circulation; (2) minimal need to reposition aircraft (aircraft operate from one location to deplane passenger and then must be moved to another to enplane passengers); and (3) minimal need to close adjacent taxiways to accommodate NLA operations. Alternatives that would meet these requirements by fragmenting or breaking up the space available for terminal and landside development not only make terminal space difficult to configure efficiently, but also require greater taxiway and apron area to provide aircraft access to passenger terminals. Alternatives resulting in an inefficient operation due to gate fragmentation were dismissed.

Does the configuration and proximity of gates and supporting facilities provide flexibility for accommodating new entrants and grouping of alliance partners? To permit efficient use of the available gates and provide flexibility in accommodating new entrants, the gate requirements identified must be part of a contiguous terminal development complex that is not divided by runways or other major development areas. Therefore, alternatives that met the gate/apron spatial requirements would include sufficient space to reasonably accommodate new entrant carriers.

2B: Provide sufficient supporting infrastructure

As a part of the Master Plan process, specific spatial requirements were identified for supporting infrastructure based on the anticipated activity level in each of the planning horizons. The following elements were considered:

Are spatial requirements met for support facilities, including cargo area? Aggregate air cargo building and apron area requirements for 2018 have been estimated at 316 acres.⁹ The requirements estimated for other support facilities in 2018 include: airline aircraft maintenance, 240 acres; airline ground support equipment (GSE) maintenance, 30 acres; flight kitchens, 17 acres; airport maintenance, 68 acres; and general aviation (GA) and fixed-base operator (FBO) facilities, approximately 15 acres.¹⁰ Similar to the other functional areas of O'Hare, the cargo and support area requirements were translated into a land envelope. Alternatives that would not provide the necessary land envelope were dismissed.

Is efficient surface access provided? Currently, access points leading to the passenger terminal and other functional areas are located at the east and northeast perimeter. Consequently, airport users on the west and southwest of the airport must travel around the perimeter of the airport. To enhance convenience for airport users accessing O'Hare from the west and southwest, the State of Illinois, in the O'Hare Modernization Act directed that roadway access to O'Hare from the west should be provided. Alternatives that would enable providing improved access for west and southwestern origin-destination passengers were identified.

⁹ O'Hare International Airport Master Plan, Page IV-27, City of Chicago, February 2004.

¹⁰ O'Hare International Airport Master Plan, Table IV-10, Page IV-28, City of Chicago, February 2004.

3.2.1.3 Tabular Summary of Initial Screening Criteria

Table 3-1 presents a tabular summary of the initial screening criteria.

TABLE 3-1 – SUMMARY OF INITIAL SCREENING CRITERIA

Purpose and Need		Initial Screening Criteria
1. Address the projected needs of the Chicago region by reducing delays at O'Hare, and thereby enhancing capacity of the NAS.		
1a	Reduce delays, especially under adverse weather conditions	Are average annual delays substantially reduced relative to other alternatives in 2018? Is the disparity between good and adverse weather acceptance and release rates reduced?
1b	Efficiently accommodate existing and future aviation operating needs	Could forecast aviation demand be accommodated? Could current and future runway length requirements be met?
2. Ensure that existing and future terminal facilities and supporting infrastructure can efficiently accommodate airport users.		
2a	Provide adequate terminal, gate, and apron areas	Are spatial facility requirements met in the terminal area? Does the configuration and proximity of gates and supporting facilities provide flexibility for accommodating new entrants and grouping of alliance partners?
2b	Provide sufficient supporting infrastructure	Are spatial requirements met for support facilities, including cargo area? Is efficient surface access provided?

3.2.2 Initial Evaluation of Alternatives

This section applies the previously defined initial screening criteria to the alternatives identified. As described in **Section 3.1, Range of Alternatives Considered**, a total of 14 alternatives are considered. These alternatives consisted of the No Action Alternative, eight O'Hare Development alternatives, and five Non-Airfield alternatives.

An initial screening of this broad range of alternatives was conducted to identify those alternatives that did not meet the project need. Alternatives that might meet the need were then carried forward for further comparative evaluation relative to the secondary screening criteria. The following sections discuss the initial screening evaluations and results.

3.2.2.1 Initial Screening of O'Hare Development Alternatives

Based upon an evaluation of alternatives considered during initial screening using the criteria previously set forth, the following O'Hare Development alternatives were dismissed from further consideration, (see **Appendix E, Alternatives**, for further explanation). The explanation follows the alternative identified in the section heading.

Alternative B

This alternative reduces delay, but not nearly as well as other O'Hare Development alternatives. Based on simulation modeling, it appears that Alternative B is least effective in accommodating projected demand and does not alleviate the existing disparity between VFR and IFR capacity. Notably, Alternative B performs considerably better than the No Action Alternative. For further information see **Appendix D, Simulation Modeling, Section D.7, Estimated Delay For**

Non-Modeled Alternatives. Alternative B also requires future terminal facilities to be separated from existing terminal facilities by an active runway (Runway 14R/32L). Alternative B is therefore eliminated from further consideration.

Alternative H

This alternative poses irreconcilable conflicts between efficient use of the proposed runway layout and adequate space for infrastructure development, most specifically terminals. Specifically, parallel Runways 5L/23R and 5C/23C would be restricted to arrivals to the northeast and departures to the southwest for safety reasons in light of the location of the terminal area directly to the northeast of these runways. Therefore, in this case the airfield capacity of this alternative would be significantly reduced relative to the other O'Hare Development alternatives. Alternatively, operation of this set of runways could be unrestricted only if the existing infrastructure were removed, specifically existing Terminal 5. Because this alternative requires either the sacrifice of efficient runway capacity or the loss of adequate terminal infrastructure, it does not meet the stated purpose and need and is therefore eliminated from further consideration.

Alternative I

Alternative I provides for the addition of four new runways oriented in a southeast-northwest direction, and aircraft routed to and from these runways would utilize the airspace currently used by Midway traffic. Midway International Airport (MDW) is located 13 miles southeast of O'Hare. These adverse airspace impacts would be significant enough to either severely limit Midway's viability as a large air carrier airport or meaningfully reduce the additional potential capacity that O'Hare could otherwise provide. It should also be noted that this option includes significant constraints on the development of future terminal facilities and would have limited surface access routes which would likely lead to roadway congestion. Alternative I does not, by itself, meet the stated purpose and need and is therefore eliminated from further consideration.

3.2.2.2 Initial Screening of Non-Airfield Alternatives

This section summarizes both the initial screening results for the Non-Airfield alternatives and the reasons why they were eliminated (see **Appendix E, Alternatives**, for further explanation).

Other Modes of Transportation and Communication

The ability of alternative modes of transportation and communication to provide realistic alternatives to O'Hare development is largely dependent upon the following factors: (1) aviation demand characteristics, including city-pair market demand; (2) the amount of aviation demand that could reasonably be served by alternative transportation modes; and, (3) the amount of aviation demand that could reasonably be avoided through the use of telecommunications.

Conventional Rail. The potential for conventional rail to accommodate forecast aviation demand at O'Hare depends on travel time, cost, availability of suitable rail equipment, and

frequency of service. **Appendix E, Section E.1.2.1, Other Modes of Transportation or Communication** contains information on current rail service in relation to aviation market demand and service. The conclusions from an analysis of rail service suggest: (1) significant investments in improved rail service would be required to make conventional rail travel a more attractive substitute for short-haul air travel from O'Hare, and (2) even assuming such improvements, the total share of the O'Hare market that might take advantage of rail service is relatively small. Thus, this alternative would not, by itself, meet the purpose and need criterion of accommodating forecast aviation demand.

High-Speed Rail. Congress has established several high-speed ground transportation corridors with the objective of linking select high-density metropolitan areas via the ultimate development of high-speed rail service. The Chicago hub corridor would link the major cities of St. Louis, Minneapolis, Detroit, Indianapolis, and Cincinnati, as well as several medium-sized cities, such as Ann Arbor, MI, Kalamazoo, MI, Bloomington, IL, Springfield, IL, and Madison, WI. On January 18, 2001, the U.S. Secretary of Transportation announced the selection of two projects, in Maryland and Pennsylvania, to be advanced into the next phase of the competition to build and demonstrate the first maglev high-speed train system in revenue service in the United States.¹¹ There are currently no plans by the U.S. Department of Transportation (Federal Railroad Administration) to implement high-speed rail in the Chicago area. Therefore, although new high-speed rail service could theoretically reduce aviation demand at O'Hare, in the absence of such plans, it does not appear reasonable to rely on this alternative to meet the purpose and need criterion of accommodating forecast aviation demand. Additional information is provided in **Appendix E, Section E.1.2.1.**

Highway Travel. Highway travel is already an alternative to air travel at O'Hare, but does not always provide an equivalent substitute for air travel. **Appendix E, Section E.1.2.1** presents information on O'Hare passenger demand and relative travel times for short-haul trips of 500 miles or less for which highway travel is most likely to be an alternative. Within O'Hare's top ten origin/destination passenger markets, none is less than 15 hours drive-time from Chicago. The conclusions from analysis of this information are: (1) approximately 93.5 percent of O'Hare passengers begin or end their trips at a point more than 500 miles from the Airport;¹² (2) the time required for highway travel to destinations of 500 miles or more limits the attractiveness of highway travel as an alternative, especially for business travel; and (3) it is unlikely that there would be improvements to highway travel that would make this a more attractive alternative for a significant share of the O'Hare travel market. Thus, this alternative would not, by itself, meet the purpose and need criterion of accommodating forecast aviation demand.

Telecommunications. Rapidly emerging telecommunications technology, such as fiber optics, state-of-the-art electronic signal technology, video-conferencing, and collaborative computing could potentially satisfy some of the forecast demand for air travel for business purposes. **Appendix E, Section E.1.2.1** presents information on the development of telecommunications

¹¹ <http://www.dot.gov/affairs/fra201.htm>

¹² Based upon an analysis of origin and destination data for the top 25 markets for O'Hare travelers in CY 2002.

technology. The conclusions from analysis of this information are: (1) despite impressive improvements in this technology, traffic at O'Hare continues to increase, (2) independent estimates of the potential impact of telecommunications represent a relatively small share of the total forecast aviation demand, and (3) the FAA has considered the impact of telecommunications in preparing their aviation demand forecasts. Thus, this alternative would not, by itself, meet the purpose and need criterion of accommodating forecast aviation demand.

Use of Other Regional Airports

There are a number of other regional airports that could accommodate additional commercial passenger service: Chicago Midway International, Gary/Chicago International, Northwest Chicagoland Regional Airport at Rockford, Milwaukee General Mitchell International, and the proposed South Suburban Airport. The use of these regional airports could potentially relieve demand at O'Hare and reduce the urgency or need for certain airport improvements. **Appendix C, Section C.1.2, Available Airports in the Chicago Region** includes a brief overview of existing regional airports and the status of planning initiatives underway for the proposed South Suburban Airport.

The Federal government does not control where, when, and how airlines provide their services; nor is the Federal government the driving force in airport capacity development or airport utilization. Rather, the aviation industry, in partnership with local and regional government, and in response to market demand, determines where and how air travel demand is accommodated. Based upon the analysis presented in **Appendix C, Section C.1.2, Available Airports in the Chicago Region**, forecast aircraft operations at both Midway and Milwaukee are anticipated to exceed their practical airfield capacity by 2018 unless capacity-enhancing improvements are undertaken.¹³ While Rockford and Gary/Chicago each have capacity that could be available to support future commercial activity, these facilities presently have surplus capacity and to date have had little to no impact on commercial activities at O'Hare. Additionally, the South Suburban Airport could provide additional capacity if built.

Appendix C, Section C.1.1, Multiple Airports Systems in the United States presents information on multiple-airport regions throughout the nation and provides an analysis for development of airline service at other regional airports, which could reduce the need to accommodate forecast aviation demand at O'Hare. In evaluating use of other airports as an alternative to enhancing capacity at O'Hare, it is helpful to consider how multiple airport systems have evolved in the nation. There are many regional aviation markets throughout the nation that support multiple commercial passenger airports. In 2002, 10 of the 15 largest air travel markets in the United States were served by more than one airport and seven (7) were served by three (3) or more secondary airports. **Exhibit 3-2** through **Exhibit 3-6** depict the top five market areas in the United States, showing the population densities and each of the airports serving these market areas. Multiple airport systems can be reasonably expected to share in the service of local originating passenger demand. In terms of local originating passengers, as of

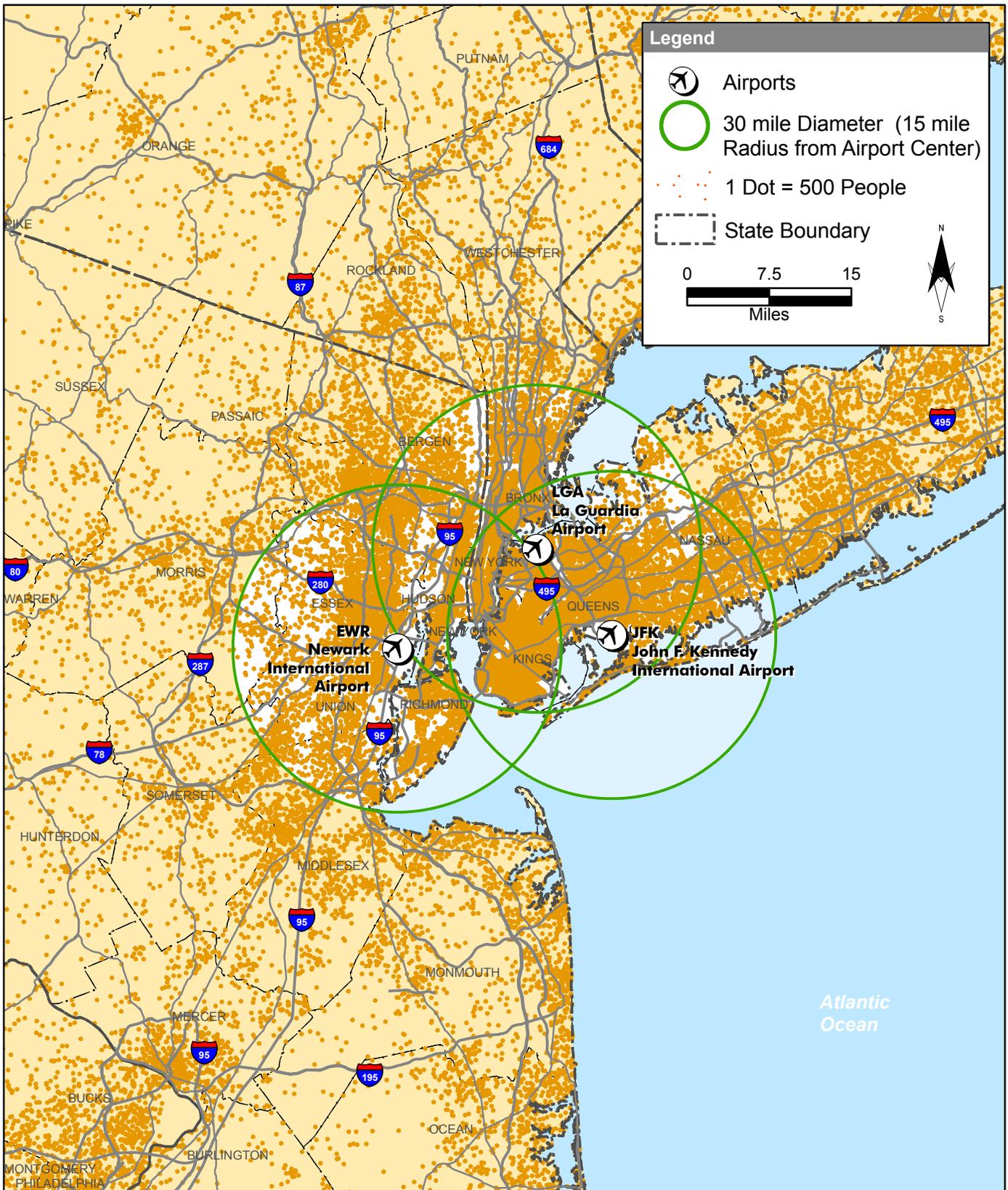
¹³ MKE is in the process of updating its Airport Master Plan, which will address the type and extent of facilities required to meet future demand. The implementation of planned improvements could substantially increase the airport's capacity.

2002, the Chicago area was the third largest air travel market in the nation, following New York and Los Angeles.

Currently in the Chicago market, O'Hare International, Midway International, and General Mitchell International Airport in Milwaukee each accommodate at least 10 percent of regional demand. There is no current example in the United States for a region to be served by more than three airports each with a significant (10 percent or greater) market share. From this data, it is not reasonable to conclude that the Chicago area could be served by more than three airports, with each having 10 percent or more of the regional demand.

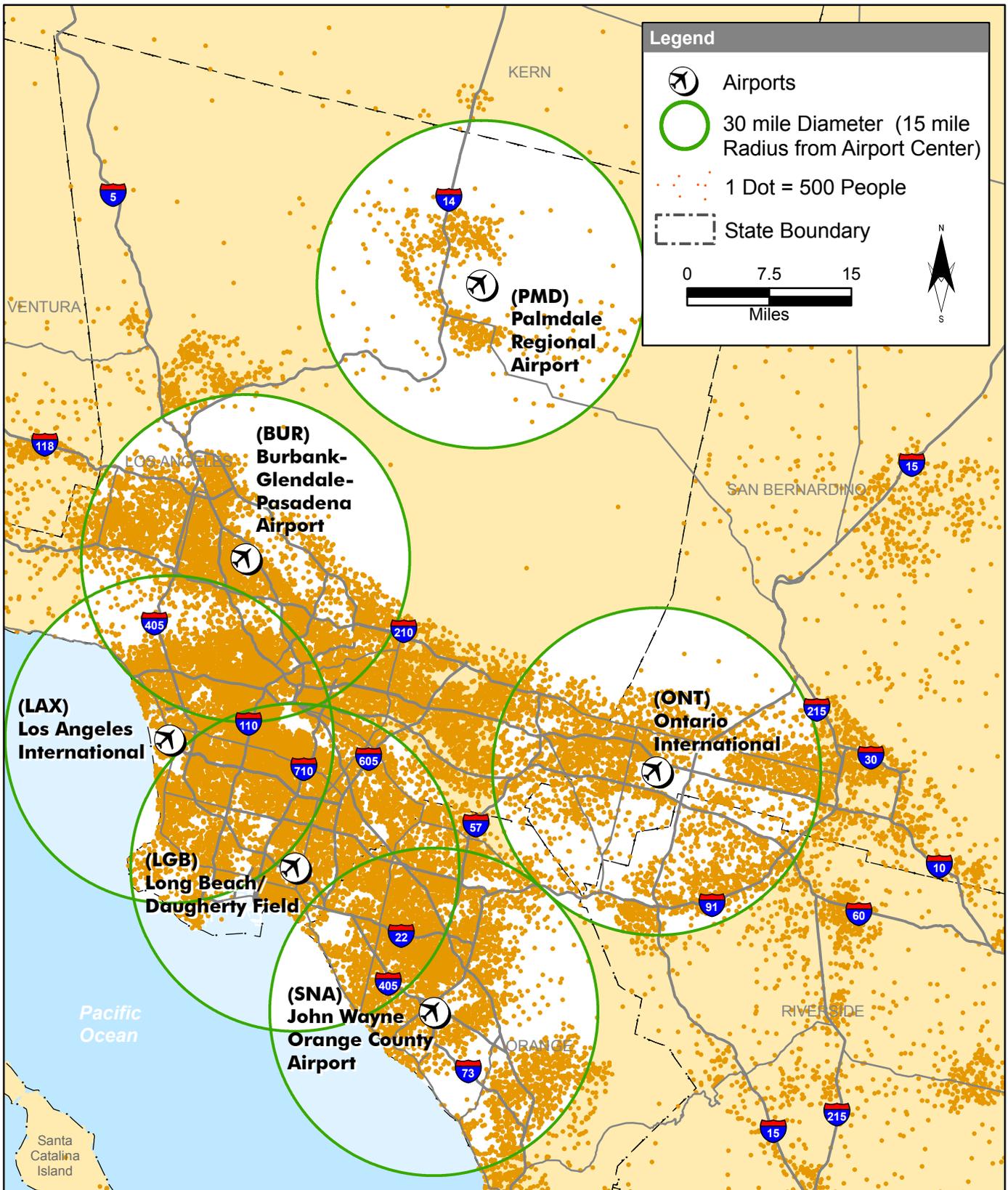
Additional conclusions from this analysis are: (1) it is possible that the capacity at other existing and potential regional airports could be used to satisfy some of the local origin-destination passenger demand forecast for O'Hare, (2) it is not likely that any of the other regional airports would be used as a significant connecting hub or international gateway during the forecast period, (3) the continued role of O'Hare as a major national connecting hub and international gateway is dependent on the airline service of local origin-destination demand at O'Hare, so there is a limit to the amount of local demand that could be diverted while still maintaining the roles of O'Hare as a hub and gateway, (4) the practical limit of potential diversion of demand from O'Hare is estimated to be far less than the likely availability of capacity at other regional airports, and (5) any material diversion of demand from O'Hare would require airline strategic decisions which cannot be predicted or relied upon. As a result, it was determined that the use of other regional airports would not, by itself, be sufficient to satisfy purpose and need. Although the use of other regional airports would not be sufficient to satisfy purpose and need, the FAA continues to respond to sponsor requests and support the development of other airports in the region, including Gary/Chicago International Airport, Greater Rockford Airport, Milwaukee General Mitchell International Airport, Chicago Midway International Airport, as well as the proposed South Suburban Airport.

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Source: U.S. Census Bureau, Census 2000. Airports, ESRI, 2002. Roads, ESRI, 2002.

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Source: U.S. Census Bureau, Census 2000. Airports, ESRI, 2002. Roads, ESRI, 2002.



