Section 4 – Selection of the Ultimate Airport Landside Access Concept

This section presents the various landside access alternatives developed for SSA utilizing the preferred ultimate airfield concept, Alternative 6.6, as the basis for identifying landside access concept alternatives. The ultimate runway configuration determines the feasible ultimate landside access concepts, which have to be able to accommodate the traffic associated with a potential future airfield capable of accommodating four simultaneous precision instrument approaches. As stated in Section 3, IDOT has held a series of Local Advisory Group meetings to present information on the Master Plan process to locally affected municipalities, government agencies and the interested public. Among other things, these Local Advisory Group meetings have provided a forum for the identification of alternative landside access concepts. Consequently, IDOT identified several landside access concept alternatives for the ultimate airport, based on alternative concepts submitted to FAA during scoping, comments received during the Local Advisory Group meetings, and internal development of alternative concepts. These ultimate airport landside access alternatives were then evaluated to determine the preferred ultimate airport landside access concept for SSA.

The existing roadway network anticipated to serve the future SSA site includes the following major arterials:

- Interstate 57 runs in a north-south direction and is located along the western edge of the SSA site.
- Illinois Route 50 runs parallel to I-57 through the SSA site. It is located approximately 2/3^{rds} of a mile east of the interstate along the west side of the airport site.
- Illinois Route 394 terminates to the northeast of the airport site. It provides a direct connection from Interstates 80 and 94 to the north to its terminus at Illinois Route 1.
- Illinois Route 1 runs in a north-south direction along the east side of the SSA site.

The original Base Concept from the 1998 *Phase 1 Engineering Study*¹ included a proposed East-West Connector Road along the northern boundary of the airport that would have connected IL-394 with I-57. The original purpose of this road was twofold: 1) It would serve as an alternative route to bring airport traffic from the northern and eastern sections of the Chicago metropolitan area to the SSA terminal area, and 2) it could serve as an eventual link for a proposed outer loop bypass highway that would connect Interstate 355 at its proposed connection with Interstate 80 in western Will County, Illinois to Interstate 65 in Indiana. While the corridor for this bypass road is included in the Chicago Area Transportation Study's (CATS) SharedPath 2030 Plan², the establishment of the alignment for the bypass is unknown at this time and programming and funding for construction of the road is currently beyond the 2030 timeframe. Since the East-West Connector Road was not required for SSA, IDOT decided to remove the road from the airport plans, although they will continue to study the need for and potential location of this road through their normal transportation planning process.

¹ Summary Draft, Phase 1 Engineering Report, Illinois Department of Transportation, September 1998.

² SharedPath 2030, Regional Transportation Plan for Northeastern Illinois, prepared by Chicago Area Transportation Study, Metropolitan Planning Organization for Northeastern Illinois, 2003.

4.1 Ultimate Airport Landside Access Alternatives

Four basic airport access concepts were developed and analyzed for the ultimate airport plan. These four basic concepts are: (1) Direct airport access from the west, (2) Direct airport access from the east, (3) Direct airport access from both the east and west, and (4) Continuous airport access across the airport. These basic concepts along with alternatives within each concept family are described below and incorporate suggestions submitted during Local Advisory Group and FAA Scoping Meetings.

4.1.1 Direct West Airport Access Only

This airport access concept assumes that passenger vehicles would access the airport exclusively from the west and is derived from the original planning concept presented in the 1998 *Phase I Engineering Study*. The highlights of this access concept include:

Alternative W-1

- Proposed interchange at I-57 (see Exhibit 4-1);
- New airport access roadway from I-57 into the passenger terminal complex;
- Main terminal building with attached linear pier concourses connected by an underground automated people mover for passenger access to a series of remote, linear pier concourses; and
- Eastern access roadway from a proposed interchange with IL-1 that would provide access to an east cargo, general aviation and airport support complex.

