O'HARE MODERNIZATION PROGRAM

AERONAUTICAL STUDY 2003-AGL-0878-NRA

FEDERAL AVIATION ADMINISTRATION AND TRANSPORTATION SECURITY ADMINISTRATION

JULY 22, 2004

Table of Contents

	Page
General Comments	1
Jet Blast	1
Access Roads	2
Phasing Drawings	2
Aircraft Rescue & Fire Fighting (ARFF)	2
NAVAIDs/FAA Facilities	2
Communications	4
Frequency Analysis	5
Security & Hazardous Materials	5
Transportation Security Administration	6
Individual Sheet Comments	6

APPENDIX A – Workscope for Aircraft Rescue & Fire Fighting (ARFF), Jet Blast, Service/Access Road, and Phasing Drawings - June 9, 2004 Letter from the Chicago Area Modernization Program Office to the City of Chicago

APPENDIX B – MTI & FTR Locations

APPENDIX C – Runway/Parallel Taxiway Separation Guidance & Update on the Status of FAA Advisory Circular 150/5300-13; Change 8 - April 8, 2004 Letter from the Chicago Area Modernization Program Office to the City of Chicago

APPENDIX D – Items from Previous ALP Review

APPENDIX E – Acronyms

O'HARE MODERNIZATION PROGRAM
AERONAUTICAL STUDY: 2003-AGL-0878-NRA
FAA COMMENTS

GENERAL COMMENTS

1. The review and comments associated with Case Number 2003-AGL-0878-NRA are for planning purposes only. Construction is not permitted until the Federal Aviation Administration (FAA) issues a Final Environmental Impact Statement (EIS) and a favorable Record of Decision (ROD).

2. The FAA, Airway Facilities (AF), System Management Office (SMO) is responsible for all existing FAA facilities. Work impacting FAA equipment because of the projects depicted in this Airport Layout Plan (ALP) will require that the sponsor/contractor notify the FAA AF, SMO of the project pre-construction meeting. The sponsor is responsible for establishing a reimbursable agreement to protect, relocate, and/or re-establish FAA equipment that will be disturbed during sponsor's project. Before each construction activity begins, FAA AF, SMO shall be contacted to provide locations of existing facility cables.

3. All FAA facility and/or infrastructure additions, modifications, relocations and/or removals required to implement the proposed ALP will require a reimbursable or similar agreement. The proposed ALP identifies the relocation and/or establishment of numerous communication, weather, radar and navigational aid systems. In addition, it would require the relocation of FAA infrastructure and support facilities. Advisory Circular (AC) 150/5300-7B, FAA Policy on Facility Relocations Occasioned by Airport Improvements or Changes, should be referenced for guidance. The Policy was written to reaffirm to the aviation community the FAA policy governing the responsibility for funding relocation, replacement and modification to Air Traffic Control and air navigation facilities that are made necessary by improvements or changes to the airport.

4. The City of Chicago, Department of Aviation (DOA) is responsible for providing a line of sight evaluation for all proposed construction that would be located between any existing and future Air Traffic Control Tower (ATCT) and any movement area under its control.

JETBLAST

5. In accordance with FAA Airport Design AC 150/5300-13, Airport Design, paragraph 600. D. Jet Blast/Exhaust, NAVAIDs, monitoring devices and equipment shelters should be located at least 300' behind the source of jet blast to minimize the accumulation of exhaust deposits on antennas. See AC 150/5300-13, Chapter 8, The Effects and Treatment of Jet Blast. The City shall conduct the jet blast study workscope as identified in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Attachment A)**

6. The Runway 14R Localizer (LOC) antenna array will stand outside the runway and taxiway safety areas, but inside the Runway 10L/28R Object Free Area (OFA). The array may be in the path of jet blast from airplanes turning from the north parallel taxiway of Runway 10L onto the north parallel taxiway of Runway 32L. The array would be expected to receive repeated 70-mph breakaway thrust jet blasts from B-747's during the facility life. Consideration should be given to mitigate these blast effects.

ACCESS ROADWAYS

7. Conduct the access roadway workscope as identified in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Attachment A)**

8. As FAA and the City of Chicago work together to further refine the locations of service and access roads, the FAA cautions against making connections where the parallel taxiway turns into the first or last connector taxiway, due to runway safety concerns.

9. For many Navigational Aids (NAVAIDs), access roads/routes are not shown (e.g., mid-Runway Visual Ranges (RVRs)), or are only partially shown. One partially shown access road system is for Runway 27R High Intensity Approach Landing System with Sequenced Flashing Lights in the Category (CAT) 2 Configuration (ALSF-2), where the path is not shown from the segment ending at Station 10+25 to the rest of the ALSF-2. Access routes to Glide Slope (GS) facilities surrounded by taxiways must be clearly defined.