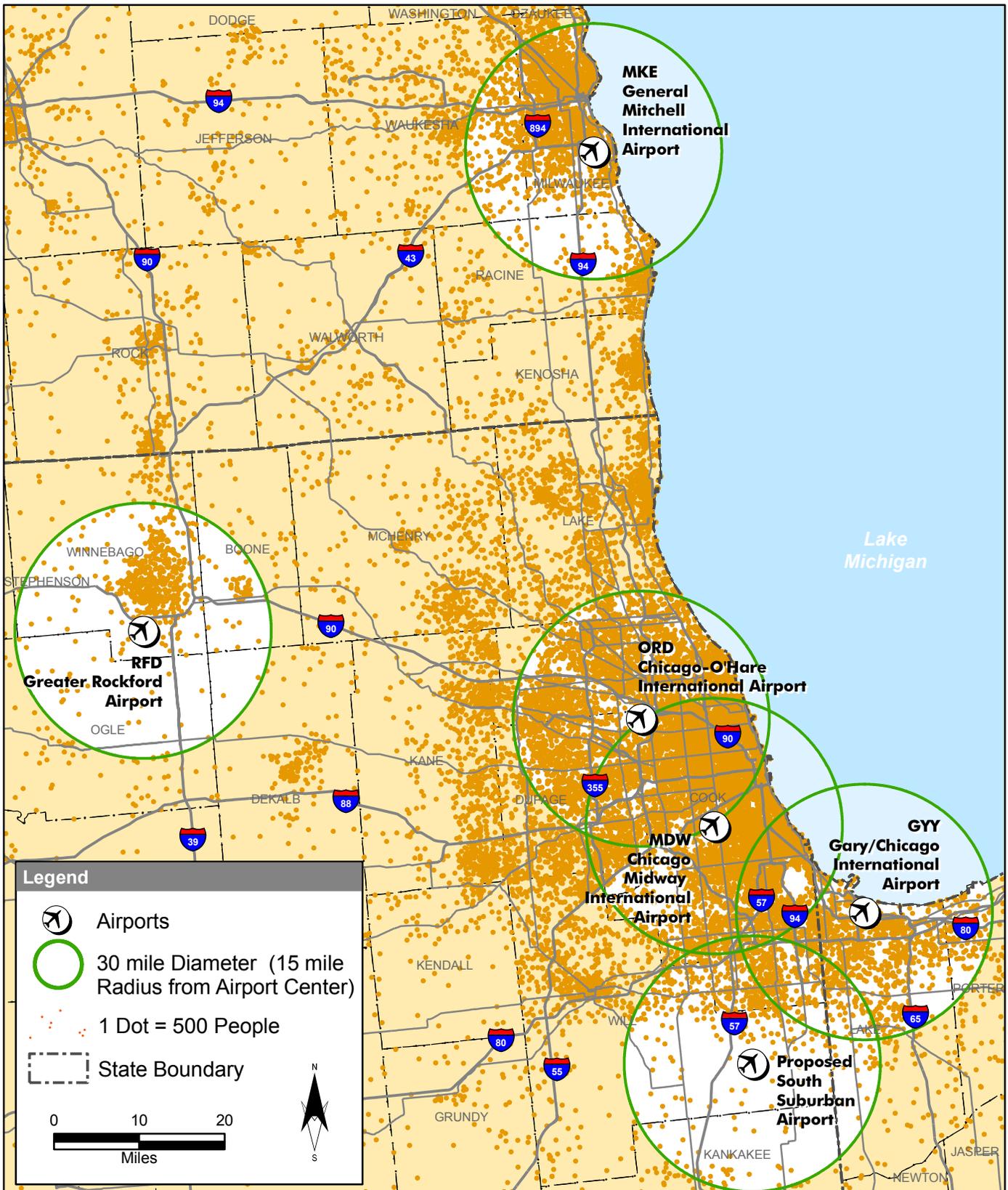
Chicago O'Hare International Airport

**O'Hare Modernization
Environmental Impact Statement**

**Population Density and 15 Mile
Radius Around Airports**

► Exhibit 3-3

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Source: U.S. Census Bureau, Census 2000. Airports, ESRI, 2002. Roads, ESRI, 2002.



Chicago O'Hare International Airport

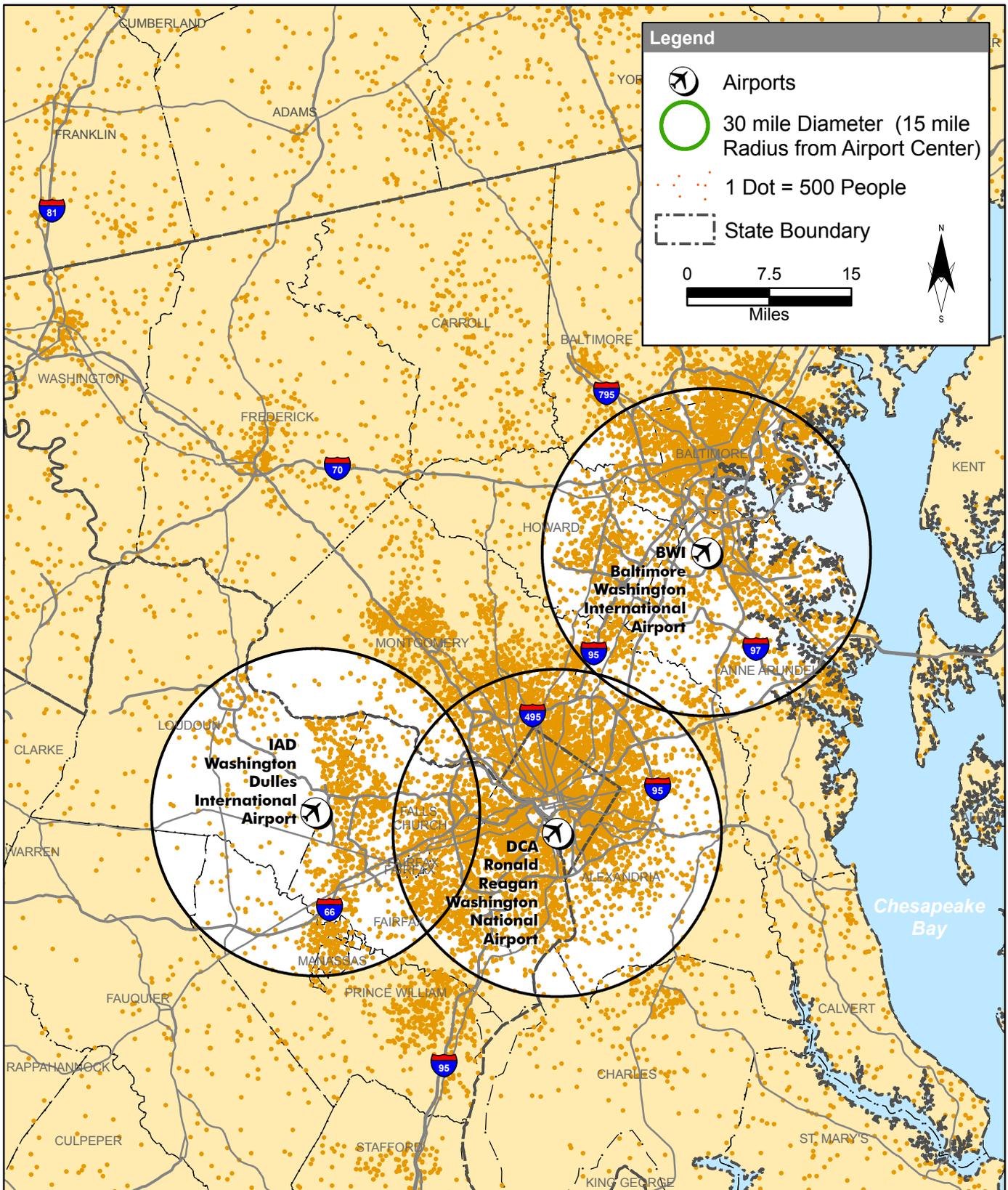
**O'Hare Modernization
Environmental Impact Statement**

**Population Density and 15 Mile
Radius Around Airports**

► Exhibit 3-4

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Source: U.S. Census Bureau, Census 2000. Airports, ESRI, 2002. Roads, ESRI, 2002.

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Use of Other Mid-Continent Airports

Other mid-continent airports could potentially be used to accommodate connecting passengers forecast for O'Hare. Significant reductions in connecting passenger traffic at O'Hare would likely reduce the level of air service for local passengers at O'Hare. The current connecting hub operations at O'Hare enable a range and frequency of service that is convenient for local passengers. With connecting passengers available to "fill" the airplanes, airlines can provide a greater offering of nonstop service to multiple destinations than would otherwise be the case. If connecting passengers were diverted to other hubs, it is likely that there would be a reduction in the frequency and range of nonstop service. This reduction in the frequency and range of service would likely be most pronounced for smaller domestic markets and for international markets, which rely significantly on connecting passenger flows. This would result in diminished service to local Chicago passengers.

Over time, as bilateral agreements for international air service have been liberalized to more closely resemble the domestic deregulated environment, international service is an increasingly important component of air service at O'Hare. International traffic at O'Hare has grown at a faster rate than domestic traffic. As shown on **Table 3-2**, O'Hare is currently one of the top five international gateway airports in the nation.

**TABLE 3-2
TOP 20 US AIRPORTS – INTERNATIONAL ENPLANEMENTS**

ACI International Enplanements – CY 2002			
Rank	Airport	International Enplanements –	
		CY 2002	(Rounded)
1	John F. Kennedy International	7,605,216	7,605,000
2	Los Angeles International	7,435,442	7,435,000
3	Miami International	7,170,124	7,170,000
4	O'Hare International	4,358,579	4,359,000
5	San Francisco International	3,650,692	3,651,000
6	Newark Liberty International	3,546,775	3,547,000
7	Hartsfield-Jackson Atlanta International	2,863,505	2,864,000
8	Houston-Intercontinental	2,855,102	2,855,000
9	Dallas/Fort Worth International	2,241,281	2,241,000
10	Honolulu International	2,125,931	2,126,000
11	Washington-Dulles	2,017,724	2,018,000
12	Boston-Logan	1,811,884	1,812,000
13	Philadelphia International	1,594,735	1,595,000
14	Detroit Metropolitan	1,340,945	1,341,000
15	Orlando International	772,182	772,000
16	Minneapolis-Saint Paul International	741,123	741,000
17	Seattle-Tacoma International	703,516	704,000
18	Fort Lauderdale – Hollywood International	602,777	603,000
19	Phoenix Sky Harbor International	601,550	602,000
20	Charlotte Douglas International	516,843	517,000

Source: Airports Council International, December 2004.

Because the Chicago region is such a strong origin and destination market, it is likely to remain as a primary hub, essential to the operations of each of the hubbing carriers. Therefore, when combined with the presence of both domestic and international connecting traffic, it is unreasonable to expect a significant shift in traffic to other mid-continent airports. Indeed, this assessment is reinforced by the recognition that of the top ten connecting hub airports, O'Hare is the only airport that also serves one of the country's top five origin and destination markets.

Furthermore, as the Seventh Circuit Court of Appeals stated in an earlier case involving improvements at O'Hare, neither the FAA nor the City of Chicago can direct how airlines conduct their network operations.¹⁴ Consequently, implementation of this alternative would require new authority to provide control over airline service patterns at O'Hare and possibly other airports, which is (1) in direct conflict with the deregulation of the airline industry that occurred in 1978 and (2) beyond the capability of the FAA.

FAA believes it is not reasonable to expect (1) one or both hubbing carriers to voluntarily shift enough connecting traffic to one or more alternative mid-continent airports to avoid the need for improvements at O'Hare or (2) that the federal government would mandate such a shift. Therefore, this alternative does not meet the purpose and need.

Congestion Management

The FAA evaluated congestion management including both administrative- and market-based options as an alternative to meet the purpose and need. To address the purpose and need, congestion management measures would need to be designed to enable O'Hare and/or other airports to accommodate all forecast originating and connecting passenger activity.

With respect to the administrative options available to implement the congestion management concept, the EIS notes in **Chapter 2, Section 2.2.4** that on March 25, 2005, the FAA issued a Notice of Proposed Rulemaking (NPRM) to extend the limitation of flight schedules as a temporary congestion management measure. The NPRM makes clear, however, that the use of arrival caps as a method of reducing flight delays is not preferable to the long-term goal of increasing airport capacity through infrastructure enhancements. This same point has also been made by the two hubbing carriers, American and United Airlines. Even if this were to occur, congestion management is not an effective tool to address the future needs of the Chicago region. As the FAA has stated earlier in the EIS for the Runway 17-35 Extension Project at Philadelphia,

As a matter of policy, [the Office of the Secretary of Transportation] and FAA disfavor administrative approaches to demand management as an artificial constraint on the demand for air transportation. For example, such approaches bar air carriers from offering air travelers as much service as they would like. Administrative approaches should only be employed where absolutely necessary and as an interim, stop-gap measure, until an acceptable solution to delay can be implemented.

Accordingly, it remains the FAA's position that administrative rules that cap operations may be suitable interim actions where improvements are physically impractical, or not yet implemented.

¹⁴ SOC v. Dole, 787 F.2d 186,196 (1986).

With respect to market-based approaches to congestion management, **Appendix E, Section E.1.2.3, Congestion Management** presents an analysis of alternatives and their applicability to O'Hare. The conclusions of this analysis are: (1) there is virtually no potential to accommodate unconstrained demand at O'Hare through peak-spreading, (2) there is likely to be potential to provide incentives for the use of larger aircraft and thereby accommodate more passenger demand with fewer aircraft operations, although this is limited by the current and projected fleet composition of airlines, and (3) congestion management alone is not likely to result in accommodation of unconstrained passenger demand without other improvements or actions. Thus, this alternative would not, by itself, meet purpose and need.

Airspace-Only Improvement Alternative

The Airspace-Only Improvement Alternative is Alternative A (No Action Alternative) combined with airspace modifications to enhance the flow of traffic to and from O'Hare. Implementing such improvements (e.g. new arrival routes) in the O'Hare airspace could reduce or eliminate the need for physical improvements to the airfield only if the capacity of the current runway system was greater than the capacity of the corresponding adjacent airspace. Today, the current runway system is the constraint on operations at O'Hare. In other words, improving the airspace at O'Hare without also making improvements in the runway capacity would be akin to adding new entrance ramps on a highway without adding new lanes. Therefore, the Airspace-Only Improvement Alternative would not, by itself, meet purpose and need. The comparison of airspace and airfield capacities is presented in greater detail in **Appendix E, Section E.1.2.4, Airspace-Only Improvement**.

New Air Traffic Control and Aircraft Navigation Technologies

The FAA and the aviation industry are pursuing a wide range of technology initiatives to improve the efficiency of the National Airspace System. These new technologies, if implemented and applied at O'Hare, could result in accommodation of more aircraft operations without an increase in airfield capacity.

Appendix E, Section E.1.2.5, New Air Traffic Control and Aircraft Navigation Technologies presents information on potential technologies, and analysis of their ability to accommodate forecast aviation demand growth at O'Hare. Based on the data and analysis, potential technology improvements appear capable of providing only marginal, incremental improvements to airfield and airspace capacity at O'Hare. Furthermore, the benefits of many of these potential improvements are speculative, relying on technologies and flight procedures that have not yet been fully developed and tested. Consequently, it is concluded that these technology improvements would not be capable of increasing O'Hare's capacity to a level sufficient to accommodate the forecast unconstrained demand levels through the planning period considered in this EIS, and therefore would not meet the stated purpose and need.

3.2.3 Summary of Initial Screening

This section identifies alternatives that have been retained for further consideration. This section also lists the alternatives that will not be carried forward for further consideration. **Table 3-3** summarizes the initial screening of Non-Airfield alternatives, including use of other modes of transportation, use of other airports, advanced air traffic control and navigation technology, congestion management, and airspace improvements. These alternatives are more fully described in **Appendix E, Section E.1.2, Non-Airfield Alternatives**. **Table 3-4** summarizes the initial screening of the O'Hare Development alternatives which are more fully presented in **Appendix E, Section E.1.3, Initial Evaluation of O'Hare Development Alternatives**.

Table 3-3 and **Table 3-4** were developed to make a side-by-side comparison of the ability of each potential alternative to meet the criteria associated with the purpose and need of the proposed action. Each alternative was evaluated by addressing the criteria as identified in **Section 3.2.1, Initial Screening Criteria**. Each of these criteria was evaluated to help determine whether or not the alternative meets, partially meets, or does not meet the purpose and need of the proposed action. For example, if an alternative clearly had the potential to meet or exceed a purpose and need screening criterion, the table cell was given a blue shade. If an alternative clearly did not have the potential to meet the criterion, the table cell was given a red shade. A yellow shade was used if the alternative had the potential to partially meet the criterion.

To be retained for further consideration as a complete alternative, alternatives had to meet each criterion. Alternatives that only partially met one or more of these criteria may be retained for consideration as part of a blended alternative as indicated in **Section 3.2.3.3, Alternative Created for Further Consideration-Blended Alternative**.

TABLE 3-3 INITIAL SCREENING - NON-AIRFIELD ALTERNATIVES

Alternative	No Action	Other Modes of Travel or Communication	Use of Other Airports		Congestion Management	Airspace Improvements	New Air Traffic Control and Aircraft Navigation Technologies						
			Regional Airports	Mid-Continent Airports									
1. Address the projected needs of the Chicago region by reducing delays at O'Hare, and thereby enhancing capacity of the NAS.													
1a	Reduce delays, especially under adverse weather conditions												
1b	Efficiently accommodate existing and future aviation operating needs												
2. Ensure that existing and future terminal facilities and supporting infrastructure can efficiently accommodate airport users.													
2a	Provide adequate terminal, gate, and apron areas												
2b	Provide sufficient supporting infrastructure												
Conclusion - Ability to meet initial screening criteria as an individual alternative.	Retain as required by NEPA	Eliminate (a)	Eliminate (a)	Eliminate	Eliminate (a)	Eliminate	Eliminate (a)						
Note: (a) This alternative will be evaluated further as part of the blended alternative discussed in Section 3.2.3.3, Alternative Created for Further Consideration.													
Legend: <table style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 15px; height: 15px; background-color: blue;"></td> <td>Alternative clearly has the potential to meet or exceed criterion</td> </tr> <tr> <td style="width: 15px; height: 15px; background-color: yellow;"></td> <td>Alternative may have the potential to partially meet criterion</td> </tr> <tr> <td style="width: 15px; height: 15px; background-color: red;"></td> <td>Alternative clearly does not have the potential to meet criterion by itself</td> </tr> </table>									Alternative clearly has the potential to meet or exceed criterion		Alternative may have the potential to partially meet criterion		Alternative clearly does not have the potential to meet criterion by itself
	Alternative clearly has the potential to meet or exceed criterion												
	Alternative may have the potential to partially meet criterion												
	Alternative clearly does not have the potential to meet criterion by itself												

TABLE 3-4 INITIAL SCREENING - O'HARE DEVELOPMENT ALTERNATIVES

Runway Layout for Each Alternative	A	B	C	D	E	F	G	H	I						
Alternative	A (No Action)	B	C (Sponsor's Proposal)	D	E	F	G	H	I						
1. Address the projected needs of the Chicago region by reducing delays at O'Hare, and thereby enhancing capacity of the NAS.															
1a	Reduces delays, especially under adverse weather conditions	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue						
1b	Efficiently accommodate existing and future aviation operating needs	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue						
2. Ensure that existing and future terminal facilities and supporting infrastructure can efficiently accommodate airport users.															
2a	Provide adequate terminal, gate, and apron areas	Red	Red	Blue	Blue	Blue	Blue	Blue	Red						
2b	Provide sufficient supporting infrastructure	Red	Blue	Blue	Blue	Blue	Blue	Blue	Red						
Conclusion - Ability to meet initial screening criteria as an individual alternative.	Retain as required by NEPA	Eliminate (a)	Retain for Secondary Screening	Eliminate											
Note: (a) This alternative will be evaluated further as part of the blended alternative discussed in Section 3.2.3.3. Alternative Created for Further Consideration.															
Legend:															
<table border="0"> <tr> <td style="width: 20px; height: 15px; background-color: blue;"></td> <td>Alternative clearly has the potential to meet or exceed criterion</td> </tr> <tr> <td style="width: 20px; height: 15px; background-color: yellow;"></td> <td>Alternative may have the potential to partially meet criterion</td> </tr> <tr> <td style="width: 20px; height: 15px; background-color: red;"></td> <td>Alternative clearly does not, by itself, have the potential to meet criterion</td> </tr> </table>											Alternative clearly has the potential to meet or exceed criterion		Alternative may have the potential to partially meet criterion		Alternative clearly does not, by itself, have the potential to meet criterion
	Alternative clearly has the potential to meet or exceed criterion														
	Alternative may have the potential to partially meet criterion														
	Alternative clearly does not, by itself, have the potential to meet criterion														

3.2.3.1 Alternatives Eliminated by Initial Screening

In compliance with CEQ Section 1502.14(a), Agencies shall "...for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Of the 15 individual alternatives identified for initial screening, nine were dismissed for not fully meeting the purpose and need of the proposed action. The blended alternative, discussed in **Section 3.2.3.3, Alternative Created for Further Consideration**, reconsiders each of the alternatives discussed in this section to determine if some combination of these alternatives may meet the purpose and need.

As noted above, the reasons for dismissal are presented in summary form in **Tables 3-3 and 3-4**. More detailed explanations are also provided in **Section 3.2.2, Initial Evaluation of Alternatives**. A list of alternatives eliminated from further consideration follows.

- Use of other modes of transportation and/or communication – highway, rail, and telecommunications
- Use of other regional airports
- Use of other mid-continent airports
- Congestion management – peak spreading, and activity reduction
- Airspace improvements (only)
- New technologies – air traffic control, aircraft performance
- O'Hare Development Alternative B
- O'Hare Development Alternative H
- O'Hare Development Alternative I

3.2.3.2 Alternatives Retained for Secondary Screening

The following five alternatives were retained for further consideration through secondary screening. Since the No Action Alternative (Alternative A) is required to be retained for full environmental analysis, this alternative is not included within the secondary screening analysis.

- O'Hare Development Alternative C
- O'Hare Development Alternative D
- O'Hare Development Alternative E
- O'Hare Development Alternative F
- O'Hare Development Alternative G

Although the use of other airports would not, in itself, meet the criteria established in **Section 3.2.1, Initial Screening Criteria**, an alternative combining use of other airports with less extensive development at O'Hare was considered to examine the possibility that such a

"blended" alternative might meet the purpose and need for the proposed action. This "blended" alternative is discussed in the next section.

3.2.3.3 Alternative Created for Further Consideration – Blended Alternative

The initial screening process identified alternatives that, while not completely meeting the needs identified in **Chapter 2, Purpose and Need**, might provide partial solutions. **Tables 3-3 and 3-4** used yellow shading in initial screening to highlight those alternatives which "may have the potential to partially meet criterion". At this point in the EIS, careful consideration of a blended alternative is particularly appropriate to provide the Agency and the public with an analysis of a combination of a more modest construction alternative and Non-Airfield alternatives.

A study of the demand/delay curve, as depicted in **Appendix E, Section E.1.2.6, Blended Alternative**, shows that Alternative B could not, by itself, substantially reduce delays when compared to other alternatives retained for secondary screening. However, Alternative B, in combination with other Non-Airfield alternatives, may potentially meet purpose and need. Partial alternatives considered included: 1) a limited airfield improvement alternative (i.e. Alternative B), 2) other modes of transportation and communication, 3) use of other airports, 4) new air traffic control and navigation technologies, and 5) congestion management.

Because a blended alternative must meet all the initial screening criteria described in **Section 3.2.1, Initial Screening Criteria** any deficiency in one component of a blended alternative must be completely remedied by some other component.

Definition and Evaluation of Blended Alternative

The following combination of developments/actions was determined to be sufficient to meet purpose and need and therefore constitute a reasonable "blended" alternative for secondary screening:

O'Hare Development Alternative B

This is a limited development alternative that would not, on its own, provide sufficient capacity to accommodate the 2018 forecast demand. However, this alternative does provide some additional capacity, which is estimated to be enough to accommodate about 1,042,000 annual aircraft operations at levels of delay similar to other retained alternatives. The unconstrained forecast of aircraft operations for 2018 is 1,194,000 aircraft operations, which is approximately 150,000 aircraft operations greater than the number that would be accommodated by O'Hare Development Alternative B. At the forecast average level of enplaned passengers per operation in 2018, this is equivalent to about 6.4 million enplaned passengers. Thus, the remaining elements of the Blended Alternative must be able to accommodate the equivalent of about 6.4 million enplaned passengers in 2018.