4.1.2 Direct East Airport Access Only

This airport access concept assumes that passenger vehicles would access the airport exclusively from the east. The highlights of this access concept include:

Alternative E-1

- Proposed interchange at IL-1 (see Exhibit 4-2);
- New airport access roadway from IL-1 interchange into the passenger terminal complex;
- Main terminal building with attached linear pier concourses connected by an underground automated people mover for passenger access to a series of remote, linear pier concourses; and
- Western access roadway from a proposed interchange with I-57 that would provide access to a west cargo, general aviation and airport support complex.

4.1.3 Direct East and West Airport Access

The impetus for developing these concepts was to provide equal airport access from the east as well as from the west. Three alternatives were developed for this concept, each of which is briefly described below.

Alternative EW-1

- Proposed interchange at I-57 (see Exhibit 4-3);
- An access roadway from I-57 interchange to a western terminal complex;
- Proposed interchange at IL-1;

- An access roadway from IL-1 interchange to an eastern terminal complex;
- No vehicular connection between the east and west terminals; and
- Underground-automated people mover connects the two terminals and provides passenger access to a series of remote, linear pier concourses.

An existing airport with this type of landside access is Hartsfield-Jackson Atlanta International Airport.

Alternative EW-2

This concept alternative is a variation of Alternative EW-1. It is a security-driven concept that was modeled after the preferred alternative (D) proposed for the Los Angeles International Airport (LAX) Master Plan³. It features:

- East and west access to east and west Ground Transportation/Security Centers located at the entrances to the airport close to new interchanges at I-57 and IL-1 (see Exhibit 4-4);
- Secure automated people mover access from the Ground Transportation Centers to the secure central passenger terminal; and
- Central passenger terminal complex.

Alternative EW-3

This concept alternative is a logical progression of Alternative EW-1, adding secondary vehicular access between east and west.

- Proposed interchanges at I-57 and IL-1 (see Exhibit 4-5);
- An access roadway from I-57 interchange to a western terminal complex;
- An access roadway from IL-1 interchange to an eastern terminal complex;
- A secondary road to provide vehicular connection between the east and west terminals; and
- Automated people mover to provide passenger connection between terminals and satellite concourses.

4.1.4 Continuous Access Roadway Concepts

Continuous Access alternatives would provide balanced airport access from the east and west. A number of large airports such as Dallas-Ft. Worth International, George Bush Intercontinental (Houston) and Phoenix Sky Harbor have a similar landside access concept. Following is a brief description of the two alternatives identified for this concept.

Alternative C-1

- Proposed interchanges at I-57 and IL-1 (see Exhibit 4-6);
- A central "spine" or "through" highway traversing the airport; and
- A series of unit terminals on each side of the spine roadway with attached linear pier or finger pier concourses.

³ Taking Flight for a Better Future, Los Angeles International Airport Final Master Plan, Los Angeles World Airports, April 2004.

Alternative C-2

- Proposed interchanges at I-57 and IL-1 (see Exhibit 4-7);
- A widely spaced "through" access road connecting I-57 and IL-1 with access roads positioned north and south of the proposed terminal complex area; and
- A terminal complex area developed within the area between the northern and southern access roadway.

4.2 Evaluation of Ultimate Landside Access Alternatives

4.2.1 Ultimate Landside Access Alternative Evaluation Criteria

The ultimate landside access alternatives were examined and evaluated based on a number of criteria that are listed and defined in **Table 4-1**. A short description of how each evaluation criteria was used to evaluate the alternatives is provided below. For supporting tables and quantities, see **Appendix A**, Page 19.

Criteria 1 – Landside Access and Capacity – This criterion was divided into three sub-criteria to rate different aspects of accessibility and capacity of the access system. Each sub-criterion was rated separately and then averaged with ratings from the other sub-criteria for each alternative.

<u>Sub-Criteria 1a</u> – Meet Future Traffic Demand – Evaluation of this criterion was based on the projected average daily traffic (ADT) and Level-of-Service (LOS) of the access roads. This criterion was used as a screening criterion; if an alternative could provide adequate LOS (defined as LOS D or higher), it was evaluated further. LOS D corresponds to moderate levels of traffic congestion. If an alternative could not provide an adequate LOS, it was eliminated from further evaluation.