Other Non-Airfield Alternatives

Other Non-Airfield alternatives were combined to provide for the excess demand not accommodated by Alternative B alone, as follows:

Alternative Modes—The alternative modes of road and rail may be redundant in that each would satisfy demand in short-haul travel markets. As reported in **Appendix E, Section E.1.2.1, Other Modes of Transportation or Communication**, the total short-haul demand¹⁵ is about 7 percent of the total O'Hare originating passenger demand in 2018, or about 1.9 million originating passengers. It is estimated that 26 percent¹⁶ of short-haul originating passengers travel to markets within 250 miles of O'Hare. Of these originating passengers, it was assumed for purposes of this Blended Alternative that 30 percent could divert to road or rail.¹⁷ This equates to about 0.15 million originating passengers.

It is further estimated that the remaining 74 percent¹⁸ of short-haul originating passengers travel to markets within 251 to 500 miles of O'Hare. Of these originating passengers, it was assumed for purposes of this Blended Alternative that 20 percent could divert to road or rail.¹⁹ This equals about 0.28 million originating passengers, resulting in a total diversion of approximately 0.43 million short-haul originating passengers to road or rail.

Use of Other Regional Airports—As described in **Appendix C, Section C.1.4, Conclusion Regarding Use of Other Regional Airports**, it is estimated that the use of other regional airports could reasonably be expected to result in 2.0 million enplaned passengers diverted from O'Hare in 2018 assuming that one or more airlines decides to develop significant new service at one or more of the under-utilized airports in the region.

Airspace Improvements—As described in the earlier **Section 3.2.2, Initial Evaluation of Alternatives**, it is estimated that airspace improvements alone would not reduce delays. In combination with any airfield improvements, such as Alternative B, some airspace improvements are likely to be required in order to achieve the delay savings indicated by the airfield analysis, but these delay savings would not be materially incremental to the airfield development itself. Therefore, airspace improvements are not included as a part of the Blended Alternative.

New Technology—As reported in **Appendix E, Section E.1.2.5, New Air Traffic Control and Aircraft Navigation Technologies** there are not precise estimates of the potential impact of new technology. However, based on the technical work cited in **Appendix E**, potential technology improvements appear capable of providing only marginal, incremental improvements to airfield and airspace capacity at O'Hare. Furthermore, the benefits of many of these potential

¹⁵ Demand for travel to markets within 500 miles of O'Hare, based upon an analysis of the top 25 markets for O'Hare originating passengers during 2002.

¹⁶ Of the top 25 markets for O'Hare travelers during 2002, one market was within 250 miles and accounted for approximately 26 percent of short-haul originating passengers.

¹⁷ Assumed percentage of modal diversion based upon "Regional Change in Domestic Origin and Destination Traffic by Mile Group" chart presented in Friday, November 12, 2004, Aviation Daily.

¹⁸ Of the top 25 markets for O'Hare travelers during 2002, four markets were within 251 – 500 miles and accounted for approximately 74 percent of short-haul originating passengers.

¹⁹ Assumed percentage of modal diversion based upon "Regional Change in Domestic Origin and Destination Traffic by Mile Group" chart presented in Friday, November 12, 2004, Aviation Daily.

improvements are speculative, relying on technologies and flight procedures that have not yet been fully developed and tested. Nonetheless, for purposes of the Blended Alternative, new technology is estimated to accommodate an additional 0.8 million enplaned passengers in 2018.

Congestion Management—As discussed in **Appendix E, Section E.1.2.3, Congestion Management**, the potential benefits from congestion management may be in two areas: (1) use of larger aircraft to serve demand at O'Hare, and (2) spreading of local demand to other regional airports. The potential benefit of spreading local demand to other regional airports is already included in the factor above, "Use of Other Airports." Therefore, the incremental contribution of congestion management to the Blended Alternative would be from the use of larger aircraft. To develop the constrained forecasts (refer to **Appendix B, Aviation Demand Forecast**), there was analysis of potential airline fleet adjustments to accommodate growth in demand without increases in aircraft operations. It was estimated that the average number of passengers per operation could be 9.5 percent higher in 2018 if airlines had incentives to utilize somewhat larger aircraft and consolidate some flight frequencies. For purposes of the Blended Alternative, this full potential is not likely to be available because of other assumed developments (e.g., transfer of some activity to other airports and other modes). It was assumed that the average number of passengers per operation could be about 7 percent higher as a result of congestion management, which is estimated to be equivalent to accommodating an additional 3.1 million enplaned passengers in 2018.

Summary—The sum of impacts from these individual Non-Airfield alternatives is about 6.3 million enplaned passengers, which is approximately enough to accommodate the demand not satisfied by Alternative B alone. Some of the individual elements described above could be overlapping, and most are not within the authority of the FAA. For example, the diversion of traffic to road/rail could include some of the same passengers that would be diverted to other regional airports. As a result, the estimate of 6.3 million enplaned passengers could be overstated.

This analysis also indicates that these Non-Airfield alternatives, even in combination, are not sufficient to meet purpose and need without some development of the O'Hare airfield.

Summary Conclusion Regarding Blended Alternative

The Blended Alternative that is described above—a combination of Alternative B and a series of Non-Airfield alternatives—is estimated to have the potential to substantially meet the purpose and need. As noted above, the estimate of demand accommodation may be overstated due to possible overlapping or double counting of individual components, (i.e. passengers that may use road or rail, may be the same that would use other airports). However, the overall assessment is sufficiently close to the purpose and need target; therefore the Blended Alternative is included in the secondary screening of alternatives that is the subject of the following section of this chapter.

3.3 SECONDARY SCREENING

The purpose of this section is to apply the appropriate criteria as defined in pertinent environmental laws to conduct secondary screening on the alternatives retained for further consideration.

This section describes the following: (1) criteria used to evaluate alternatives retained in the previous section as potentially meeting the purpose and need, (2) application of these criteria to potential alternatives, (3) alternatives eliminated from further consideration, and (4) alternatives retained for detailed evaluation in **Chapter 5, Environmental Consequences**.

3.3.1 Criteria for Secondary Screening of Potential Alternatives

This section describes the criteria drawn from the applicable environmental statutes and regulations that are used in this section to evaluate the alternatives retained as a result of the initial screening process. For example, several criteria are found in FAA Order 5050.4A (Paragraph 83b). In pertinent part that Order provides:

[These acts] require a finding that "no feasible and prudent alternative" exists. The terms "feasible" and "prudent" are separate criteria and refer to sound engineering principles and sound judgment, respectively. A construction alternative, for example, may be feasible if, as a matter of sound engineering principles, it can be built. It may not be prudent, however, because of safety, policy, environmental, social, or economic consequences. The environmental documentation must show that no feasible and prudent alternative exists when all factors (safety, national policy, efficiency, economic, social, and environmental) are considered.²⁰

In an effort to provide further clarity beyond that provided in the Draft EIS, this section further describes how the FAA has applied the several criteria the FAA used in conducting secondary screening for this particular airport improvement proposal.

- Pursuant to NEPA, the FAA must take a "hard look" at all "reasonable" alternatives, which involves a study of those alternatives "that are practical or feasible from the technical and economic standpoint and using common sense."
- Because the proposed action involves the application for a permit from the U.S. Army Corps of Engineers to fill waters of the U.S., issuance of the 401 Water Quality Certification from the Illinois EPA, and required FAA findings regarding wetlands and floodplains, the FAA must also comply with the alternative analysis of the Clean Water Act, requiring a finding that no practicable alternative exists that would avoid or further minimize impacts to the resources at issue.
- Further, the proposed action implicates Section 4(f) of Department of Transportation Act and Section 6(f) of the Land and Water Conservation Act (See **Appendix L**) because there is proposed use of properties protected by those statutes.
- As a result, the FAA must conduct alternatives analyses as required by those statutes.

²⁰ FAA Order 5050.4A, Airport Environmental Handbook, Paragraph 83b, October 8, 1985.

The Council on Environmental Quality (CEQ) and the FAA's environmental policies and procedures require the EIS to serve as the platform for satisfying not only NEPA, but all these other environmental statutes as well. Because the concepts of reasonableness, practicability, and prudence are so similar, it would make little sense to conduct separate sets of analyses for these retained alternatives under each of the statutes identified above. Therefore, the FAA has integrated into the secondary screening a common-sense understanding of these similar concepts.

By definition, each of the retained alternatives appears feasible as a matter of sound engineering principles, is capable of being implemented, and could be operated safely. The examination of whether the retained alternatives are "reasonable" in the secondary screening analysis involves issues of practicality and prudence. Accordingly, the retained alternatives are evaluated relative to one another with respect to environmental, social, efficiency, economic, and national policy factors.

The alternative analysis for the other non-environmental obligations appears separately in **Section 3.6, Evaluation of Derivatives** of this Chapter.

3.3.1.1 Environmental and Social Factors

This criterion addresses impacts (as discussed in **Chapter 5, Environmental Consequences**) to those environmental resources for which legal requirements mandate the selection of feasible and prudent, or practicable alternatives that would avoid or minimize significant impact. It is appropriate to eliminate alternatives that are clearly inferior in these areas if other alternatives with similar benefits and costs are available. In this case, none of the O'Hare Development Alternatives considered in secondary screening are clearly inferior when examining environmental factors. Alternatives C, D, E, F, G, and the Blended Alternative all have essentially the same land envelope as shown on **Exhibit 3-1**. Therefore, the alternatives retained for secondary screening are not clearly inferior relative to one another in terms of environmental factors. As a result, no alternatives will be eliminated because of environmental factors alone.

3.3.1.2 Operational Efficiency Factors

The average annual delay that would result from accommodating forecast demand was considered. Alternatives that are similar to other alternatives given the consideration of other factors but are clearly inferior to those alternatives with respect to operational efficiency criteria will not be considered prudent and therefore will be eliminated from further consideration.

3.3.1.3 Economic Factors

Impacts to the local tax base from relocations, costs of delay, as well as the cost of construction were considered. As part of this consideration, the FAA has formulated a comparison of the development costs of each of the alternatives remaining for Secondary Screening. Although the FAA only has the detailed cost estimate for Alternative C, using engineering judgment, the FAA can estimate how each of the remaining alternatives compare with one another in terms of costs without detailed estimates for each of the alternatives. For example, Alternative F of each of the

remaining alternatives is the most costly based on the fact that it would involve the construction of 5 new runways, whereas the other alternatives vary from 2 new runways (Blended Alternative) to 4 new runways (Alternatives C and G). Likewise, Alternative D (3 new runways) would cost less than Alternative C (4 new runways). Alternatives that are similar to other alternatives given the consideration of other factors but are clearly inferior to those alternatives with respect to economic factors will not be considered prudent and therefore will be eliminated from further consideration.

3.3.1.4 National Policy Factors

The FAA in its consideration of alternatives, in addition to the relevant environmental statutes, has been mindful of its statutory charter to encourage the development of civil aeronautics and safety of air commerce in the United States (49 U.S.C. 40104). FAA has also considered the congressional policy declaration that airport construction and improvement projects that increase the capacity of facilities to accommodate passenger and cargo traffic be undertaken to the maximum feasible extent so that safety and efficiency increase and delays decrease [49 U.S.C. 47101(a) (7)].

As previously discussed, all of the alternatives that passed initial screening appear feasible as a matter of sound engineering principles. While some alternatives may be feasible from an engineering standpoint, they must also be prudent from a policy standpoint. This criterion addresses prudence, or sound judgment, as mandated in FAA Order 5050.4A. The determination of prudence should consider if the actions necessary to implement the alternative are within the authority or control of Federal, state, and/or local agencies. NEPA guidance specifies that alternatives beyond the authority of the sponsoring agency must be considered. However, for an alternative to be prudent, some way to implement an alternative should be available, and potential conflicts with federal and state law should be considered. Therefore, while alternatives may be prudent from an environmental, social, efficiency, and economic perspective, they must also be prudent from a national policy standpoint.

The CEQ provides guidance through publication of *The Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations* in the Federal Register on March 23, 1981 regarding the jurisdiction of the agency preparing the EIS. It states the following:

2a. Alternatives Outside the Capability of Applicant or Jurisdiction of Agency. If an EIS is prepared in connection with an application for a permit or other federal approval, must the EIS rigorously analyze and discuss alternatives that are outside the capability of the applicant or can it be limited to reasonable alternatives that can be carried out by the applicant?

[Answer] Section 1502.14 requires the EIS to examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant.

2b. Must the EIS analyze alternatives outside the jurisdiction or capability of the agency or beyond what Congress has authorized?

[Answer] An alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable. A potential conflict with local or federal law does not

necessarily render an alternative unreasonable, although such conflicts must be considered. Section 1506.2(d). Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA's goals and policies. Section 1500.1(a).

3.3.2 Secondary Screening Evaluation

As described in **Section 3.2.3.2, Alternatives Retained for Secondary Screening**, a total of five alternatives potentially meeting the purpose and need were retained for secondary screening. These alternatives consisted of five O'Hare Development options. To investigate the possibility that a combination of partial solutions could collectively meet the purpose and need, the Blended Alternative was also developed for consideration.

The evaluation of each alternative is summarized in the following sections. A tabular summary of the results of the secondary screening evaluation is shown in **Section 3.3.3, Summary of Secondary Screening**.

3.3.2.1 Alternative C

Alternative C would have environmental impacts that are substantially equal to other alternatives and as noted previously appears to be feasible from an engineering standpoint. Based on all of the modeling data available to the FAA, Alternative C would perform the best in terms of delay reduction among the other alternatives with the least number of minutes of delay in 2018. Therefore, in terms of delay costs, this alternative would yield the greatest dollar savings to passengers and airlines.

However, Alternative C would have a greater impact than Alternatives D, G, and the Blended Alternative on the local tax base of the surrounding communities by requiring acquisition both northwest and southwest of the current airport boundary. Additionally, because Alternative C requires the same acquisition area as Alternative F, Alternative C would have the same impact on the local tax base as Alternative F. In terms of development costs, Alternative C would cost more than Alternatives D, E, and the Blended Alternative, and less than Alternatives F and G.²¹ Additionally, Alternative C would not require changes to state laws, federal laws, or national policy to be implemented.

At this point in the analysis, Alternative C appears sufficiently prudent relative to the other alternatives to warrant full evaluation in **Chapter 5, Environmental Consequences**.

3.3.2.2 Alternative D

Alternative D would have environmental impacts that are substantially equal to other alternatives and as noted previously appears to be feasible from an engineering standpoint. Alternative D would perform better in terms of delay reduction than the Alternatives B, E, and

²¹ Discussion Outline – OMP Advisory Session, Runway 12/30, "Proof of Concept" Evaluation, Ricondo and Associates, Inc. [CCT], September 11, 2003. The estimated incremental costs of options 5B (Alternative F) and 5C (Alternative G) relative to option 5A (Alternative C) are presented in Table IV-1 of this report.

the Blended Alternative and worse than Alternatives C, F, and G. Therefore, in terms of delay costs, Alternative D would yield greater dollar savings to passengers and airlines than Alternatives B, E, and the Blended Alternative, but less than the savings of Alternatives C, F and G.

Alternative D would have approximately the same effect as Alternative G and the Blended Alternative on the local tax base of the surrounding communities because all three alternatives require acquisition both northwest and southwest of the current airport boundary. However, Alternative D would have less effect on the local tax base than Alternatives C and F as the area required would be slightly less than Alternatives C and F. In terms of development costs, Alternative D would cost more than the Blended Alternative, less than Alternatives C, F and G, and about the same amount as Alternative E. Additionally, Alternative D would not require changes to state laws, federal laws or national policy to be implemented.

At this point in the analysis, Alternative D appears sufficiently prudent relative to the other alternatives to warrant full evaluation in **Chapter 5, Environmental Consequences**.

3.3.2.3 Alternative E

Alternative E would have environmental impacts that are substantially equal to other alternatives and as noted previously appears to be feasible from an engineering standpoint.

Based on a review of potential primary operating configurations, Alternative D (Alternative C without proposed Runway 10R/28L) would perform better than Alternative E (Alternative C without proposed Runway 9L/28R). This conclusion is based on evaluating potential operating configurations in both good weather and adverse weather during east and west flow operations. Potential arrival and departure hourly rates are presented in **Table 3-5**.

**TABLE 3-5
PROJECTED ARRIVAL AND DEPARTURE HOURLY RATES FOR ALTERNATIVES
D AND E**

	VFR East	VFR West	IFR East	IFR West
Alternative D	110/110	120/140	100/100	120/120
Alternative E	110/110	110/110	100/100	100/100

Note: For all projected hourly rates presented, the rates are based on the geometry of the proposed runway layouts in each alternative. It also was assumed that taxi routes to serve each runway are available and the appropriate runway balance can be achieved.

Source: Federal Aviation Administration.

As can be observed from **Table 3-5**, Alternatives D and E perform similarly under both good and adverse weather conditions in an east flow operation. However, Alternative D would process both more arrivals and departures per hour in both IFR and VFR west flow conditions. These differences in hourly rates would result in a higher average annual delay for Alternative E than Alternative D.

Given the above discussion, Alternative E would perform better in terms of delay reduction than Alternative B and the Blended Alternative and worse than Alternatives C, D, F and G. Therefore, in terms of delay costs, Alternative E would yield greater dollar savings to

passengers and airlines than Alternative B, and the Blended Alternative, but less than the savings of Alternatives C, D, F and G.

Alternative E would have the least effect on the local tax base of the surrounding communities by requiring acquisition only southwest of the current airport boundary; whereas all other O'Hare Development alternatives would require acquisition in both the northwest and southwest. In terms of development costs, Alternative E would cost more than the Blended Alternative, but less than Alternatives C, F and G. Additionally, Alternative E would cost approximately the same amount as Alternative D. Additionally, Alternative E would not require changes to state laws, federal laws or national policy and therefore could be implemented.

Given that Alternative E is not as effective as reducing delay as Alternative D, while costing about the same in terms of development (both Alternatives include the construction of 3 new runways), Alternative E is not prudent (relative to Alternative D), and it is eliminated from further consideration.

3.3.2.4 Alternative F

Alternative F would have environmental impacts that are substantially equal to other alternatives and as noted previously appears to be feasible from an engineering standpoint. Based on all of the modeling data available to the FAA, Alternative F would perform better in terms of delay reduction than all the other alternatives with the exception of Alternative C. However, given that Alternative F has the same runways as Alternative C, as well as an additional runway (12/30), Alternative F, if implemented, would most likely be operated in the same way as Alternative C. In other words, Runway 12/30, while included in Alternative F, would seldom be used. Therefore, it can be said that the average annual delays for Alternative F would be the same as Alternative C. Therefore, in terms of delay costs, Alternative F would yield the same dollar savings to passengers and airlines as Alternative C and greater savings than Alternatives D, E, G and the Blended Alternative.

Alternative F would have a greater impact than Alternatives D, E, G and the Blended Alternative on the local tax base of the surrounding communities by requiring acquisition both northwest and southwest of the current airport boundary. Additionally, because it requires the same acquisition area as Alternative C, Alternative F would have the same impact on the local tax base as Alternative C. In terms of development costs, this alternative would cost more than all other alternatives considered in secondary screening because of the cost for an additional air carrier runway, relocation of the Post Office, and other ancillary infrastructure. Alternative F would not require changes to federal laws or national policy to be implemented.

Alternative F provides a minimal increment of delay reduction or operational benefit beyond that of Alternative G. In addition, Alternative F would require the construction of one runway more than Alternative C, and that additional runway would likely be used on an infrequent basis. Therefore, Alternative F is more expensive to construct without an attendant increase in effectiveness relative to Alternative C. It also reduces land available for air cargo development. Therefore, further consideration of Alternative F is not prudent (relative to Alternative C), and it is eliminated from further consideration.

3.3.2.5 Alternative G

Alternative G would have environmental impacts that are substantially equal to other alternatives and as noted previously appears to be feasible from an engineering standpoint. Based on all of the modeling data available to the FAA, Alternative G would perform better in terms of delay reduction than Alternatives D, E, and the Blended Alternative and slightly worse than Alternatives C and F. Therefore, in terms of delay costs, this alternative would yield greater dollar savings to passengers and airlines than Alternatives D, E, and the Blended Alternative and slightly less savings as Alternatives C and F.

Alternative G would have approximately the same effect as Alternative D and the Blended Alternative on the local tax base of the surrounding communities because all three alternatives require acquisition both northwest and southwest of the current airport boundary. However, Alternative G would have less effect on the local tax base than Alternatives C and F as the area required would be slightly less than Alternatives C and F. In terms of development costs, Alternative G would cost more than Alternatives C, D, E, and the Blended Alternative, while slightly less than Alternative F.²² Alternative G would not require changes to federal laws or national policy to be implemented.

At this point in the analysis, Alternative G appears sufficiently prudent relative to the other alternatives to warrant full evaluation in **Chapter 5, Environmental Consequences**.

3.3.2.6 Blended Alternative

The Blended Alternative would have environmental impacts that are substantially equal to other alternatives and as noted previously appears to be feasible from an engineering standpoint. Based on professional judgment, the Blended Alternative would perform worst in terms of delay reduction of all the alternatives considered in secondary screening. Therefore, in terms of delay costs, this alternative would yield the least dollar savings to passengers and airlines.

The Blended Alternative would have approximately the same effect as Alternatives D and G on the local tax base of the surrounding communities because all three alternatives require acquisition both northwest and southwest of the current airport boundary. However, the Blended Alternative would have less effect on the local tax base than Alternatives C and F as the area required would be slightly less than Alternatives C and F. In terms of development costs, the Blended Alternative would cost less than all of the alternatives considered in secondary screening, excluding the No Action Alternative (Alternative) A.

The Blended Alternative consists of several speculative technological, and infrastructure developments that are combined with a fundamental restructuring of current marketplace management of aviation demand. While it is conceivable that this series of events could occur and adequately address the needs for this project, there are many hurdles that must be

²² Discussion Outline – OMP Advisory Session, Runway 12/30, “Proof of Concept” Evaluation, Ricondo and Associates, Inc. [CCT], September 11, 2003. The estimated incremental costs of options 5B (Alternative F) and 5C (Alternative G) relative to option 5A (Alternative C) are presented in Table IV-1 of this report.

overcome including the fact that most are not within the control of the FAA to implement. These hurdles were independently discussed in the initial screening of each of the components used in the Blended Alternative in **Section 3.1.2, Non-Airfield Alternatives**.

The Blended Alternative only has the potential to meet the purpose and need requirements if each of the identified components is implemented and achieves optimal performance. The implementation of the many components lies with multiple entities, and each of those entities must address numerous secondary effects in implementing each of the components. These secondary effects include cost, difficulty in coordinating multiple entities, unwillingness of public to accept congestion management, uncertainty of federal policy changes relative to congestion management, uncertainty in development and acceptance of new technology, etc. There is such little margin of error in the Blended Alternative that an adverse secondary effect, and/or a failure to achieve optimal implementation, in just one of the components could completely undermine this alternative. It is unreasonable to expect so many unproven technologies and concepts that are overseen by a disparate range of entities to perfectly come together and represent a prudent alternative.

A significant component of the Blended Alternative is the use of other airports. The use of other airports is driven by the market and cannot be directed by the FAA. In a deregulated domestic aviation industry, the Federal government does not control where, when, and how airlines provide their services; nor is the Federal government the driving force in airport capacity development or airport utilization. Rather, the aviation industry, in partnership with local and regional government, in response to market demand, drives where and how air travel is accommodated.

The Blended Alternative, even if it could be implemented, would still yield the least delay reduction while not serving the forecast demand at O'Hare. Finally, the Blended Alternative would require changes to federal laws and/or national policy that have created the federally-deregulated, free market based, national aviation system to enable its full implementation. Under present law, the federal government cannot prescribe controls affecting the rates, routes, or services governing commercial aviation. Similarly FAA cannot require a change in the passenger distribution pattern of other modes of transportation. While the FAA must consider alternatives beyond its jurisdiction, CEQ also states, "A potential conflict with local or federal law does not necessarily render an alternative unreasonable, although such conflicts must be considered." The conflict with Federal law and policy coupled with the inability of the FAA to control the market forces makes the Blended Alternative not reasonable. Therefore, further consideration of the Blended Alternative is not prudent or reasonable, and it is eliminated from further consideration.

3.3.3 Summary of Secondary Screening

Based upon the application of secondary screening criteria, three of the alternatives appear to be feasible and sufficiently prudent to warrant detailed consideration. Although the No Action Alternative (Alternative A) would not meet the stated purpose and need for the proposed action, it has been retained as a reference point for comparing the environmental consequences of the other retained alternatives in accordance with the requirements of NEPA. The

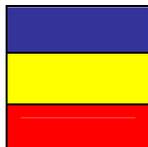
alternatives retained for detailed consideration in **Chapter 5, Environmental Consequences** are Alternatives C, D and G.

Table 3-6 summarizes the results of the secondary screening for the five alternatives that passed initial screening as well as the Blended Alternative.

**TABLE 3-6
SUMMARY OF SECONDARY SCREENING**

Alternative	C Sponsor's Proposal	D	E	F	G	Blended Alternative
Runway Layout for Each Alternative						
1. ENVIRONMENTAL- Identify clearly superior and/or inferior alternatives with respect to environmental factors.						
No alternative is clearly inferior or superior with respect to environmental factors. Therefore, no alternatives were eliminated on the basis of environmental factors.						
2. OPERATIONAL EFFICIENCY - Identify clearly superior and/or inferior alternatives with respect to operational efficiency.						
Delay Reduction						
3. ECONOMIC - Identify clearly superior and/or inferior alternatives with respect to economic factors.						
A. Delay Costs						
B. Local Tax Base						
C. Development Costs						
4. NATIONAL POLICY - Identify clearly superior and/or inferior alternatives with respect to implementation factors.						
Implementation Factors						
5. CONCLUSION						
Retain for Detailed Evaluation	YES	YES	NO	NO	YES	NO

Legend:



Alternative is better than other alternatives in the specific category.

Alternative is between other alternatives in the specific category.

Alternative is worse than other alternatives in the specific category.

3.4 DESCRIPTION OF ALTERNATIVES RETAINED FOR DETAILED CONSIDERATION

This section summarizes the physical characteristics of the alternatives retained for detailed evaluation to ensure consistent evaluation of the benefits and environmental consequences among the alternatives.

3.4.1 Alternative A – No Action

In accordance with CEQ Regulations, Section 1502.14, the No Action Alternative is retained for detailed consideration. Under Alternative A, it is assumed some limited development at O'Hare would continue without the proposed action. For purposes of defining the No Action Alternative, improvements which would be reasonably foreseeable without the O'Hare Modernization and which would not require additional FAA reviews or approvals pursuant to NEPA are included in the No Action Alternative. NEPA approvals include any FAA action pursuant to the agency's NEPA guidance documents, such as (1) preparation of an EIS, supplemental EIS, or written re-evaluation, (2) approval of an environmental assessment (EA) or written re-evaluation of an EA, and (3) determination that "extraordinary circumstances" would not require formal environmental assessment for projects that are otherwise categorically excluded.

Major improvement projects included as part of Alternative A are described in **Appendix E, Section E.6.1, Alternative A - No Action**. The rationale used to include or exclude individual projects follows:

- Projects that have been initiated are reflected in the No Action Alternative.
- Projects that are likely to be developed in the near term with or without development of the Sponsor's Proposed Action are reflected in the No Action Alternative.
- Projects that would require FAA NEPA approval as defined above will not be included unless the NEPA process has been initiated.
- Most Alternative A improvements are intended to replace and/or rehabilitate Airport infrastructure to maintain operations throughout the planning period. However, a few of the projects associated with Alternative A would enhance the operational capabilities of the existing airfield. These include the following:
- Implementation of Category II/III Instrument Landing Systems (ILS) to serve Runways 27L and 27R. Note that the environmental considerations associated with the installation of these ILSs were evaluated in the *Final Environmental Assessment for the Upgrade of Runways 27L and 27R to a Category II/III Instrument Landing System*,²³

²³ Final Environmental Assessment for the Upgrade of Runways 27L and 27R to a Category II/III Instrument Landing System. FAA, October 1, 2004.

dated October 1, 2004. The FAA issued a Finding of No Significant Impact (FONSI) and Record of Decision (ROD) on the same date.

- Chicago Terminal Airspace Project (CTAP) evaluated modifications to aircraft routes and air traffic control procedures in the Chicago area to reduce the overall en route time for aircraft using O'Hare and other airports in the Chicago area. The FAA issued its Record of Decision on November 2, 2001. Further information on CTAP is included in **Chapter 1, Introduction and Background**.
- Land-and-Hold-Short Operations (LAHSO) at O'Hare are also included in the No Action Alternative. Under LAHSO, aircraft are permitted to land on certain runways under various configurations, and then hold short of certain intersecting runways. Using LAHSO, intersecting/crossing runways can be used to provide independent operations subject to certain operating criteria. While LAHSO provides sufficient capacity to serve the current activity levels during good weather, it cannot be used under adverse weather conditions (IFR) (ceiling below 1,000-foot and/or visibility less than three-miles), or in wet runway conditions. An FAA Order²⁴ to this effect was issued regarding LAHSO procedures at O'Hare in February 2001.

A graphic depiction of Alternative A is presented on **Exhibit 3-7** on the following page. As shown, the airfield layout of Alternative A consists of three pairs of parallel runways (e.g., six total runways) oriented in the 9/27, 14/32, and 4/22 directions. The lengths and widths of these runways are provided in **Table 3-7**, and are identical to the existing runway lengths and widths.

TABLE 3-7
RUNWAY CHARACTERISTICS: ALTERNATIVE A

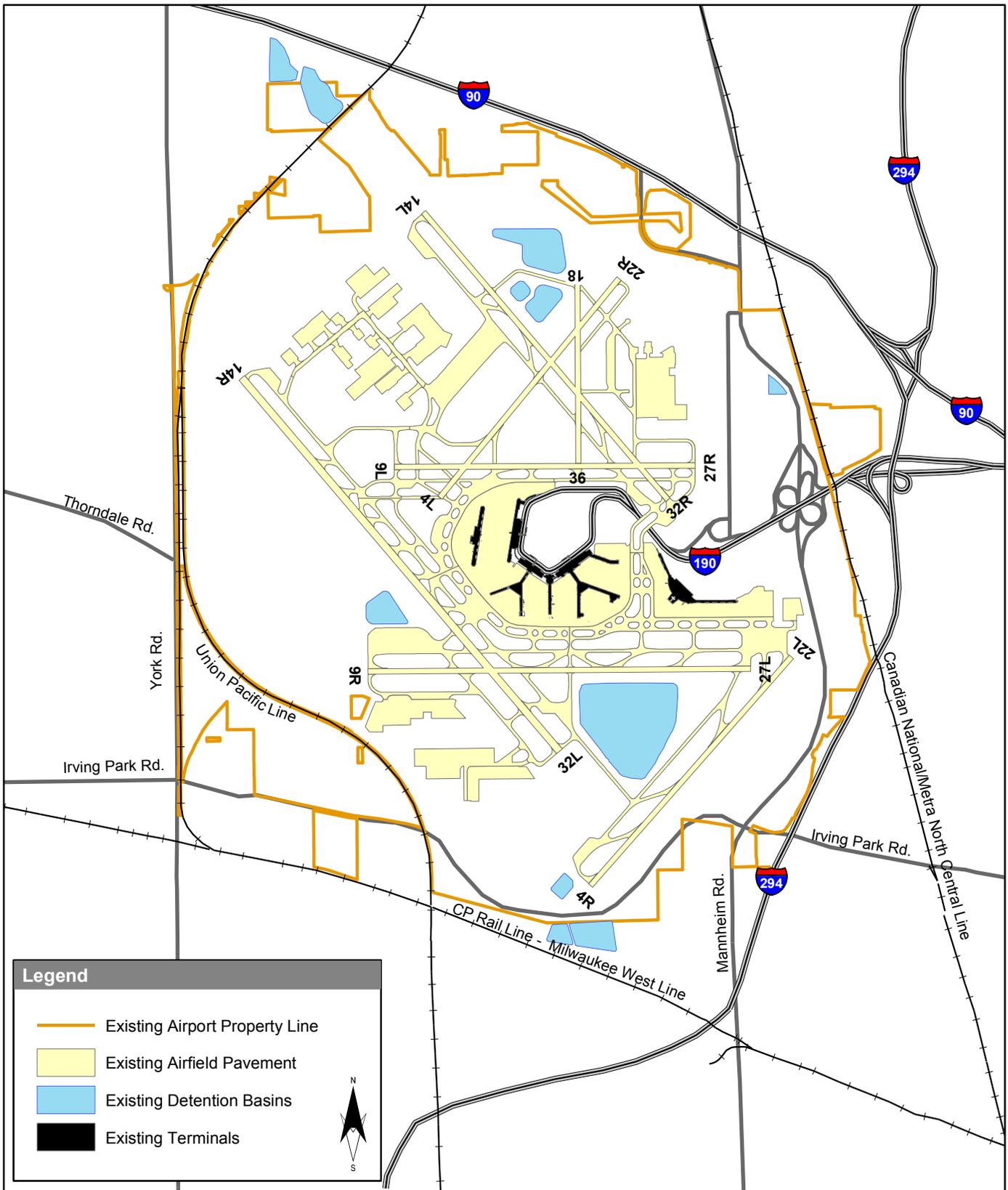
Runway	Length	Width
9L/27R	7,967	150
9R/27L	10,144	150
4L/22R	7,500	150
4R/22L	8,075	150
14L/32R	10,005	150
14R/32L	13,000	200

Source: National Oceanic & Atmospheric Administration Survey, September 2002.

In Alternative A, the airport's terminal facilities would remain in the existing locations. The terminal complex would consist of the Airport's existing gates, which are distributed among four terminals. Customs and immigration services facilities to process passengers arriving from abroad would remain located in Terminal 5, requiring all international arrivals disembark their passengers at Terminal 5.

²⁴ FAA Order ORD 7110.118, Land and Hold Short Operations (LAHSO), February 9, 2001.

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Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004



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**Alternative A -
No Action**

► **Exhibit 3-7**

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Ground access to the terminal complex would remain and would be provided via the existing I-190 corridor. Ground access to other major airport development areas—including the cargo complex on the south side of the airfield, the general aviation and air cargo facilities located on the former Air Force site on the northeast corner of the airfield, and airline maintenance complex located on the northwest corner of the airfield—would remain the same as it is today.

Aside from committed airfield and support facility improvements on and around the former Air Force facility, aviation support, air cargo, and general aviation facilities would remain in their current locations without substantial modification or expansion.

Based on Total Airspace and Airport Modeller (TAAM) simulation results, Alternative A would neither reduce existing delays nor accommodate anticipated growth in aviation activity at the Airport at acceptable levels of delay. A detailed description of the operational and delay characteristics of Alternative A is provided in **Appendix E, Section E.6.1, Alternative A – No Action**.

3.4.2 Alternative C

A graphic depiction of Alternative C is presented on **Exhibit 3-8**. Major improvement projects that would be undertaken in Alternative C are described in **Appendix E, Section E.6.2, Alternative C**.

As presented on **Exhibit 3-8**, the current airfield at the Airport would be reconfigured in accordance with the O'Hare Modernization Program proposed by the City of Chicago. Ultimately, this airfield reconfiguration would result in two sets of parallel runways. The first set would consist of six parallel runways in the 9/27 orientation, whereas the second set would consist of two parallel runways in the 4/22 orientation. Runways 14L/32R and 14R/32L would be decommissioned. The lengths and widths of all runways in Alternative C are provided in **Table 3-8**.

**TABLE 3-8
RUNWAY CHARACTERISTICS: ALTERNATIVE C**

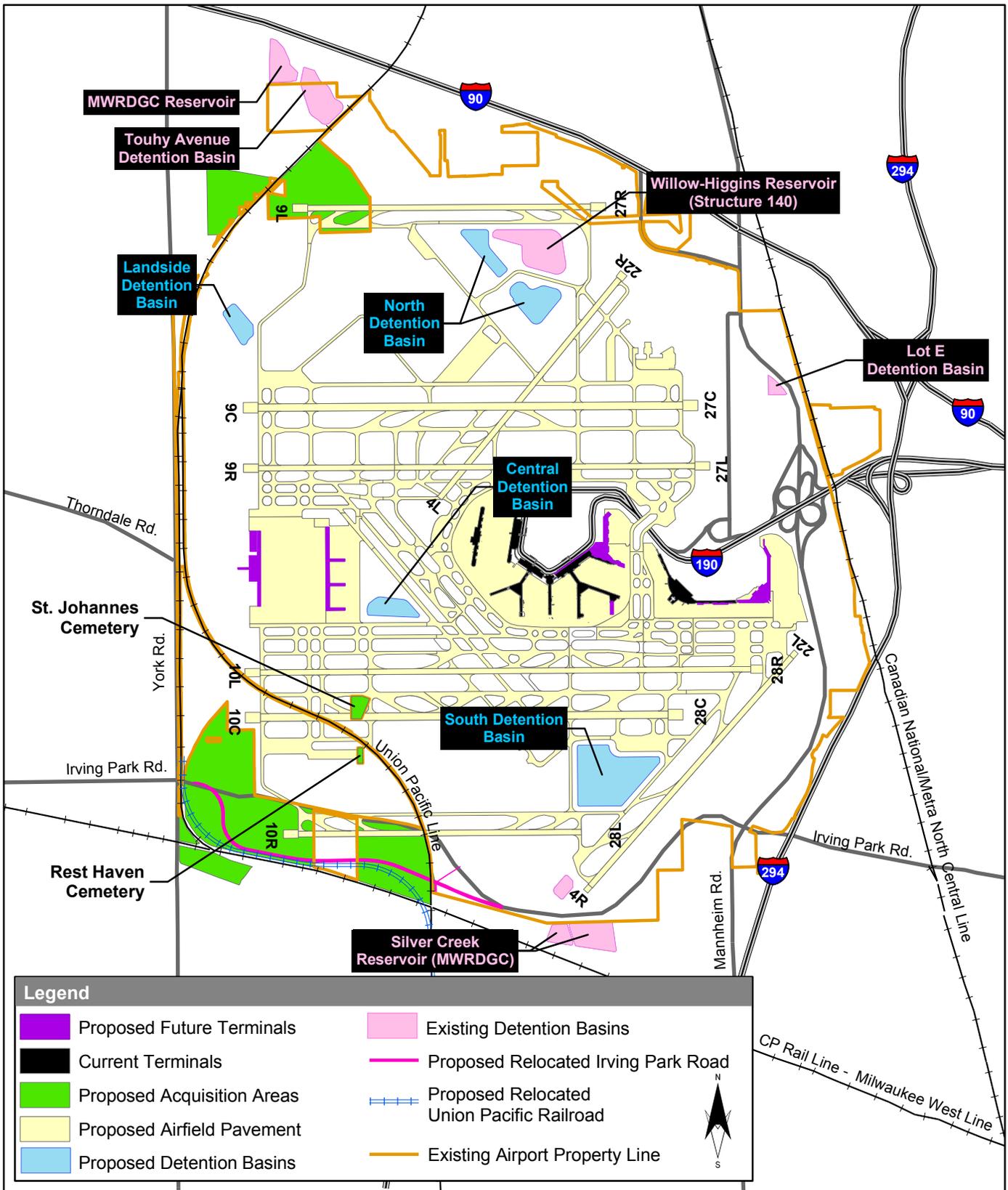
Future runway designation	Existing runway designation	Ultimate length (feet) (a)	Ultimate width (feet)
9L/27R	n/a	7,500	150
9C/27C	n/a	11,245	200
9R/27L	9L/27R	11,260 (7,967)	150
10L/28R	9R/27L	13,000 (10,144)	150
10C/28C	n/a	10,800	200
10R/28L	n/a	7,500	150
4L/22R	4L/22R	7,500 (7,500)	150
4R/22L	4R/22L	8,075 (8,075)	150

Notes: n/a = not applicable

(a) The value shown in parenthesis is the existing runway length.

Source: Draft Airport Layout Plan, October 2003; National Oceanic & Atmospheric Administration Survey, September 2002.

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Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004



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As indicated in **Table 3-8**, existing Runway 9L/27R would be renamed Runway 9R/27L and existing Runway 9R/27L would be renamed Runway 10L/28R. Both of these existing runways would be extended in Alternative C. Existing Runway 9L/27R/future Runway 9R/27L would be extended from 7,967 feet to 11,260 feet and existing Runway 9R/27L/future Runway 10L/28R would be extended from 10,144 feet to 13,000 feet.

In Alternative C, the existing airport terminal complex would be expanded with the construction of Terminals 4 and 6, and the expansion of Concourse K (part of existing Terminal 3). In addition, a new 60-gate terminal complex—including both landside and airside facilities—would be constructed on the west side of the airfield. This new west terminal would be supported by its own access roadway system, parking facilities, and passenger processing facilities. The west terminal would be connected to the existing terminal complex via an underground people mover system that would permit ticketed, screened passengers to travel between the new west terminal and Terminal 1. The new west terminal would incorporate its own U.S. Customs and Immigration Services facilities to process international travelers.

Land areas would be reserved in Alternative C for the expansion of airline support, airport support, and air cargo facilities. In addition, facilities for new storm water detention, wastewater treatment, and utilities would be provided. To accommodate new runways and supporting development in Alternative C, the City of Chicago would acquire approximately 135.8 acres of land northwest of the existing Airport boundary and approximately 304.2 acres of land to the southwest of the Airport.

Based on TAAM simulation results, Alternative C would accommodate the unconstrained 2009, 2013, and 2018 flight schedules at reasonable delay levels. A detailed description of the operational and delay characteristics of Alternative C is provided in **Appendix E, Section E.6.2, Alternative C**.

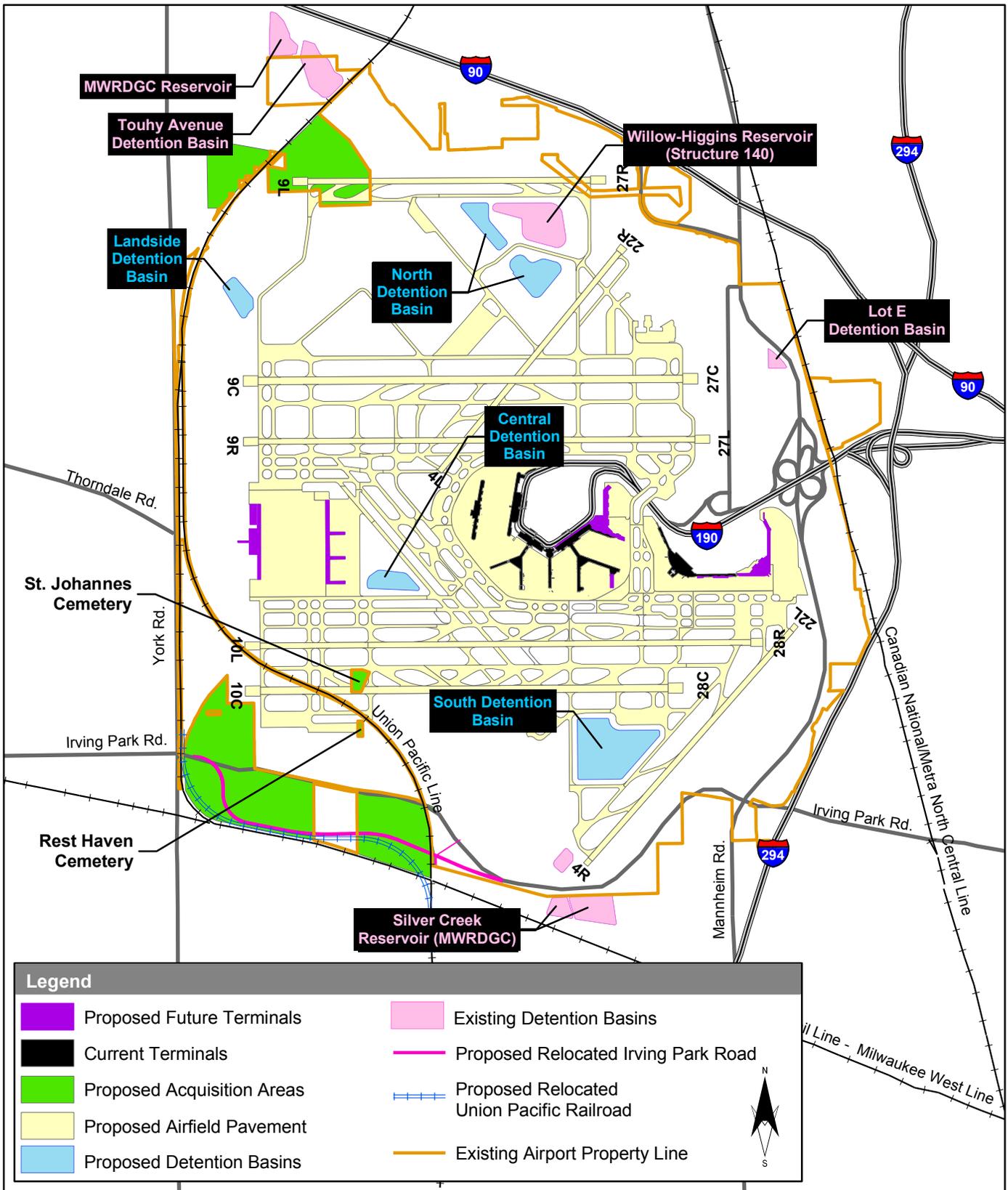
3.4.3 Alternative D

A graphic depiction of Alternative D is presented on **Exhibit 3-9**. Major improvement projects that would be undertaken in Alternative D are described in **Appendix E, Section E.6.3, Alternative D**.

As presented on **Exhibit 3-9** in Alternative D,²⁵ the current six-runway airfield at the Airport would be reconfigured in accordance with the O'Hare Modernization Program proposed by the City of Chicago with the exception that 7,500-foot long Runway 10R/28L would not be constructed. Ultimately, this airfield reconfiguration effort would result in two sets of parallel runways. The first set would consist of five parallel runways in the 9/27 orientation, whereas the second set would consist of two parallel runways in the 4/22 orientation. The existing 14/32 parallel runway system, consisting of Runways 14L/32R and 14R/32L would be decommissioned. The lengths and widths of all runways in Alternative D are provided in **Table 3-9**.

²⁵ In materials prepared by the City of Chicago, Alternative D is referred to as Alternative X.

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Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004



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Alternative D

► Exhibit 3-9

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**TABLE 3-9
RUNWAY CHARACTERISTICS: ALTERNATIVE D**

<u>Future runway designation</u>	<u>Existing runway designation</u>	<u>Ultimate length (feet) (a)</u>	<u>Ultimate width (feet) (a)</u>
9L/27R	n/a	7,500	150
9C/27C	n/a	11,245	200
9R/27L	9L/27R	11,260 (7,967)	150
10L/28R	9R/28L	13,000 (10,144)	150
10C/28C	n/a	10,800	200
4L/22R	4L/22R	7,500 (7,500)	150
4R/22L	4R/22L	8,075 (8,075)	150

Notes: n/a = not applicable

(a) The value shown in parenthesis is the existing runway length.