<u>Sub-Criteria 1b</u> – *Balanced Access to Airport* – Landside access was evaluated based on the ability of a concept to offer airport access from at least two directions.

<u>Sub-Criteria 1c</u> – *Terminal Area Frontage* – Measured the potential terminal frontage length for each alternative. The terminal frontage length ranged from a minimum of 3,200 feet to a maximum of 12,000 feet. Alternatives that could provide for more frontage area were ranked higher than those that provided less.

Criteria 2 – Security – This criterion evaluated alternatives based on their ability to restrict vehicles from direct access to the passenger terminal. Those alternatives that were able to provide for controlled access (potential screening plaza or other security control) to the terminal area were ranked higher than those that did not.

Criteria 3 – *Relative Cost Comparison* – Compared relative costs of each alternative. Those alternatives that are relatively less expensive rated higher than those that are relatively more expensive.

Criteria 4 – Access to Airport Development Areas – This criterion measured the length of the airport access road in miles to determine the land area potentially accessible for airport-related development along the entrance road(s). Alternatives that provide access to more airport property rated higher than those that provide access to less airport property.



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Section 4 - Selection of the Ultimate Airport Landside Access Concept

Exhibit 4-5



Section 4 - Selection of the Ultimate Airport Landside Access Concept



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Table 4-1 Ultimate Airport Landside Access Alternatives Evaluation Criteria								
No.	Criteria	Definition						
1	Ability to accommodate potential future traffic demand	 The ability of an alternative to: Meet future traffic demand (beyond DBO+20) Provide balanced access to airport Maximize terminal access frontage 						
2	Ability to meet security criteria	 The ability of an alternative to incorporate: Screened or Controlled access for vehicles Separation of public traffic from employee and commercial vehicle traffic 						
3	Comparison of relative costs	 Comparative costs for each concept Costs related to operational benefits 						
4	Ability to provide access to airport development areas	 The ability of an alternative to: Maximize airport access frontage opportunities Maximize terminal-related development/expansion potential 						
5	Ability to avoid and/or minimize land use impacts and community disrup- tion	 The ability of an alternative to avoid and/or minimize: Population displacement Conflicts with local land use plans 						
6	Ability to avoid and/or minimize natural resource impacts	 The ability of a concept to avoid and/or minimize impacts to: Wetlands Floodplains Water resources Prime farmland 						

Source: TAMS, an Earth Company, 2004.

Criteria 5 – *Avoid and/or minimize Land Use Impacts and Community Disruption* – This criterion was divided into two sub-criteria to rate different impacts that are of concern to the landowners and communities surrounding the site. Each sub-criterion was rated separately and then averaged with ratings from the other sub-criteria for each alternative.

<u>Sub-Criteria 5a</u> – *Population Displacement* – Alternatives that minimize impacts to homes and residents were rated higher than those that had greater impacts.

<u>Sub-Criteria 5b</u> – Conflicts with Local Land Use Plans – Each alternative was evaluated against the Land Use Plan for the Eastern Will County Area (August 1997) to determine if the alternative would conflict with the plan. Conflicts were defined as access roads being located outside of the previously defined airport boundary (as depicted on the land use map) or on land planned for other uses by the communities within the airport boundary.

Criteria 6 – *Avoid and/or Minimize Natural Resource Impacts* – This criterion was divided into four sub-criteria to rate different impacts that are of concern to the Federal and state natural resource agencies, special interest groups and the general public. Each sub-criterion was rated separately and then averaged with ratings from the other sub-criteria for each alternative.

<u>Sub-Criteria 6a</u> – *Impacts to Wetlands* – Alternatives that would result in less impacts to wetlands rated higher than alternatives with greater impacts.

<u>Sub-Criteria 6b</u> – *Impacts to Floodplains* – Alternatives that would result in less impacts to floodplains rated higher than alternatives with greater impacts.