Source: October 2003 Draft Airport Layout Plan, National Oceanic & Atmospheric Administration Survey, September 2002.

As indicated in **Table 3-9**, existing Runway 9L/27R would be renamed Runway 9R/27L and existing Runway 9R/27L would be renamed Runway 10L/28R. Both of these existing runways would be extended in Alternative D. Existing Runway 9L/27R/future Runway 9R/27L would be extended from 7,967 feet to 11,260 feet and existing Runway 9R/27L/future Runway 10L/28R would be extended from 10,144 feet to 13,000 feet.

In Alternative D, the existing airport terminal complex would be expanded with the construction of Terminals 4 and 6, and the expansion of Concourse K. In addition, a new 60-gate terminal complex—including both landside and airside facilities—would be constructed on the west side of the airfield. This new west terminal would be supported by its own access roadway system, parking facilities, and passenger processing facilities. The west terminal would be connected to the existing terminal complex via an underground people mover system that would permit ticketed, screened passengers to travel between the new west terminal and Terminal 1. The new west terminal would incorporate its own U.S. Customs and Immigration Services facilities to process international travelers.

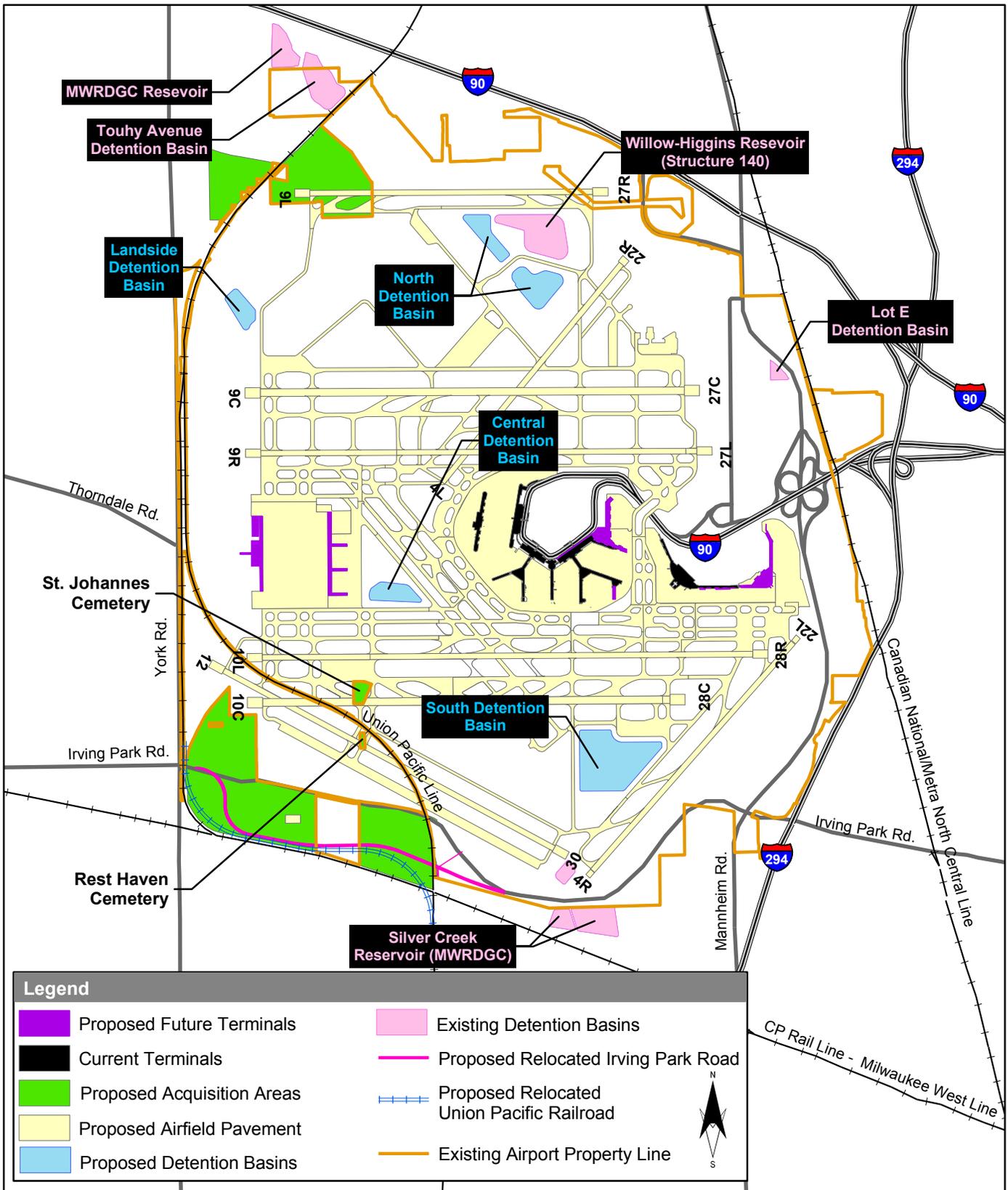
Land areas would be reserved in Alternative D for the expansion of airline support, airport support, and air cargo facilities. In addition, new storm water detention, wastewater treatment, and utilities facilities would be provided. To accommodate new runways and supporting development in Alternative D, the City of Chicago would acquire approximately 135.8 acres of land northwest of the existing Airport boundary and approximately 277.7 acres of land to the southwest of the Airport.

Based on TAAM simulation results, Alternative D would accommodate the unconstrained 2009, 2013, and 2018 flight schedules at reasonable delay levels. A detailed description of the operational and delay characteristics of Alternative D is provided in **Appendix E, Section E.6.3, Alternative D**.

3.4.4 Alternative G

A graphic of Alternative G is presented on **Exhibit 3-10**. Major improvement projects that would be undertaken in Alternative G are described in **Appendix E, Section E.6.4, Alternative G**.

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Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004



Chicago O'Hare International Airport

**O'Hare Modernization
Environmental Impact Statement**

Alternative G

► **Exhibit 3-10**

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As presented on **Exhibit 3-10** the current six-runway airfield at the Airport would be reconfigured in accordance with the O'Hare Modernization Program proposed by the City of Chicago with the exception that 7,500-foot long Runway 10R/28L would not be constructed. In place of this distant south parallel runway, a 9,946-foot long runway would be constructed on the southwest quadrant of the airfield with a 12/30 orientation. Ultimately, this airfield reconfiguration effort would result in two sets of parallel runways plus new Runway 12/30. The first set would consist of five parallel runways in the 9/27 orientation, whereas the second set would consist of two parallel runways in the 4/22 orientation. The existing 14/32 parallel runway system, consisting of Runways 14L/32R and 14R/32L would be decommissioned. The lengths and widths of all runways in Alternative G are provided in **Table 3-10**.

TABLE 3-10
RUNWAY CHARACTERISTICS: ALTERNATIVE G

<u>Future runway designation</u>	<u>Existing runway designation</u>	<u>Ultimate length (feet) (a)</u>	<u>Ultimate width (feet) (a)</u>
9L/27R	n/a	7,500	150
9C/27C	n/a	11,245	200
9R/27L	9L/27R	11,260 (7,967)	150
10L/28R	9R/28L	13,000 (10,144)	150
10C/28C	n/a	10,800	200
12/30	n/a	9,946	150
4L/22R	4L/22R	7,500 (7,500)	150
4R/22L	4R/22L	8,075 (8,075)	150

Notes: n/a = not applicable

(a) The value shown in parenthesis is the existing runway length.

Source: 2003 Draft Airport Layout Plan, National Oceanic & Atmospheric Administration Survey, September 2002.

As indicated in **Table 3-10**, existing Runway 9L/27R would be renamed Runway 9R/27L and existing Runway 9R/27L would be renamed Runway 10L/28R. Both of these existing runways would be extended in Alternative G. Existing Runway 9L/27R/future Runway 9R/27L would be extended from 7,967 feet to 11,260 feet and existing Runway 9R/27L future Runway 10L/28R would be extended from 10,144 feet to 13,000 feet.

In Alternative G, the existing airport terminal complex would be expanded with the construction of Terminals 4 and 6, and the expansion of Concourse K. In addition, a new 60-gate terminal complex—including both landside and airside facilities—would be constructed on the west side of the airfield. This new west terminal would be supported by its own access roadway system, parking facilities, and passenger processing facilities. The west terminal would be connected to the existing terminal complex via an underground people mover system that would permit ticketed, screened passengers to travel between the new west terminal and Terminal 1. The new west terminal would incorporate its own U.S. Customs and Immigration Services facilities to process international travelers.

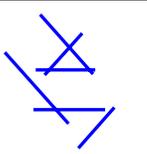
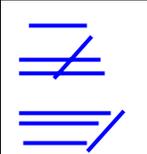
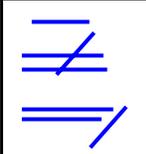
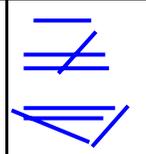
Land areas would be reserved in Alternative G for the expansion of airline support, airport support, and air cargo facilities. In addition, new storm water detention, wastewater treatment, and utilities facilities would be provided. To accommodate new runways and supporting development in Alternative G, the City of Chicago would acquire approximately 135.8 acres of land northwest of the existing Airport boundary and approximately 277.7 acres of land to the southwest of the Airport.

Based on TAAM simulation results, Alternative G would accommodate the unconstrained 2009, 2013, and 2018 flight schedules at reasonable delay levels. A detailed description of the operational and delay characteristics of Alternative G is provided in **Appendix E, Section E.6.4, Alternative G**.

3.5 SUMMARY EVALUATION OF ALTERNATIVES

CEQ Regulations Section 1502.14 states that an EIS must "...present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public." This section briefly compares the operational issues, cost considerations, environmental impacts, and ability to meet project needs for the four alternatives retained for detailed consideration, namely Alternative A (No Action), Alternative C, Alternative D, and Alternative G. A summary comparison is provided in **Table 3-11**. The comparison of environmental impacts summarized in this section addresses material differences among the alternatives in certain impact categories. These environmental impacts and others are described in greater detail in **Chapter 5, Environmental Consequences**.

**TABLE 3-11
SUMMARY COMPARISON OF RETAINED ALTERNATIVES**

Runway Layout for Each Alternative					
Alternatives		A	C	D	G
1. Environmental Impacts					
Wetland impacts	Jurisdictional & non-jurisdictional, including non-wetland Waters of the United States (acres)	23.5	154.2	154.2	154.2
Floodplain impacts	Increase in impervious surfaces area (acres)	0	1,000	823	1,126
DOT Section 4(f)/6(f) Parkland impacts	Parkland properties to be acquired	0	3	3	3
Section 106 impacts	Properties to be acquired and removed	0	4	4	4
Acquisition and relocation impacts	Area of proposed land acquisition (acres)	0	440	413	413
	Population of proposed land acquisition area	0	2,631	2,553	2,553
	Housing Units	0	539	522	522
	Businesses	0	197	164	164
65+ DNL noise impacts (Build Out)	Area (acres)	12,427	11,263	11,187	11,216
	Housing Units	5,199	6,754	7,392	6,572
	Population	14,512	19,577	21,154	19,135
Environmental justice impacts	Minority residents in proposed acquisition area by race	0	1,575	1,479	1,479
	Minority residents in proposed acquisition area by ethnicity	0	1,599	1,524	1,524
Air Quality Impacts	Compliance with NAAQS	Exceedance of CO at 1 location	No exceedances	No exceedances	No exceedances
2. Operational Efficiency Factors					
2018 average annual delay	(minutes per operation)	17.1	5.8	10.5	6.9
2018 annual operations served	(operations)	974,000	1,194,000	1,194,000	1,194,000
3. Economic Impact Factors					
Delay cost	Delay cost to the airlines in 2018 (millions) based on \$25 per minute of delay	\$416.4	\$173.1	\$313.4	\$206.0
Local tax base	Tax base loss of parcels acquired (millions)	\$0	\$5.7	\$5.3	\$5.3
Relative development costs	Relative construction cost	Less than C, D or G	More than A, D, less than G	More than A, less than C, G	More than A, C and D
4. National Policy Factors					
Implementation factors	Regulatory – Does authority exist to implement?	Yes	Yes	Yes	Yes
	Sponsor – Is there a sponsor able to fund?	Yes	Yes	Yes	Yes
	Service Provider – Will adequate service be initiated?	Yes	Yes	Yes	Yes

Notes: Surface transportation effects are included in Sections VII-C, Surface Transportation of this Executive Summary.
n/a = not applicable

Source: TPC Analysis, Chapter 5, Environmental Consequences.

3.5.1 Alternative A – No Action Summary Evaluation

The Alternative A (No Action Alternative) reflects retaining the existing facilities at O'Hare while undertaking some previously approved improvements; however, material increases in capacity associated with projects addressed in this EIS would not occur in Alternative A. As a result, this alternative would not achieve the purpose and need, and thus, while some environmental impacts may be less in certain areas, others are greater because delay conditions are not reduced. A brief summary of potential Alternative A impacts follows.

3.5.1.1 Environmental Impacts of Alternative A

For Alternative A, few new environmental impacts are expected beyond current impacts. As shown in **Table 3-11**, Alternative A results in few direct impacts to the social environs of O'Hare. Alternative A impacts 10.0 acres of jurisdictional wetlands and 13.5 acres of non-jurisdictional wetlands, for a total of 23.5 acres impacted. See **Section 5.12.3.1, Alternative A – No Action**, in **Section 5.12, Wetlands**, for further details of these impacts. Waters of the U.S. (WUS) are not impacted by Alternative A. Alternative A does not require property acquisitions that would displace residents or businesses and does not adversely impact culturally significant property (Section 106 or 4(f)). Alternative A would however result in substantial impacts on air carriers and their passengers by neither serving the forecast demand for air travel nor improving the current delay conditions at O'Hare. No environmental justice impacts would occur with the implementation of Alternative A. The quantification of noise exposure indicates that Alternative A would expose 12,897 acres to greater than 65 DNL noise levels, including approximately 17,500 residents.

3.5.1.2 Operational Factors of Alternative A

Alternative A is not capable of accommodating the forecast demand that has been projected for O'Hare. At 1,194,000 annual operations in 2018, average annual delays at O'Hare would be in excess of 25 minutes per operation; it is therefore not reasonable to assume that the existing airfield could accommodate this level of activity. Thus a constrained demand forecast was developed to evaluate No Action Alternative that would accommodate 974,000 annual operations and 44,972,500 enplaned passengers. For detail on the development of the constrained demand forecast, see **Appendix B, Aviation Demand Forecast**. At this constrained level of activity, average annual delay would be 17.1 minutes per operation. As a result of the existing airfield, delays at O'Hare would not be reduced, and as stated Alternative A does not meet the purpose and need. A summary of operational factors associated with Alternative A is provided in **Appendix D, Simulation Modeling**.

3.5.1.3 Economic Impact Factors of Alternative A

Alternative A would result in the least impact on the local tax base of the surrounding communities and has the least cost to implement. However, the Alternative A would result in substantial economic disruption to the region due to the extensive delays and inherent

constraints on aviation activity. The delay cost associated with Alternative A is estimated at \$416.4 million in 2018.

3.5.2 Alternative C Summary Evaluation

Alternative C includes a substantial redesign of the physical and operational characteristics of Chicago O'Hare International Airport. It was first proposed by the City of Chicago and has been refined throughout the planning process. Alternative C was developed to provide the optimal operational benefit while being sensitive to both social and environmental factors. A brief summary of potential Alternative C impacts follows.

3.5.2.1 Environmental Impact Factors of Alternative C

Environmental impacts associated with Alternative C are substantially equal to those of Alternatives D and G while typically they are greater than those of the No Action Alternative (Alternative A). Alternative C would affect 78.1 acres of jurisdictional wetlands, 50.1 acres of non-jurisdictional wetlands, and 26.0 acres of Waters of the US. The environmental impacts of Alternative C could be minimized through participation in and commitment to mitigation programs, however the environmental impacts would still be greater than in the No Action Alternative.

Alternative C would impact a total of three Section 4(f) sites (parklands), one of which is also a Section 6(f) site. Alternative C impacts four Section 106 sites. Alternative C requires the acquisition of 539 residences and 197 businesses. The residential relocation required by Alternative C would disproportionately affect minority individuals, and therefore results in environmental justice impacts. The quantification of noise exposure indicates that Alternative C would expose 12,609 acres to greater than 65 DNL noise levels, including approximately 23,985 residents.

3.5.2.2 Operational Factors of Alternative C

Under Alternative C, average annual delay in 2018 is estimated at 5.8 minutes per operation. The delay reduction achieved by Alternative C is greater than the delay reduction of Alternatives A, D and G. This is due in part to the fact that Alternative C is the only alternative capable of providing four independent arrival streams in good weather. Moreover, Alternative C also is the only alternative that has the potential, should the technology/procedures be approved, of immediately implementing four independent arrival streams during all weather conditions. As a result, Alternative C preserves the potential to produce even greater delay reduction benefits than are assumed here. A summary of operational factors associated with Alternative C is provided in **Appendix D, Simulation Modeling**.

3.5.2.3 Economic Impacts of Alternative C

Relative to the No Action Alternative in 2018, Alternative C would generate an estimated \$243 million in cost savings from delay reduction. The implementation cost for Alternative C is slightly greater than Alternative D and slightly less than Alternative G.

As businesses and homes are purchased under Alternative C, many taxing bodies that receive various taxes from these properties would lose tax revenue that is now realized. This loss of tax revenue would be ongoing and would have a significant negative impact to the taxing bodies. The loss in property contained in the local tax base, based on 2002 tax bills for one year is estimated to be approximately \$5.7 million.

On August 6, 2003, the Illinois General Assembly passed legislation known as the O'Hare Modernization Act, Section 21. Reimbursement for tax base losses, which states the following:

Whenever the City acquires parcels of property within any school district or community college district for the O'Hare Modernization Program, the City shall, for the following taxable year and for each of the 5 taxable years thereafter, pay to that district the amount of the total property tax liability of the acquired parcels to the district for the 2002 taxable year, increased or decreased each year by the percentage change of the district's total tax extension for the current taxable year from the total tax extension for the prior taxable year; provided that no annual increase shall exceed the lesser of 5% or the annual increase in the Consumer Price Index. Funds payable by the City under this Section shall be paid exclusively from non-tax revenues generated at airports owned by the City, and shall not exceed the amount of those funds that can be paid for that purpose under 49 U.S.C. 47107 (1)(2).

Notwithstanding any other provision of this Section: (i) no funds shall be payable by the City under this Section with respect to any taxable year succeeding the 2009 taxable year; (ii) in no event shall such funds be payable on or after January 1, 2010; (iii) in no event shall the total funds paid by the City pursuant to this Section to all districts for all taxable years exceed \$20,000,000; and (iv) any amounts payable to a district by the City with respect to any parcel of property for any taxable year shall be reduced by the amount of taxes actually paid to the district for that taxable year with respect to that parcel or any leasehold interest therein.

Nevertheless, the acquisition of properties to implement Alternative C, if selected, would have implications requiring mitigation.

3.5.3 Alternative D Summary Evaluation

Alternative D is a variation of Alternative C and was developed by FAA to evaluate how the airport would operate without the construction of proposed Runway 10R/28L. A brief summary of potential Alternative D impacts follows.

3.5.3.1 Environmental Impact Factors of Alternative D

Environmental impacts associated with Alternative D are substantially equal to those of Alternatives C and G while typically they are greater than those of the No Action Alternative (Alternative A). Alternative D would affect 78.1 acres of jurisdictional wetlands, 50.1 acres of non-jurisdictional wetlands, and 26.0 acres of Waters of the US. The environmental impacts of Alternative D could be minimized through participation in and commitment to mitigation programs, however the environmental impacts would still be greater than in the No Action Alternative.

Alternative D would impact a total of three 4(f) sites (parklands), one of which is also a 6(f) site. Alternative D impacts four Section 106 sites. Alternative D requires the acquisition of 522 residences and 164 businesses. The residential relocation required by Alternative D would disproportionately affect minority individuals, and therefore results in environmental justice

impacts. The quantification of noise exposure indicates that Alternative D would expose 12,526 acres to greater than 65 DNL noise levels, including 23,380 residents.

3.5.3.2 Operational Factors of Alternative D

Under Alternative D, average annual delay in 2018 is estimated at 10.5 minutes per operation. The delay reduction achieved by Alternative D is less than the delay reduction of Alternatives C and G but significantly more than that of Alternative A. A summary of operational factors associated with Alternative D is provided in **Appendix D, Simulation Modeling**.

3.5.3.3 Economic Impact Factors of Alternative D

Relative to the No Action Alternative in 2018, Alternative D would generate an estimated \$103 million in cost savings from delay reduction. The implementation cost for Alternative D while greater than Alternative A is also somewhat less than Alternatives C and G.

As businesses and homes are purchased under Alternative D, many taxing bodies that receive various taxes from these properties would lose tax revenue that is now realized. This loss of tax revenue would be ongoing and would have a significant negative impact to the taxing bodies. The loss in property contained in the local tax base, based on 2002 tax bills for one year is estimated to be approximately \$5.3 million. Nevertheless, the acquisition of properties to implement Alternative D, if selected, would have implications requiring mitigation.

3.5.4 Alternative G Summary Evaluation

Alternative G was developed by FAA initially as an alternative to the City's proposal to assess if a different runway layout had the potential to substantially increase airfield capacity. A brief summary of potential Alternative G impacts follows.

3.5.4.1 Environmental Impact Factors of Alternative G

Environmental impacts associated with Alternative G are substantially equal to those of Alternatives C and D while typically they are greater than those of the No Action Alternative (Alternative A). Alternative G would affect 78.1 acres of jurisdictional wetlands, 50.1 acres of non-jurisdictional wetlands, and 26.0 acres of Waters of the US. The environmental impacts of Alternative G would be minimized through participation in and commitment to mitigation programs, however the environmental impacts would still be greater than in the No Action Alternative.

Alternative G would impact a total of three 4(f) sites (parklands), one of which is also a 6(f) site. Alternative G impacts four Section 106 sites. Alternative G requires the acquisition of 522 residences and 164 businesses. The residential relocation required by Alternative G would disproportionately affect minority individuals, and therefore results in environmental justice impacts. The quantification of noise exposure indicates that Alternative G would expose 12,623 acres to greater than 65 DNL noise levels, including approximately 22,935 residents.

3.5.4.2 Operational Factors of Alternative G

Under Alternative G, average annual delay in 2018 is estimated at 6.9 minutes per operation. The delay reduction achieved by Alternative G is significantly greater than the delay reduction of Alternatives A and D but slightly less than that of Alternative C. A summary of operational factors associated with Alternative G is provided in **Appendix D, Simulation Modeling**.

3.5.4.3 Economic Impact Factors of Alternative G

Relative to the No Action Alternative in 2018, Alternative G would generate an estimated \$210.4 million in cost savings from delay reduction. The implementation cost for Alternative G is greater than Alternatives A, C, and D.

As businesses and homes are purchased under Alternative G, many taxing bodies that receive various taxes from these properties would lose tax revenue that is now realized. This loss of tax revenue would be ongoing and would have a significant negative impact to the taxing bodies. The loss in property contained in the local tax base, based on 2002 tax bills for one year is estimated to be approximately \$5.3 million. Nevertheless, the acquisition of properties to implement Alternative G, if selected, would have implications requiring mitigation.

3.6 EVALUATION OF DERIVATIVES

In the course of reviewing comments on the Draft EIS, FAA was presented with suggestions and requests regarding the alternatives presented in the Draft EIS that could be considered for the purpose of avoiding or mitigating some of the impacts associated with proposed Build Alternatives.

Although in many cases these suggestions or requests have been described by commenters as "new alternatives", FAA has reviewed these proposals and believes that they are properly characterized as "variants" or "derivatives" to the alternatives that were presented in the Draft EIS. A document titled "The Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," in the Federal Register on March 23, 1981, Question 29b specifically deals with the issue of how an agency must respond to a comment raised on the Draft EIS concerning a specific alternative or alternative(s) not previously considered. Below are two scenarios discussed in this document which supports the agency's approach to the further evaluation of "variants" or "derivatives."

A second possibility is that an agency may receive a comment indicating that a particular alternative, while reasonable, should be modified somewhat, for example, to achieve certain mitigation benefits, or for other reasons. If the modification is reasonable, the agency should include a discussion of it in the final EIS...

A third slightly different possibility is that a comment on a draft EIS will raise an alternative which is a minor variation of one of the alternatives discussed in the draft EIS, but this variation was not given any consideration by the agency. In such a case, the agency should develop and evaluate the new alternative, if it is reasonable, in the final EIS. If it is qualitatively within the spectrum of alternatives that were discussed in the draft, a supplemental draft will not be needed...

The derivative alternatives can generally be categorized as follows: (1) commenter developed derivatives of the "No Build" or "Limited Build" alternatives, and (2) FAA developed derivatives of Alternative C (Preferred Alternative). For greater details on comments received as part of the formal EIS process, please see **Appendix U, Response to Comments**, of this FEIS.

The purpose of this section in Chapter 3 is to evaluate the commenter developed derivatives in relation to the FAA's screening criteria utilized in the EIS. FAA representatives evaluated these eight derivatives relative to the purpose and need. Based on its evaluation, FAA has determined that none of the commenter derivatives meet purpose and need. Therefore, these derivatives were not retained for secondary screening.

In addition, the FAA independently took a hard look at additional derivatives of Alternative C that the Agency had requested its staff to develop as a result of comments made on the Draft EIS. An effort was made to further evaluate avoidance or minimization of potential impacts to resources (cemeteries) in the project area. FAA representatives from within the Great Lakes Region (Airports, Air Traffic, CAMPO, TPC, and Runway Safety Officer) evaluated the FAA developed derivatives in comparison to Alternative C. Based on its evaluation, FAA determined that none of the five FAA derivatives was a less restrictive alternative capable of performing as well as Alternative C. Similarly, none of the five derivatives would avoid or minimize impacts to the cemeteries while also performing as well as Alternative C.

3.6.1 Considerations for the Evaluation of Commenter Derivatives

The proposed commenter derivatives of the "No Build" or "Limited Build" Alternatives are substantially similar to alternatives that have been evaluated earlier in this **Chapter 3**. The proposed derivatives, offered by the commenters, are further discussed below, including an evaluation of their merits in relation to the FAA's screening criteria.

Commenter's Developed Derivatives of the "No Build" or "Limited Build" Alternatives

- **Derivative H** – No Action with Use of Other Airports and Congestion Management (Average Annual Delay of 9.3 Minutes per Operation)
- **Derivative I** – No Action with Use of Other Airports and Congestion Management (Average Annual Delay consistent with NPRM Modeled Delay)
- **Derivative J** - No Action with Use of Other Airports and Congestion Management (Average Annual Delay 4, 6, 8 Minutes per Operation or other FAA Level)
- **Derivative K** – OMP Phase I (Original Alt. B) along with Use of Other Airports and Congestion Management
- **Derivative L1** –Refinement of Alternative B, with the Northernmost Runway moved to a southern position.
- **Derivative L2** – Refinement of Alternative B, with the Northernmost Runway moved to the south, and the new Runway 10C moved to the north.
- **Derivative M** – No Action with a New South Runway only (4300' south from existing Runway 9R/27L)

- **Derivative N** - No Action with a New South Runway only (5000' south from existing Runway 9R/27L)

3.6.1.1 Commenters' Derivatives H, I and J

Commenters' Derivatives H, I, and J are essentially the same alternative. Commenters' Derivatives H, I and J are the existing O'Hare Airport coupled with the use of other airports and the use of congestion management. The only difference among the three is the assignment by the commenter of a variable level of average annual delay:

- **Commenters' Derivative H** – average annual delay of 9.3 minutes per operation;
- **Commenters' Derivative I** – average annual delay consistent with the NPRM modeled delay level;
- **Commenters' Derivative J** – average annual delay – 4, 6, 8 minutes per operation or other FAA-determined delay level.

FAA acknowledges that these derivatives include the use of the No Action Alternative coupled with both the use of other airports and congestion management. The FAA has evaluated a Congestion Management Alternative using the unconstrained level of operations; this detailed analysis can be found in **Appendix E, Alternatives, Section E.1.2.3** of this EIS. This analysis concluded that the Congestion Management Alternative, by itself, would not meet the purpose and need. The FAA has also evaluated a Use of Other Regional Airports Alternative; this detailed analysis can be found in **Appendix C, Use of Other Airports**, of this EIS with further documentation in **Section 3.2.2.2, Initial Screening of Non-Airfield Alternatives**. This analysis concluded that the Use of Other Regional Airports Alternative, by itself, would not meet the purpose and need.

FAA has further evaluated the possibility of a combination of congestion management and the use of other airports potentially satisfying the purpose and need in a "No Action" scenario. Based on the analysis of these potential developments contained in **Appendix E**, FAA has concluded that these two developments—congestion management and use of other airports—even in combination, would not be able to meet purpose and need without any other development of the ORD airfield.

As noted earlier, the Commenters' Derivatives H, I and J are essentially the same as the Congestion Management Alternative. The FAA has now, by comparison, evaluated the Commenters' Derivatives H, I and J against alternate levels of operations resulting from the different delay thresholds as suggested by the Commenters. The delay thresholds suggested by the Commenters in connection with Commenters' Derivatives H, I, and J would all result in the accommodation of a lower level of annual operations than the unconstrained demand forecast presented in this EIS. Therefore, the Commenters' Derivatives H, I, and J would also fail to meet the purpose and need at the resultant lower level of operations.

3.6.1.2 Commenters' Derivative K

Commenters' Derivative K includes OMP Phase I (referred to elsewhere in the EIS as Alternative B) coupled with the use of other airports and the use of congestion management.

As part of **Section 3.3.2.6, Blended Alternatives**, the FAA has evaluated a Blended Alternative. This Blended Alternative includes Alternative B coupled with a number of non-airfield alternatives. The Blended Alternative included multiple components above and beyond Commenters' Derivative K—that is, the inclusion of the Use of Other Modes of Communication or Transportation, Airspace Improvements, and the Use of New Technologies.

As discussed in **Section 3.2.2.2, Initial Screening of Non-Airfield Alternatives** of this EIS, the FAA does not consider congestion management as an acceptable, long-term solution to traffic congestion at airports where improvements are physically possible, and the airport operator desires to undertake such improvements. In the Order Limiting Schedule Operations, the FAA recognized voluntary agreements between FAA, United Airlines and American Airlines to temporarily (ending October 2005) reduce the number of flights during peak periods between 1 p.m. and 8 p.m. local time by 5 percent in an effort to reduce the delay at O'Hare. Subsequent to the issuance of the Draft EIS, the FAA issued a Notice of Proposed Rulemaking (NPRM), shown below to extend the limitation of flight schedules:

The FAA is proposing this rule to address persistent flight delays related to over-scheduling at O'Hare International Airport (O'Hare). This proposed rule is intended as an interim measure, because the FAA anticipates that the rule would yield to longer term solutions to traffic congestion at the airport. Such solutions include an application by the City of Chicago that, if approved, would modernize the airport and reduce levels of delay, both in the medium term and long term. For this reason, the proposed rule includes provisions allowing for the limits it imposes to be gradually relaxed and in any event would sunset in 2008.

The NPRM makes clear, however, that the use of arrival caps as a method of reducing flight delays is not preferable to the long term goal of increasing airport capacity through infrastructure enhancements. As stated:

Although arrival caps are being proposed in this rule, imposing caps on the use of airport capacity does not meet aviation demand; rather, such caps artificially limit operations during certain hours to achieve the benefit of delay reduction. The FAA's preferred approach to reducing delay and congestion is to increase airport infrastructure so that capacity meets demand. Because a timely increase to airport capacity is not always feasible, alternative measures may be necessary to address congestion that adversely affects the efficiency of the national airspace system.

In addition to such administrative approaches to congestion management, FAA may also consider market-based approaches (e.g., peak period pricing). As discussed in **Section 3.2.2.2, Initial Screening of Non-Airfield Alternatives** of this EIS, the FAA has recently reviewed the potential application of market-based congestion management in connection with the EIS for Runway 17-35 at Philadelphia International Airport. In this case, FAA has concluded that,

As a matter of policy, [the Office of the Secretary of Transportation] and FAA disfavor administrative approaches to demand management as an artificial constraint on the demand for air transportation. For example, such approaches bar air carriers from offering air travelers as much service as they would like. Administrative approaches should only be employed where absolutely necessary and as an interim, stop-gap measure, until an acceptable solution to delay can be implemented.

Accordingly, it remains the FAA's position that administrative rules that cap operations may be suitable interim actions where improvements are physically impractical, or not yet implemented.

As reported in **Section 3.3.2.6, Blended Alternative**, of this EIS, "the Blended Alternative, even if it could be implemented, would still yield the least delay reduction, while not serving the forecast demand." Since Commenters' Derivative K would yield less delay reduction than the Blended Alternative, Derivative K does not warrant further consideration by the FAA.

3.6.1.3 Commenter's Derivatives L1 and L2

Commenter's Derivatives L1 and L2 represent refinements to Alternative B presented earlier in this Chapter 3. Commenter's Derivative L1 is a refinement of Alternative B, with the difference being the northernmost runway is moved to a southern position. Commenter's Derivative L2 is also a refinement of Alternative B, with the differences being the northernmost runway is moved to the south, and the new runway 10C is moved to the north. As stated previously L1 and L2 represent Limited Build derivations of Alternative B.

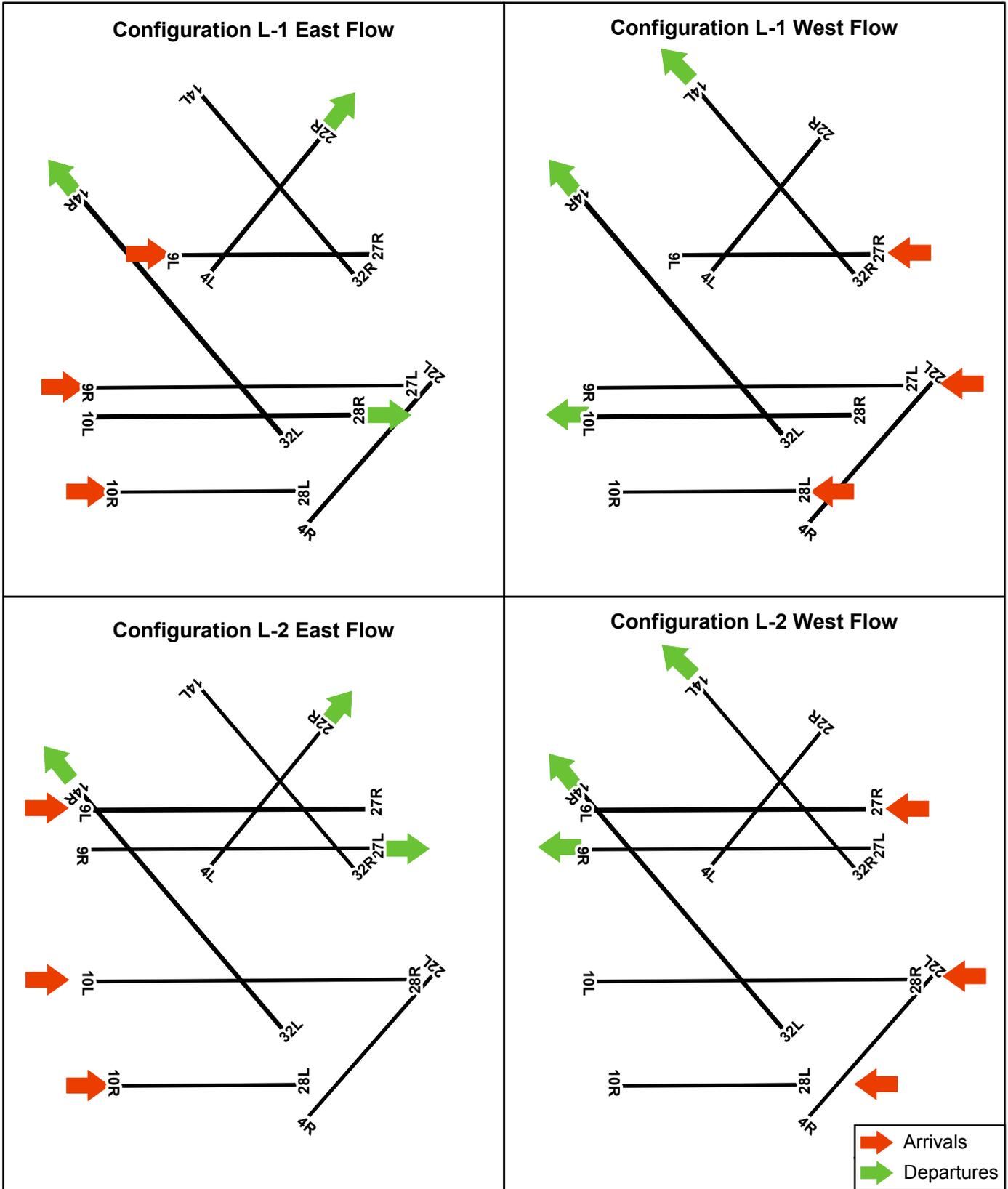
A group of FAA representatives from within the Great Lakes Region (Airports, Air Traffic, Chicago Area Modernization Program Office, and FAA's Third Party Contractor and Runway Safety Officer) analyzed the Commenters' Derivatives L1, L2, and a combination of L1 and L2) discussed below. These suggested airfield operating configurations represented unique east flow and west flow operations. Potential Operating Configurations for L-1 East Flow, L-1 West Flow, L-2 East Flow and L-2 West Flow are shown on **Exhibit 3-11**. The following briefly summarizes discussions resulting from FAA's review of these derivatives offered by the Commenters.

General Comments Concerning L1 and L2

- As noted by the commenters, these derivatives could potentially, eliminate the need to acquire properties in Elk Grove Village, Bensenville, and the two cemeteries.
- Western terminal development would not be precluded with these derivatives, but Runway 14R/32L would remain and would create a natural barrier to terminal development on the airfield.
- Due to parallel runway spacing, during weather conditions below a 4,500' ceiling and 7 statute miles visibility, the operating configurations resulting from these derivatives would be limited to two arrival runways thus limiting the arrival capacity of the airfield to approximately 76 to 80 per hour which is equivalent to the IFR rate today.
- Reducing the length of Runway 10R/28L by approximately 1,500 feet and shifting it to the east would cause the Runway Protection Zone for Runway 10R to infringe on areas east of the Airport. At only 6,095 feet in length, this runway would not be used by as many aircraft as the FAA has projected for the Preferred Alternative, thereby making this runway only marginally useful and shifting much of that runway's traffic to other runways.

- Both Alternative L-1 and L-2 retain the “runway triangle” on the north side of the airport (current Runways 9L/27R, 4L/22R and 14R/32L) which would never allow the airport to achieve the efficiencies of the proposed OMP. This is because all three of those runways are “dependent” upon each other, intersecting in ways that limit operations, and increase controller workload. In essence, any such proposal can only fine-tune the efficiency of today’s airfield.
- Due to the length of proposed runways and their location, intersection departures would not be viable nor could Land and Hold Short Operations (LAHSO) be utilized. Therefore, every runway crossing would be across an active runway, thereby reducing efficiency.

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Source: Reproduced from data presented in the Affidavit of Joeseeph Del Balzo, May 5, 2005.



Chicago O'Hare International Airport

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**Potential Operating
Configurations L-1 & L-2**

▶ Exhibit 3-11

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Derivative L-1 – East Flow

- This configuration would be comparable to Plan X (use of a specific set of runways as described in the Draft EIS) that is used today. See **Appendix D, Simulation Modeling, Section D.3**. It would provide marginal increases in the hourly operational throughput over Plan X. However, this configuration would neither reduce existing delays nor accommodate anticipated growth in aviation activity at the Airport at acceptable levels of delay.

Derivative L-1 – West Flow

- This configuration would be comparable to Plan W (use of a specific set of runways as described in the Draft EIS) that is used today. See **Appendix D, Simulation Modeling, Section D.3**. It would provide benefits in hourly operational throughputs over Plan W. Although this specific configuration would provide modest delay benefits, it would not accommodate anticipated growth in aviation activity at the Airport at acceptable levels of delay.

Derivative L-2 – East Flow

- This configuration would be comparable to Plan X which is utilized today. See **Appendix D, Simulation Modeling, Section D.3**. However, due to the runway interaction between arrivals and departures, this configuration would perform worse than the existing airfield and would not be used.

Derivative L-2 – West Flow

- This configuration would be comparable to Plan W which is utilized today. See **Appendix D, Simulation Modeling, Section D.3**. However, due to the runway interaction between arrivals and departures, this configuration would perform worse than the existing airfield and would not be used.

A Potential Derivative Which Combines Commenters' Derivatives L-1 & L-2

- A combined airfield configuration which might include some or all of the components of the L-1 and L-2 configurations presented by the Commenters' would yield many of the same problems listed above. Further, the complexities brought about by all of the interdependencies, the inability to perform triple approaches in all weather conditions, and potential performance issues during IFR conditions make further detailed analysis of such a combined derivative by FAA unnecessary.

Conclusion on Commenters' Derivatives L1 and L2

Based on the above analysis, FAA concludes that the Commenters' Derivatives L1 and L2, even though potentially feasible, do not warrant further consideration by the FAA. In particular, the FAA finds that the Commenters' Derivatives L1 and L2, which represent refinements to Alternative B presented in detail earlier in this Chapter 3, are most likely to yield less delay

savings than Alternative B. Alternative B was found not to meet purpose and need. Therefore, Commenters' Derivatives L1 and L2 would also not meet purpose and need.

3.6.1.4 Commenter's Derivative M – No Action with a New South Runway Only (4300' South from Existing Runway 9R/27L)

On July 5, 2005, the FAA received comments from Mr. Joseph Karaganis and Mr. Robert Cohn on the FAA's Draft Section 4(f) and Section 6(f) Evaluation for the O'Hare Modernization Program. As part of this comment document, a transcript of a recent newscast was attached that indicated that, "a single new runway on the airport's south end would accomplish the same benefits at a fraction of the cost."

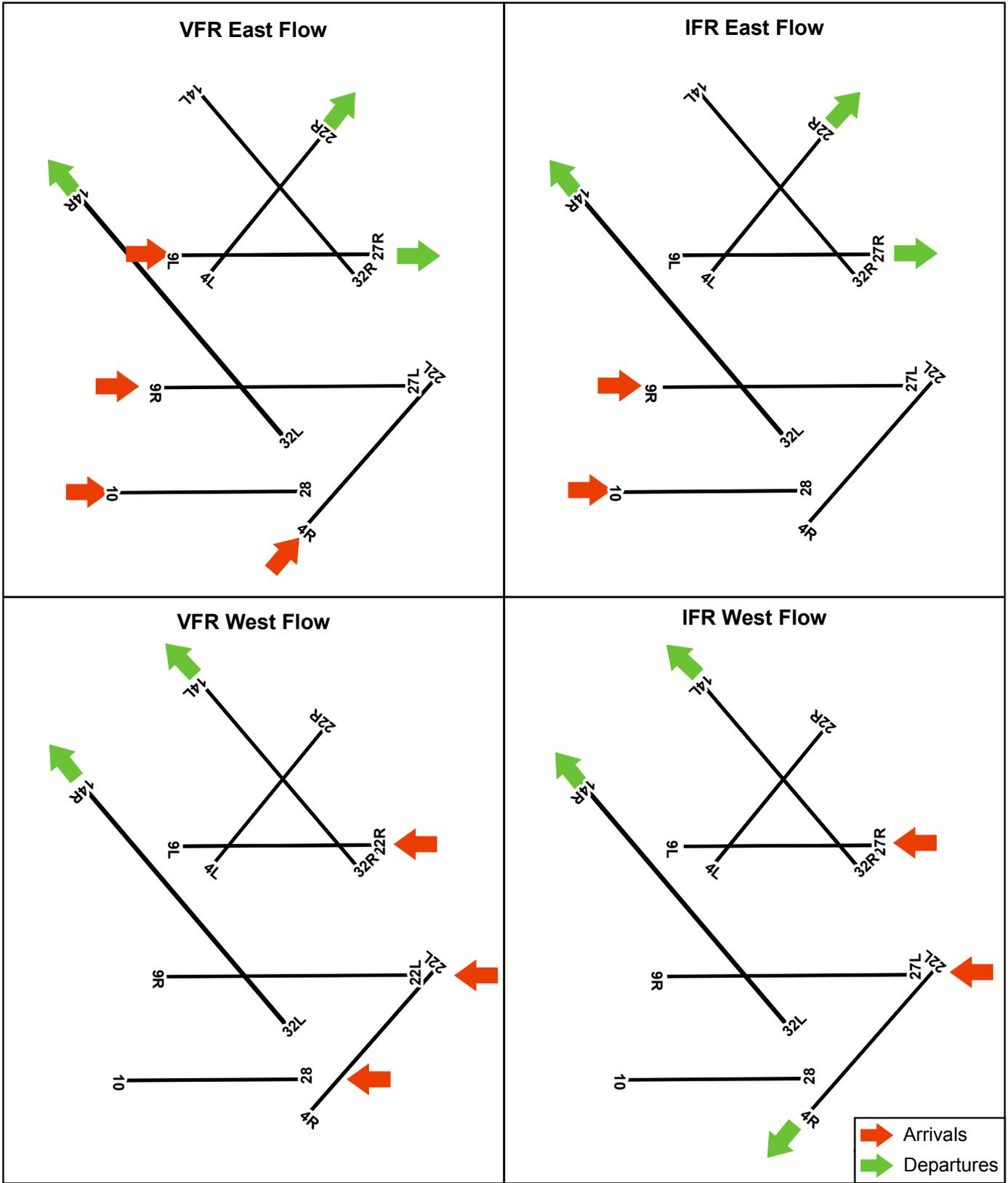
Although no proposed airport layout diagram was included providing runway length or its specific location with respect to O'Hare's other runways, the FAA has evaluated two derivatives of the No Action Airfield with a proposed new runway on the south side taking into account runway spacing criteria: (1) No Action Airfield with a south runway 4,300' (referred to as proposed Runway 10/28) from existing Runway 9R/27L, (2) No Action airfield with a south runway (referred to as proposed Runway 10/28) 5,000' from existing Runway 9R/27L.