<u>Sub-Criteria 6c</u> – *Impacts to Water Resources* – Alternatives that would result in less impacts to water resources (streams, lakes, etc.) rated higher than alternatives with greater impacts to water resources.

<u>Sub-Criteria 6d</u> – *Impacts to Prime Farmland* – Alternatives that would result in less impacts to prime farmland rated higher than alternatives with greater impacts to prime farmland.

4.2.2 Ultimate Landside Access Alternatives Evaluation Matrix

The next step in the evaluation process was the development of an evaluation matrix to assess the landside access concepts. Each concept was evaluated and ranked by each criteria identified in **Table 4-1**. A rating scale from 1 to 5 was assigned to each criterion to better distinguish differences between each of the alternatives. A score of 5 was considered the best score for a criterion, while a score of 1 was considered the worst.

The first criterion shown in **Table 4-1** was a screening criterion; if an alternative could not meet Sub-criteria 1a, it was eliminated from further consideration. Alternatives W-1 and E-1 did not meet this criterion; thus, they were eliminated. The remaining alternatives were compared against the remaining criteria developed for this process. **Table 4-2** depicts the results of applying the criteria and rating scale to each of the ground access concepts. Because some of the alternatives with each basic access concept were indistinguishable from each other (for example Alternatives EW-1 and EW-2) they were evaluated together, as shown on Table 4-2. The evaluation worksheet with a more detailed explanation of the rating scale is presented in **Table 4-3**.

4.2.3 Preferred Ultimate Airport Landside Access Alternative

Based on application of the evaluation criteria, Alternative W-1 and Alternative E-1 were eliminated because they did not meet Sub-criterion 1a. The highest rated alternatives were Alternatives EW-1 (**Exhibit 4-2**) and EW-2 (**Exhibit 4-3**), which represent *West and East Airport Access* with no secondary vehicular connection. These alternatives scored higher mostly because they would involve less overall costs and provided better security. For purposes of the preferred ultimate concept, Alternative EW-1 was selected as the preferred ultimate airport landside access concept because it provides the greatest flexibility. It could develop into a different type of access (i.e., continuous or west and east with secondary vehicular connection) in the future if traffic or operational conditions dictate the need for such access.

Table 4-2 Ultimate Airport Landside Access Alternatives Evaluation Matrix									
No.	Criteria	<u>Alternative</u> <u>W-1</u>	<u>Alternative</u> <u>E-1</u>	Alternatives EW-1 & EW-2	<u>Alternative</u> <u>EW-3</u>	Alternatives <u>C-1 & C-2</u>			
1	Landside Access and Capacity			3.0	3.5	5.0			
а	Ability of I-57 Interchange to accommodate traffic demand beyond DBO+20	No	No	Yes	Yes	Yes			
b	Balanced access to airport			3	4	5			
С	Terminal area frontage			3	3	5			
2	Screened/Controlled Vehicular Access (Security)			5	4	4			
3	Relative Cost Comparison			3	1	1			
4	Access to airport development areas			5	5	5			
5	Avoid and/or Minimize Land Use Impacts and Community Disruption			2.5	2.5	2.5			
а	Population displacement			1	1	1			
b	Conflicts with local land use plans			4	4	4			
6	Avoid and/or Minimize Natural Resource Impacts			1.0	1.0	1.0			
а	Wetlands			1	1	1			
b	Floodplains			1	1	1			
С	Water resources			1	1	1			
d	Prime farmland			1	1	1			
	Total			19.5	17.0	18.5			
	Rating			3.3	2.8	3.1			

Source: TAMS, an Earth Tech Company, 2004.