Background Information/Assumptions

- The No Action Alternative with one South Runway Only Derivatives consist of the existing airfield with a new east/west runway located at 4,300 feet or 5,000 feet south of and parallel to the existing Runway 9R/27L. The proposed runway is referred to as Runway 10/28.
- The proposed south runway only (Runway 10/28) is designed at 7,500 feet in length. All primary operating configurations considered with these derivatives assume that appropriate taxiway structures will exist to support the use of the runway layouts.

No Action Airfield with Proposed Runway 4,300' from Existing Runway 9R/27L

The FAA has evaluated the No Action Airfield derivative with a proposed new runway oriented in an east/west direction located 4,300 feet from existing Runway 9R/27L. Anything closer to other runways would significantly limit the operational capability of the runway. Based on the proposed runways in this alternative, Air Traffic would operate the proposed runways in the four primary operating configurations as illustrated in **Exhibit 3-12**.



Source: Developed from transcript of a newscast from www.nbc5.com in Chicago occurring June 29, 2005 at 6:00 p.m. and 10:00 p.m. The June 25 Transcript was submitted as an attachment to a July 5, 2005 letter from Karaganis/Cohn which commented on the Draft 4(f)/6(f) Evaluation.

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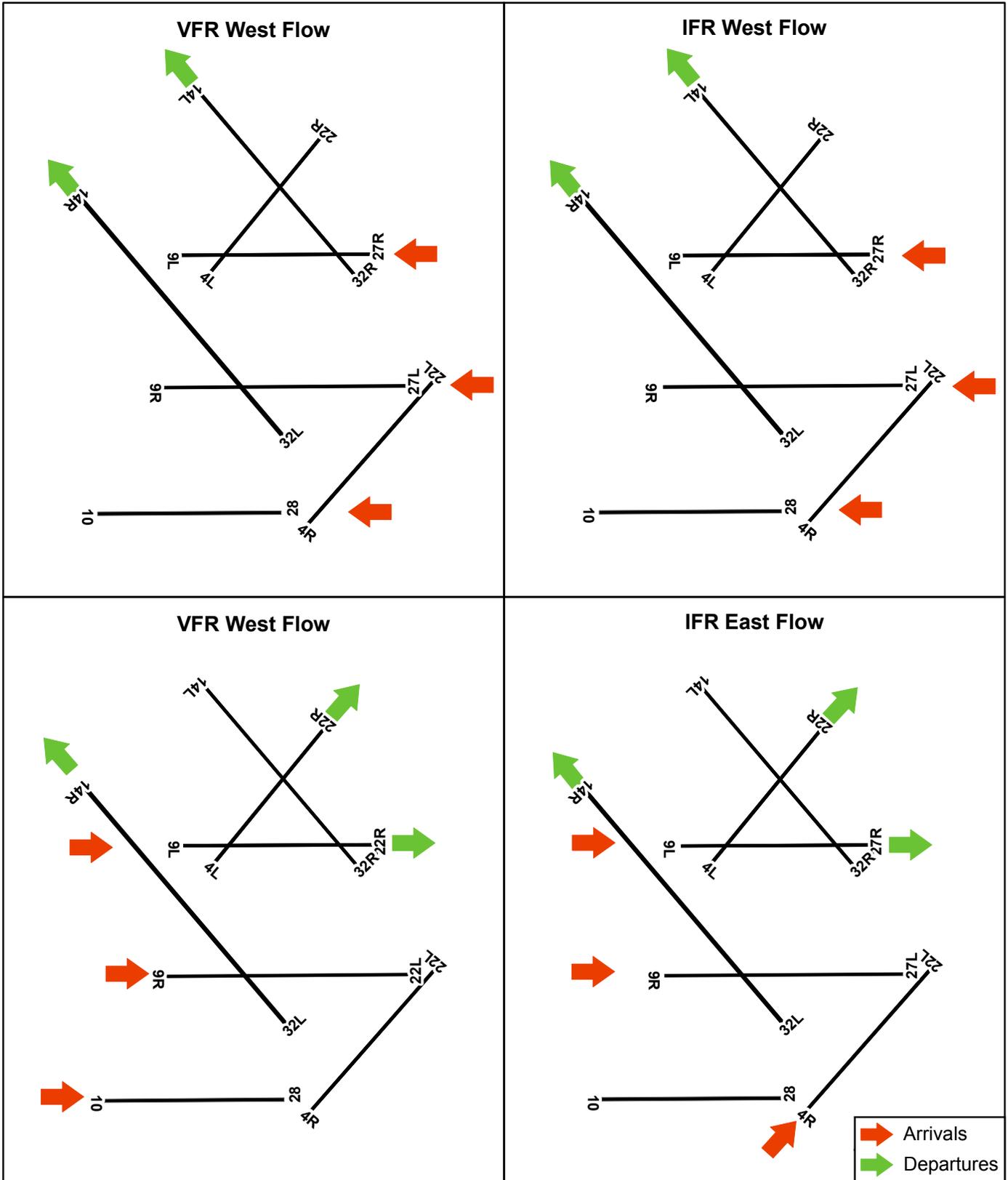
General Comments

- The proposed runway layout of this alternative provides the capability for quadruple approaches using three parallel runways and a converging runway. Quadruple approaches can only be utilized a limited portion of the time, namely in good weather during East Flow operations. However, arrivals to Runway 9R would be limited to approximately 10 per hour to maintain a balanced airfield.
- Due to the converging approach in VFR East Flow, high weather minimums would apply. VFR conditions are generally defined as 1,000 foot ceiling and a visibility of 3 nautical miles. For this configuration (VFR East Flow), the weather minimums would require a ceiling of 2,500 feet and a visibility of at least 7 nautical miles to protect for the missed approach and to provide separation between Runway 10R arrivals and Runway 4R arrivals.
- Triple approaches for IFR East or IFR West Flow would not be allowed. FAA Order 7110.65 requires 5,000' between parallel runways for simultaneous triple approaches. This limitation restricts the hourly arrival throughput of this alternative to a level equivalent to the existing airfield.

3.6.1.5 Commenter's Derivative N – No Action with a New South Runway Only (5000' South from Existing Runway 9R/27L)

The FAA has evaluated the No Action Airfield with a proposed new runway oriented in an east/west direction located 5,000 feet from existing Runway 9R/27L. Based on the proposed runways in this alternative, Air Traffic would operate the proposed runways in the four primary operating configurations as illustrated in **Exhibit 3-13**.

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Source: Developed from transcript of a newscast from www.nbc5.com in Chicago occurring June 29, 2005 at 6:00 p.m. and 10:00 p.m. The June 25 Transcript was submitted as an attachment to a July 5, 2005 letter from Karaganis/Cohn which commented on the Draft 4(f)/6(f) Evaluation.



Chicago O'Hare International Airport

**O'Hare Modernization
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**Potential Operating
Configurations N**

► Exhibit 3-13

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General Comments

- No quadruple arrivals in either good weather or poor weather would be available under this alternative if the far south proposed runway is shifted exactly 5,000 feet south of existing Runway 9R/27L. The Runway Safety Areas (RSA's) for Runway 28L and Runway 4R would overlap. In order for quadruple arrivals to be available using three parallel runways and a converging runway, the proposed south runway would have to be shifted further west potentially requiring additional property acquisition in Bensenville.
- Land and Hold Short Operations (LAHSO) would be required with a Rejected Landing Procedure (RLP). To date, no LAHSO operations with an RLP have been approved nationwide
- This alternative would perform worse than Alternatives B, C, D and G.
- Locating the proposed southern runway at 5,000 feet from the existing Runway 9R/27L would require additional land acquisition to the south. Specifically, the following facilities would require relocation:
 - United States Post Office,
 - Detention basins located to the south of the Post Office,
 - Irving Park Road,
 - Railroad Yard.
- In addition to the land in the southwest quadrant proposed to be acquired in the preferred alternative, property would have to be acquired south of Green Street in Bensenville.

Conclusory Remarks Concerning Commenter Derivatives M and N

Based upon the above analysis, the FAA concludes that Derivatives M and N, even though potentially feasible, do not warrant further consideration by the FAA. Triple IFR West and East Flow Approaches would not be allowed for Alternative M due to inadequate separation runway to runway. This limitation would restrict the hourly arrival throughput to a level comparable to the existing airfield. Derivative N Runway 28L RSA would cause conflicts with the RSA for Runway 4R. There would be operational restrictions due to LAHSO and RLP requirements which have not been approved nationwide. Additional land acquisition southwest and the relocation of major facilities south would be required for a potential runway that underperforms when compared to Alternatives B, C, D & G. As a result, neither of these derivatives meets purpose and need.

3.6.2 FAA Derivatives of Alternative C (Preferred Alternative)

Derivatives of Alternative C have been considered by FAA as a result of comments received on the Draft EIS. In an effort to respond to comments, the FAA has considered refinements to Alternative C that would mitigate impacts on two cemeteries (St. Johannes and Rest Haven). As part of this analysis, FAA developed five derivatives to Alternative C which are discussed as follows:

FAA Derivatives of the "Full Build" Alternative

- **Derivative C1** - Alternative C with No Runway 10C/28C
- **Derivative C2** - Alternative C with Runway 10C/28C Shortened to 7,500'
- **Derivative C3** - Alternative C with Runway 10C/28C Shortened to 6,900'
- **Derivative C4** - Alternative C with Runway 10C Shifted 350' South & Shortened to No Less than 10,300'
- **Derivative C5** - Alternative C with Runway 10C Shifted 450' South & Shortened to No Less than 10,300'

FAA representatives from within the Great Lakes Region (Airports, Air Traffic, CAMPO, TPC, and Runway Safety Officer) evaluated the FAA developed derivatives in comparison to Alternative C.

3.6.2.1 Derivative C1 – Alternative C with No Runway 10C

General Comments on Derivative C1

- In general, Alternative C proposes 6 east/west parallel runways plus 2 crosswind runways oriented in the southwest/northeast direction. Runway 10C is utilized as a full time runway in all primary operating configurations. While Derivative C1 (5 east/west parallels) has the capability to absorb some of the hourly flights lost in the VFR and IFR west primary operating configurations represented in the original Alternative C, not all of the operations can be accommodated without a higher level of delay. **Exhibit 3-14** sets forth the various operating configurations for Derivative C1.
- VFR and IFR east primary operating configurations do not have the ability to accommodate a greater level of traffic.
- All operating configurations under this scenario do not support 4 arrival runways in a balanced airfield operation.
- All primary operating configurations depicted assume that appropriate taxiway structures will exist to support the use of the runways as they are depicted.
- The former runway pair of Runways 10C and 10L are no longer coupled operationally during IFR weather. During IFR weather, Runway 10C and Runway

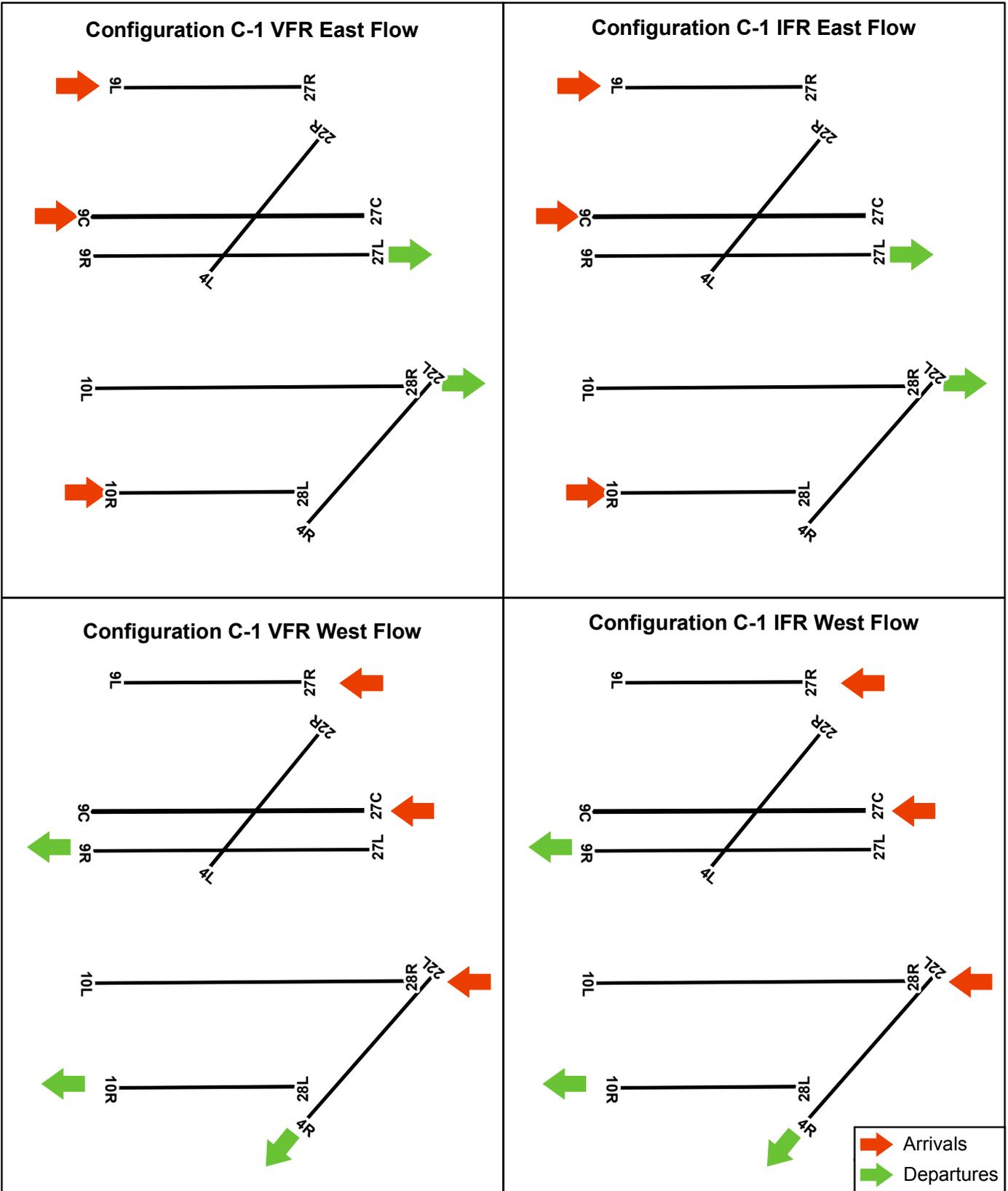
- 10L must be operated in a sense as one runway, while the pair Runway 10L and Runway 10R can be operated independently.
- If the proposed Runway 10C/28C is removed, the far south runway (proposed Runway 10R/28L) would need to be extended to at least 8,500 feet to accommodate a significant majority of the forecast fleet mix.

Conclusory Remarks on Derivative C1

The FAA examined Derivative C1, Alternative C without Runway 10C/28C. In Alternative C, Runway 10C/28C would be utilized as a full time runway in all primary operating conditions. Derivative C1's east flow departure capacity in poor weather conditions is reduced from 120 aircraft per hour to about 90 per hour, a significant reduction, by restricting departures to two independent runways. It also appears that the absence of this 10,800 foot runway would require an extension to proposed runway 10R/28L of at least 1,000 feet to 8500' in order to accommodate a majority of the forecast fleet mix. Because of existing runway 4R/22L, such an extension could only be accomplished on the west side of the airport, requiring additional land acquisition in the Bensenville area. In the absence of such an extension, the airfield becomes "imbalanced" with more traffic using the runways located north of the terminals because of the greater lengths they provide. This imbalance reduces the effectiveness of the proposed layout and means the airport would not achieve the delay reduction expected by the proposed action. Also, the removal of runway 10C/28C deprives the airport of one of two runways that are both wide enough and long enough for use by New Large Aircraft (NLA).

The absence of Runway 10C/28C would remove the ability to conduct quadruple simultaneous landings in VFR weather, and would eliminate the future potential for quadruple operations in IFR weather. Because of the separation distances required for taxiway clearances and other restrictions, it is not feasible to widen to 200 foot any other proposed runway that is long enough to handle NLA. As a result, Derivative C1 is not a less restrictive alternative that is capable of performing as well as Alternative C.

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Source: Federal Aviation Administration, Great Lakes Region, Air Traffic, C.A.M.P.O. and A.D.O. July 2005.



Chicago O'Hare International Airport

**O'Hare Modernization
Environmental Impact Statement**

**Potential Operating
Configurations C-1**

► Exhibit 3-14

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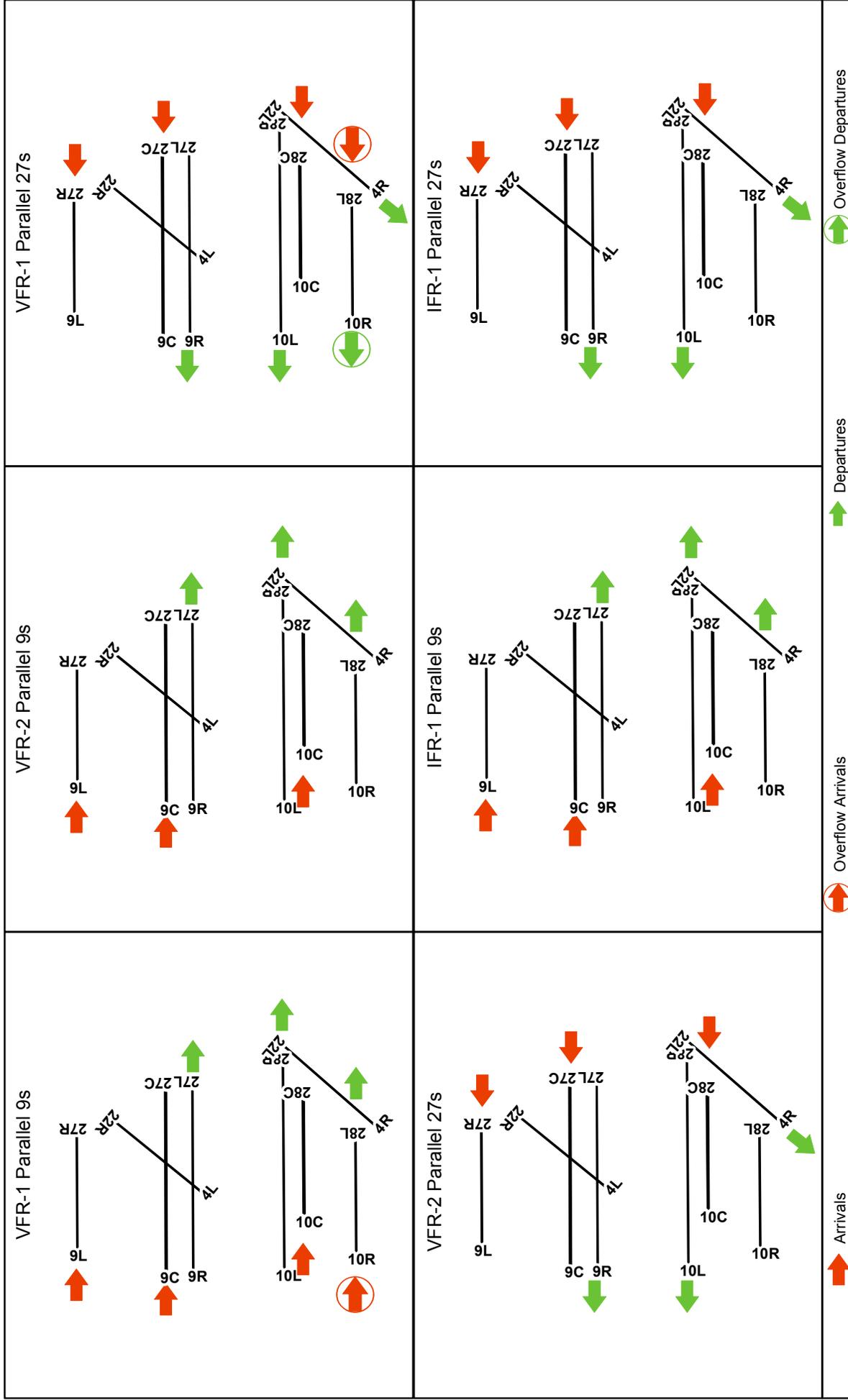
3.6.2.2 Derivative C2 – Alternative C with Runway 10C Shortened to 7500'

The FAA has also evaluated an additional derivative to Alternative C that leaves Runway 10C in the current location but shortens it from 10,800 feet to 7,500 feet. Based on an FAA operational analysis, these proposed runways would be operated primarily in the same manner as with Alternative C. However, significant operational issues arise with the shortening of the runway and the supporting taxiway network. **Exhibit 3-15** depicts the operating configurations anticipated with this proposed derivative.

General Comments-Alternative C2

- The significant shortening of Runway 10C/28C was evaluated earlier in the planning phase of the project. In this particular evaluation, (referred to Option 2 at the time), Runway 9R/27L was maintained at a shorter length in order to attempt to provide end-around taxiways. Due to the space requirements for end-around taxiways and the remaining available runway length, this option was not carried forth as viable.
- Runway 10C/28C is envisioned as a primary (only one of two on the proposed airfield) runway for Group VI aircraft. Reducing the length to 7,500 feet would eliminate this runway from consideration for those aircraft. All Group VI aircraft would be restricted to the north side of the airport and utilize proposed Runway 9C/27C.
- From a proposed runway use perspective, FAA air traffic would operate this layout in the same manner as Alternative C. However, due to the proposed shortening of Runway 10C/28C and supporting taxiway network, operational issues would be significant.
- Runway 10C/28C would be an arrival runway on an east flow operation. Movement of aircraft west of the approach end of Runway 10C would be impossible while other aircraft are arriving Runway 10C, due to requirements to remain clear of protected surfaces.
- The addition of Precision Object Free Zone (POFZ) and Runway Protection Zone (RPZ) restrictions would require arrival aircraft from Runway 10R and Runway 10C to cross Runway 10L at Taxiway ZT or further east. This is incompatible with the operation of the runways as conceived, and would provide a significant reduction in the number of departures on Runway 10L with the introduction of up to 60 arrivals crossing Runway 10L per hour in the last 1/3 of the runway.
- Wake turbulence also plays a role in this runway layout. Heavy jet and Boeing 757 aircraft departures on Runway 10L at the full length could become a wake turbulence factor for Runway 10C arrivals. In addition, Heavy and Boeing 757 aircraft assigned to arrive on Runway 10C would provide wake turbulence issues for Runway 10L departures.

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Source: Federal Aviation Administration, Great Lakes Region, Air Traffic, C.A.M.P.O. and A.D.O. - July 2005.

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- There would be no apparent method of routing Runway 10R departures to that runway. Runway 10R departures would need to cross mid-field with the Runway 10R and Runway 10C arrivals, significantly reducing the number of aircraft able to depart on Runway 10L. Under this scenario, it may not be viable to get to and from other runways other than to cross Runway 10L in the last 1/3 of the runway with the departures, and the last 1/4 with the arrivals.

Conslusory Remarks on FAA Derivative C2

The FAA studied the C2 configuration that would call for Runway 10C/28C to be shortened to 7,500 feet. This configuration would present safety issues and is therefore unacceptable because of the significant inefficiencies in operation that would be required to insure safety. This configuration also would impose significant operational constraints on the airfield. In its shortened layout, Runway 10C/28C would be an arrival runway in east flow conditions while Runway 10L/28R would continue to serve as a departure runway. Because the threshold of shortened Runway 10C would be relocated some 3,200 feet east of the threshold of Runway 10L, traffic landing on Runway 10C would be exposed to the wake turbulence of aircraft that had begun their takeoff roll further west on Runway 10L. Similarly, heavy jet and B-757 arrivals on 10C could produce wake turbulence issues for 10L departures. The addition of restrictions required by Precision Object Free Zone and Runway Protection Zone standards would negate planned efficiencies in taxi time and taxi routes for aircraft landing on 10C and departing on 10R. Also, reduction in length to 7,500 removes this runway as appropriate for use by NLA, as described above. As a result, Derivative C2 is not a less restrictive alternative that is capable of performing as well as Alternative C.

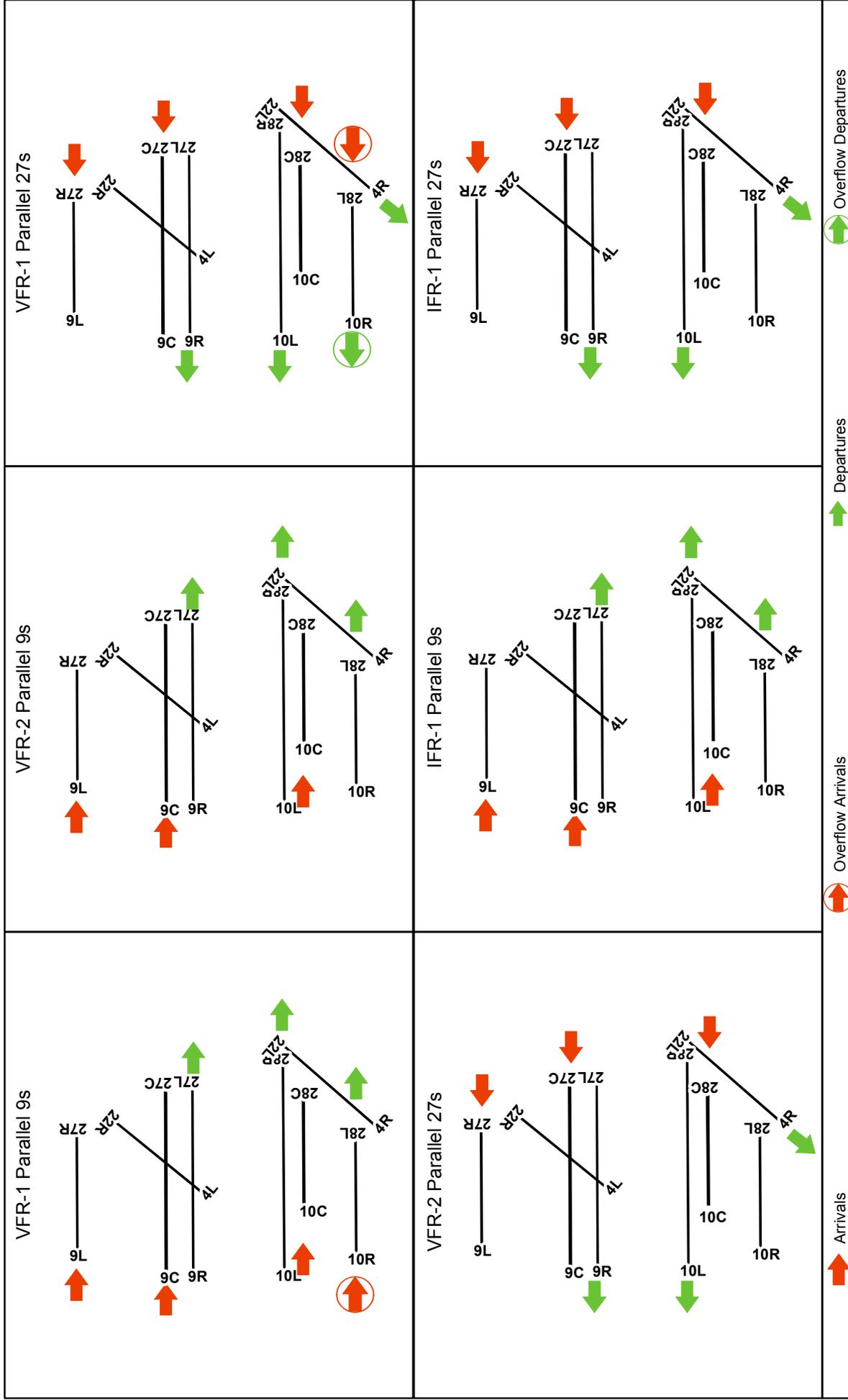
3.6.2.3 Derivative C3 – Alternative C with Runway 10C Shortened to 6900'

The FAA has evaluated Derivative C3 which is the City of Chicago's Alternative C with the proposed Runway 10C in its planned location but shortened from 10,800 feet to 6,900 feet. See **Exhibit 3-16** for the various operating configurations of this derivative.

General Comments-Derivative C3

- The Derivative C3 is nearly identical in operational aspects to Derivative C2 with two exceptions. First, with respect to Group VI aircraft, Derivative C3 (total length of 6,900') is operationally more restrictive than Derivative C2 (total length of 7,500'). Second, in a further shortened Runway 10C/28C under Derivative C3, wake turbulence issues could be greater than under Derivative C2.

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Source: Federal Aviation Administration, Great Lakes Region, Air Traffic, C.A.M.P.O. and A.D.O. - July 2005.

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Conclusory Remarks on Derivative C3

The FAA studied a C3 configuration in which runway 10C/28C was shortened to only 6,900 feet. This configuration produces the same impediments to delay reduction that are associated with a 7,500 runway alternative described previously as Alternative C2 and it exacerbates the safety-efficiency problem related to wake turbulence beyond that expected from a 7,500 foot runway. As a result, Derivative C3 is unacceptable because safety concerns would require the FAA to operate this derivative in an inefficient manner. As a result, Derivative C3 is not a less restrictive alternative that is capable of performing as well as Alternative C.

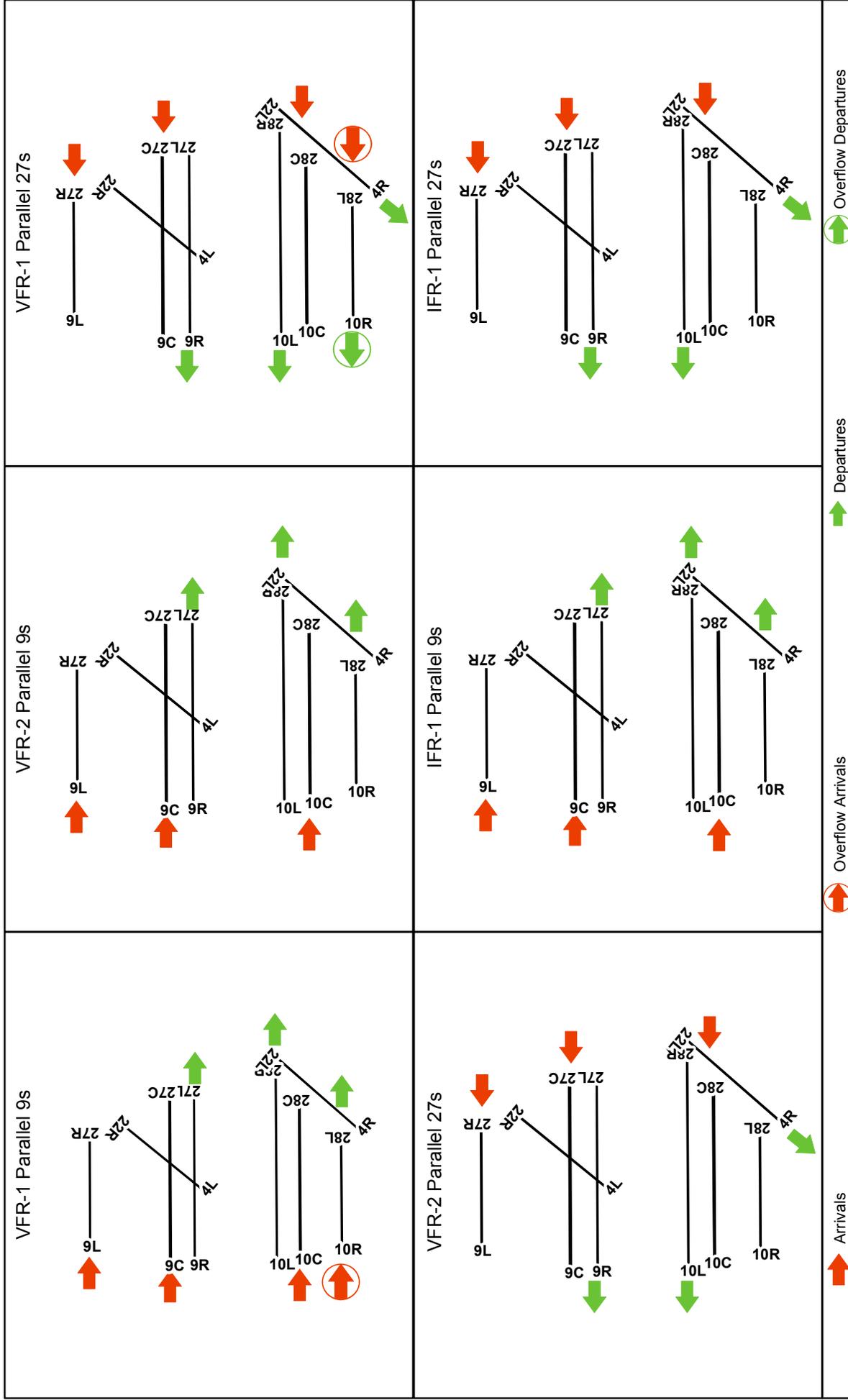
3.6.2.4 Derivative C4- Alternative C with Runway 10C Shifted 350' South & Shortened to No Less than 10,300'

The following section describes the FAA analysis of Alternative C4 which is Alternative C with Runway 10C/28C shifted 350' south and shortened to no less than 10,300 feet. See **Exhibit 3-17** for the various operating configurations of this derivative.

General Comments-Derivative C4

- A preliminary Terminal Instrument Procedures (TERPs) analysis was completed as part of the early planning effort. The results of this analysis indicated that there is a small land envelope on a line running east/west between proposed Runway 10C/28C and Runway 10R/28L. Shifting the proposed Runway 10C/28C south would likely force an overlap of the TERPs surfaces for Category II/III approaches to Runway 10R and Runway 10L. This could cause high minimums to be required on these runways impacting the operational efficiency during poor weather conditions.
- From a proposed runway use perspective, FAA air traffic would operate this layout in the same manner as Alternative C. However, this shifting of this proposed runway would cause operational constraints detailed below.
- To maintain the geometry of the airport, and the same operating assumptions, Runway 10C/28C would need to be shortened. This reduction would most likely take place on the east end of the runway. The reduction in runway length would include appropriate safety areas, localizer and glide slop critical areas.
- Initial traffic flow assumptions on the west configuration assumed that departing aircraft on Runway 22L would not be airborne prior to crossing over the flight path of Runway 28C arrivals. In Alternative C, the original distance from the threshold of Runway 22L to the extended final is 2,400 feet. The movement of Runway 10C/28C to the south does not provide a linear addition of length for the departure roll on Runway 22L. The movement 350 feet south moves the intersection of the flight paths about 450 feet southwest. The more the flight path crosses to the southwest, the greater the possibility of wake turbulence issues.

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Source: Federal Aviation Administration, Great Lakes Region, Air Traffic, C.A.M.P.O. and A.D.O. - July 2005.

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- Moving proposed Runway 10C/28C would require modification to the proposed south storm water detention facility.
- The proposed south cargo area would need to be modified and other areas on the Airport may have to be identified to meet the facility requirement analysis.
- By moving proposed Runway 10C/28C further away from the central terminal area, all aircraft arriving or departing on Runway 10C/28C would experience an increase in unimpeded taxi time.
- A modification to the airfield resulting in Runway 10C/28C shifting south of the proposed location in Alternative C could limit the ability of the airfield to support future quadruple approach procedures in IFR conditions, should quadruple IFR procedures be approved in the future by the FAA.

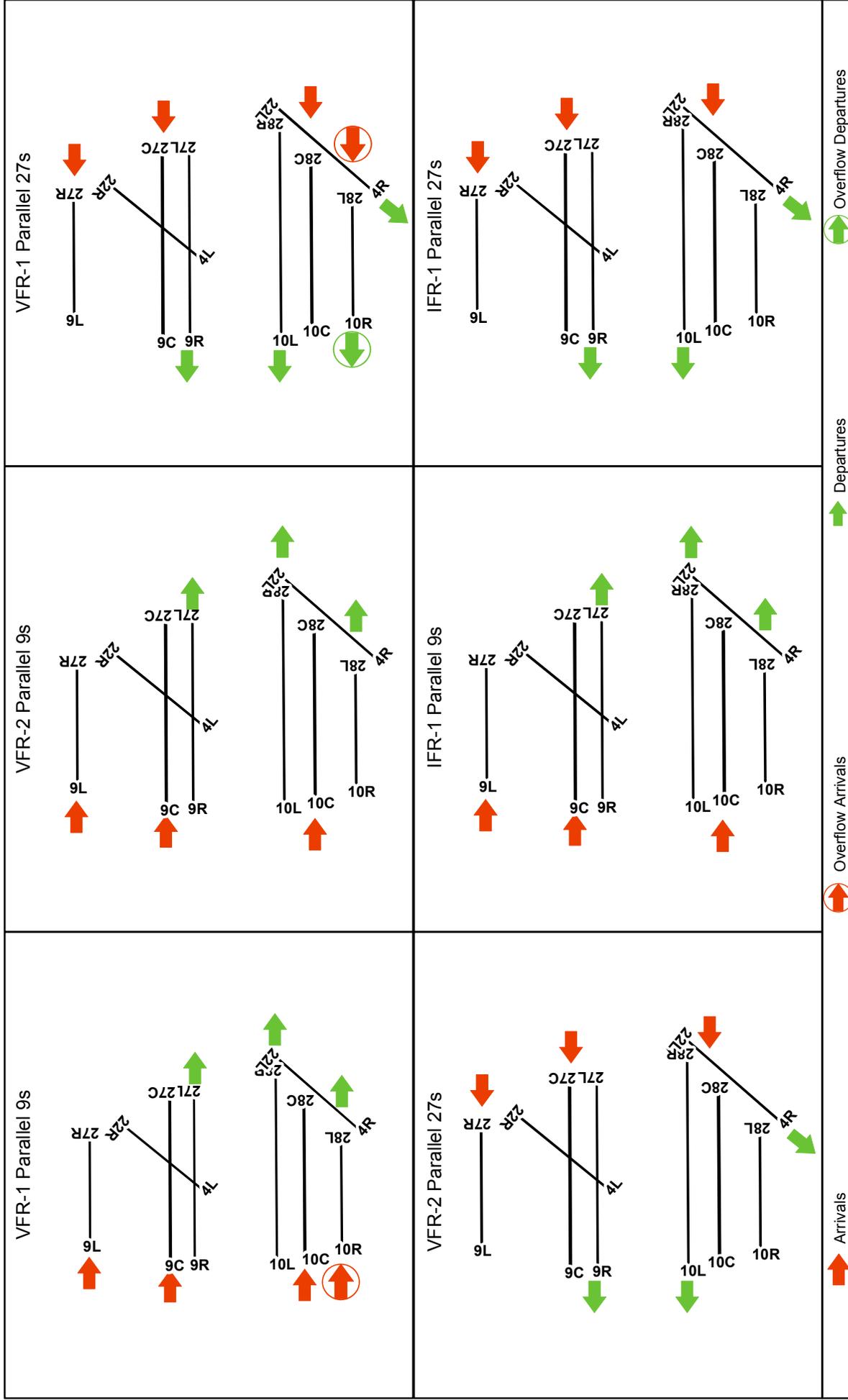
Conclusory Remarks on FAA Derivative C4

The FAA studied a configuration in which Runway 10C/28C was shifted some 350 feet south and shortened by 500 feet from its present proposed length of 10,800 feet. The movement to the south is to avoid St. Johannes Cemetery; the shortening of runway length is to preserve the existing airport geometry, specifically the relationship between Runway 10C/28C and Runway 4R/22L. Even in this modified form, however, wake turbulence issues appear because aircraft departing Runway 22L are farther into takeoff roll when crossing the extended intersection with arrival Runway 28C. The greater distance to the southwest that the Runway 28R flight path crosses Runway 22L, the greater the possibility there is for wake turbulence issues. Moving Runway 10C/28C to the south would require reducing the size of the south storm water detention facility that now abuts taxiways serving Runway 10C/28C, as well as modification to cargo areas. Should future technology allow for quadruple approach procedures in IFR weather, the lesser distance between 10C/28C and 10R/28L means the less likely such procedures could be authorized. Even without quadruple approaches, however, the requirement of the FAA's Terminal Instrument Procedures regarding Category II/III Instrument Landing System Approach surfaces could impact proposed minimum landing conditions on Runways 10C and 10R, thereby hampering the operational efficiencies of these runways during poor weather conditions. It appears that Derivative C4 is unacceptable because safety concerns would require the FAA to operate this derivative in an inefficient manner. As a result, Derivative C4 is not a less restrictive alternative that is capable of performing as well as Alternative C.

3.6.2.5 Derivative C5- Alternative C with Runway 10C Shifted 450' South & Shortened to No Less than 10,300'

Alternative C5 is defined as Alternative C with Runway 10C shifted south 450 feet and shortened to no less than 10,300 feet. Based on an FAA operational analysis, this runway layout derivative would be operated nearly the same as Alternative C. However, significant operational issues arise with the shifting of the runway south. See **Exhibit 3-18** for the various operating configurations of this derivative. Comments concerning this derivative are discussed in detail as follows.

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Source: Federal Aviation Administration, Great Lakes Region, Air Traffic, C.A.M.P.O. and A.D.O. - July 2005.

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General Comments-Derivative C5

- The comments on Derivative C5 are nearly identical to those previously mentioned concerning Derivative C4 with two exceptions. First, the movement 450 feet south (in Derivative C5) moves the intersection of the flight paths about 550 feet southwest. This is approximately 100' greater than in Derivative C4. The more the flight path crosses to the southwest, the greater the possibility of wake turbulence issues. Second, moving the runway 450 feet south (compared to Alternative C4 at 350 feet) would further increase the unimpeded travel times.

Conclusory Remarks on FAA Derivative C5

The FAA studied relocating Runway 10C/28R some 450 feet south of its proposed location and shortening it to 10,300 to preserve the airfield's proposed geometry. Safety issues relating to wake turbulence identified in Alternative C4 above are increased, since the point where the flight path to 28C crosses Runway 22L is even farther to the southwest. The south storm water detention facility is compromised to an even greater degree, and the opportunity for quadruple approaches in poor weather conditions is virtually eliminated. It appears that Derivative C5 is unacceptable because safety concerns would require the FAA to operate this derivative in an inefficient manner. As a result, Derivative C5 is not a less restrictive alternative that is capable of performing as well as Alternative C.

3.7 PREFERRED ALTERNATIVE

The Final EIS by regulation is required to identify a "preferred alternative." The FAA in its consideration of alternatives, in addition to the relevant environmental statutes, has been mindful of its statutory charter to encourage the development of civil aeronautics and safety of air commerce in the United States (49 U.S.C. §40104). FAA has also considered the congressional policy declaration that airport construction and improvement projects that increase the capacity of facilities to accommodate passenger and cargo traffic be undertaken to the maximum feasible extent so that safety and efficiency increase and delays decrease [49 U.S.C. §47101(a) (7)]. As defined in CEQ's 40 Questions and Answers about the NEPA Regulations, "The 'agency's preferred alternative' is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors." In identifying a preferred alternative, the FAA has examined financial feasibility and has conducted concurrent with this EIS, an examination of religious liberty claims concerning the proposed relocation of cemeteries.

3.7.1 Environmental Consequences

Three build alternatives, in addition to the No Action Alternative, were retained for detailed study in the EIS. **Table 3-11** presents a side-by-side comparison of the alternatives in terms of environmental, economic, and operational impacts. A review of **Table 3-11** shows that Alternatives C, D, and G have the same impacts in four categories (wetlands, DOT Section 4(f)/6(f), historic properties, and air quality). **Table 3-11** also shows that Alternative C has

environmental impacts that are slightly greater in several other impact categories than Alternatives D and G. For example the population impacted by the 65+ DNL noise contour in 2018 for Alternative C is 24,103 persons, which is 566 persons greater than for Alternative D, and 796 persons greater than for Alternative G. Alternative G has fewer noise impacts but greater floodplain impacts than the other build alternatives. With regard to land acquisition, Alternative C would require the relocation of approximately 539 housing units and 197 businesses, while Alternatives D and G would require the relocation of approximately 522 housing units and 164 businesses.

3.7.2 Delay Reduction

Alternative C is more effective and efficient than the other Build Alternatives in meeting the purpose and need identified in this EIS. Alternative C provides the greatest reduction in average annual delay. Adoption of Alternative C would provide the greatest benefits, not only to the Chicago region, but also to the NAS. All of the Build Alternatives fully satisfy the purpose and need of ensuring that existing and future terminal facilities and supporting infrastructure (access, landside, and related ancillary facilities) can efficiently accommodate airport users.

As discussed in the EIS, O'Hare affects the NAS because the airfield lacks adequate runway capacity and gate availability to handle both current and forecast levels of activity for O'Hare. In addition, delays at O'Hare have a direct impact on the NAS, in part because approximately 51% of the total passengers traveling through O'Hare currently connect to and from other airports.

The three Build Alternatives C, D, and G provide for 1,194,000 annual operations served in 2018. The resulting average annual delay in 2018 is 5.8 minutes per operation for Alternative C, (City's OMP), 10.5 minutes per operation for Alternative D, and 6.9 minutes per operation for Alternative G. Notably, when comparing Alternative C to Alternative D, there is an 81 percent increase in the average annual delay with Alternative D. When comparing Alternative C to Alternative G, there is a 19 percent increase in the average annual delay with Alternative G.

In contrast with the Build Alternatives, the No Action Alternative is projected to serve 974,000 annual operations (constrained) in 2018 at an average annual delay 17.1 minutes per operation. This is approximately 200,000 less operations at a significantly higher level of delay than any of the Build Alternatives and does not meet the purpose and need.

3.7.3 Public Involvement

The FAA did not identify a preferred alternative in the Draft EIS, believing that this decision could best be made after consideration of all comments and subsequent analysis that post-dated the Draft EIS. **Section I-D** of the Executive Summary identifies the extensive outreach conducted by the FAA to maximize public involvement in the Agency's evaluation of O'Hare modernization. Further, the Agency's careful scrutiny of the comments received on the Draft EIS, and the responses crafted to those comments (see **Appendix U**) provided additional insight into the identification of the preferred alternative.

3.7.4 Identification of Preferred Alternative

In consideration of the substantial similarity between the environmental impacts for Build Alternatives C, D, and G, the FAA has identified the alternative that best fulfills its statutory mission and responsibilities as the "Preferred Alternative." Given the clear superiority of Alternative C in terms of the average annual delay reduction, the FAA has identified Alternative C, the Sponsor's proposed O'Hare Modernization Program, as the Preferred Alternative. This identification of Alternative C as the Preferred Alternative fully satisfies all of the FAA's environmental obligations associated with consideration of the proposed OMP.

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