Table 4-3 Ultimate Airport Landside Access Alternatives Evaluation Worksheet													
Score	Rating	Criterion 1a Capacity of Airport Access Roads (beyond DBO+20)	Criterion 1b Balanced Airport Access	Criterion 1c Terminal Frontage Area (feet)	Criterion 2 Screened /Controlled Vehicular Access	Criterion 3 Relative Cost Comparison	Criterion 4 Airport-related Land Use Development Potential (miles of access road)	Criterion 5a Population Displacement	Criterion 5b Conflicts with Land Use Plans	Criterion 6a Impacts on Wetlands	Criterion 6b Impacts on Floodplains	Criterion 6c Impacts on Water Resources	Criterion 6d Impacts on Prime Farmland
5	Excellent	YES (LOS C or higher)	Continuous access (East - West)	Greatest Length (12,000)	No direct vehicle access to terminal	3.5 miles or less of access road - one interchange	6.2	Lowest population impacted	No conflict	Lowest acreage impacted	Lowest acreage impacted	Lowest amount of streams impacted	Lowest acreage impacted
4	Good	N/A	Equal East - West Airport Access (with secondary vehicular connection)	60 - 79% (8,440)	Provision for a vehicle screening plaza	Over 3.5 miles of access road - one interchange	20 - 39% less	20 - 39% greater impact	1 conflict	20 - 39% greater impact	20 - 39% greater impact	20% - 39% greater impact	20% - 39% greater impact
3	Average	N/A	Equal East - West Airport Access (no vehicular connection)	40 - 59% (6,720)	Design provisions for a secure curbfront	6.2 miles of access road - two inter- changes (no secondary connection)	40 - 59% less	40 - 59% greater impact	2 conflicts	40 - 59% greater impact	40 - 59% greater impact	40% - 59% greater impact	40% - 59% greater impact
2	Fair	N/A	West Airport Access Only	20 - 39% (4,960)	Screening of vehicles prior to approaching the terminal	6.2 miles of access road - two inter- changes (secondary connection)	60 - 79% less	60 - 79% greater impact	3 conflicts	60 - 79% greater impact	60 - 79% greater impact	60% - 79% greater impact	60% - 79% greater impact
1	Poor	NO (LOS D or lower)	Local Roads Only	Shortest Length (3,200)	No security provisions	7 miles of access road – two interchanges	80 - 100% less	Highest population impacted	> 3 conflicts	Highest acreage impacted	Highest acreage impacted	Highest amount of streams impacted	Highest acreage impacted

Source: TAMS, an Earth Tech Company, 2004. LOS = Level-of-Service N/A = Not Applicable

Section 5 - Preliminary Ultimate Airport Concept

The South Suburban Airport is not anticipated to become a mature, fully developed airport until well beyond DBO+20. In response to the downturn in the U.S. economy, the September 11, 2001 terrorist attacks, and rise in fuel prices, the air travel industry has undergone major changes. Airports are currently struggling to accommodate these dynamic changes that have resulted in new design and operational requirements. These changes will continue to affect existing air travel patterns and dictate that airports must have the flexibility to respond to changes that could affect future air travel.

Because of these considerations, and because it is very difficult to predict the level of activity and/or the type of operations beyond the DBO+20 time horizon, IDOT has concluded that it is premature to determine the exact concept of the ultimate passenger terminal complex and support/ancillary facilities. However, IDOT believes that it is prudent to make planning provisions for preserving the option of four parallel runways (that would allow for simultaneous precision instrument approaches) and equal east and west airport access for the ultimate airport development phase, as selected in Sections 3 and 4 of this document. **Exhibit 5-1** shows the preferred ultimate airfield and landside access concept for the ultimate airport. The future terminal complex is anticipated to evolve and expand within the area bordered by the two innermost runways. Preservation of this area would provide flexibility for implementing any one of numerous terminal complex concepts, which will ultimately be determined by future air travel demand, the airlines operating at SSA in the future, and future design and operational requirements.

The preliminary ultimate airport concept, as shown in Exhibit 5-1, will be used in the following sections as one criterion in the evaluation of Inaugural Airport alternatives. If an alternative conflicts with the preliminary ultimate concept, then it will be rated lower than other alternatives that do not conflict with the preliminary ultimate airport concept.



Section 5 - Preferred Ultimate Airport Concept

Exhibit 5-1