PHASING DRAWINGS

10. Conduct the phasing workscope as identified in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Attachment A)**

AIRCRAFT RESCUE & FIRE FIGHTING (ARFF)

11. Conduct the Aircraft Rescue Fire Fighting (ARFF) workscope as identified in June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Attachment A)**

NAVAIDS/FAA FACILITIES

12. The proposed ALP, Aeronautical Study number 2003-AGL-0878-NRA, identifies the best location for FAA NAVAIDs, given the information currently available. It is required that prior to construction, all FAA National Airspace System (NAS) facilities will undergo extensive siting evaluation by the FAA and the sponsor. The FAA and the sponsor will use more specific and timely information to determine the optimal location, in accordance with applicable FAA orders, AC's and siting criteria. Specifically, the placement of the Very High Frequency (VHF) Omni-directional Range (VOR), Airport Surveillance Radar (ASR), ATCTs, components of the Instrument Landing System (ILS) as well as surveillance, communication and weather system facilities, etc. will require additional engineering to determine their optimal placement. In addition, each

construction activity shall be preceded by a Construction Safety Phasing Plan (CSSP) aeronautical study.

13. To accommodate the modifications proposed under the ALP, extensive duct work, infrastructure and fiber optics cable modifications are needed. Proactive, aggressive planning by the sponsor will be necessary to accommodate or support the infrastructure requirements within the periods and phases identified.

14. The VOR with Distance Measuring Equipment (DME) critical area has a radius of 1000'. The proposed ALP identifies the existing and future location of the VOR/DME, as well as its critical area. The VOR 1000' critical area is equivalent to a Building Restriction Line (BRL). Any proposed construction, grade change, massing of vehicles or aircraft within 1000' of any VOR shall be evaluated by the FAA in order to protect the integrity of the VOR operation. The area within the critical area must not be modified without prior approval from the FAA.

15. The ASR critical area has a radius of 1500'. The proposed ALP identifies the existing and future locations of the ASRs, as well as the critical areas. The ASR critical area should not be equated to a BRL. Proposed constructions within an ASR critical area must be evaluated, and if possible, approved on a case-by-case basis. Any proposed construction, grade change or structure proposed within 1500' of any ASR shall be evaluated by the FAA to protect the integrity of the ASR operation. The area within the critical area must not be modified without prior approval from the FAA.

16. In response to the ALP proposed under earlier Airspace Study number 2002-AGL-0848-NRA, the FAA requested that the critical area for the National Weather Service (NWS) owned Automated Surface Observation System (ASOS) and its 500' critical area be depicted. The current proposal, 2003-AGL-0878-NRA, identifies the future location of the ASOS co-located with the Runway 27L GS. With this configuration, the ASOS 500' critical area depiction is not necessary, however it should be understood that a 500' critical area exists around the proposed ASOS. This particular critical area should not be equated to a BRL. Construction should be evaluated, and if possible, approved on a case-by-case basis. Any proposed construction, grade change or structure proposed within 500' of the proposed ASOS should be evaluated to protect the integrity of the ASOS operation. The area within the critical area must not be modified without prior approval from the FAA and the NWS.

17. Underground diesel fuel storage tanks will be required at some locations. It is assumed that each of the LOC/ALSF-2 buildings will contain a diesel Engine Generator (EG). Each EG requires a minimum of a 1,000-gallon diesel fuel tank. Because the LOC buildings must be within the Runway Protection Zone (RPZ), the tanks must be placed underground. The underground tanks must meet all the applicable local, state, and federal environmental requirements.

18. The Precision Approach Path Indicator (PAPI) facilities are, by design, located close to runways and taxiways. It will be necessary to design the area in such a way to promote operability, serviceability and accessibility to the PAPI facilities. To facilitate protection of the PAPIs from grass cutting equipment, it will be necessary to place the PAPIs on an asphalt (or equivalent) pad that will provide a buffer from grass cutting equipment. In addition, service road access to the PAPIs from the connector taxiways will be essential.

During snow operations, a plan must be developed by the City of Chicago to protect the PAPIs from the discharge of snow removal equipment. The piling and banking of snow cannot be placed in such a way as to interfere with the line of sight for the PAPIs.

19. The PAPI pad, access road width and location in relation to the connector taxiways should be evaluated together by the FAA and the sponsor. The pad may be substantially wider and longer than the access road width in order to permit snow removal equipment to circumnavigate the visual aid. This could create the impression of a continued taxiway, potentially creating a hazard. Access roads should not commence at a taxiway across from another taxiway, possibly creating the impression of a continuation of that taxiway. Each PAPI "Snow Pad" should be reviewed by the FAA, to ensure that all concerns area addressed.

20. Numerous existing NAS facilities on the airfield are required for the operation of the ASR-9 and Airport Surface Detection Equipment, Type Three (ASDE-3). These facilities are called Moving Target Indicator (MTI) reflectors and Fixed Target Reflectors (FTRs). While the FAA does not require that these FAA NAS facilities appear on the ALP, the FAA is providing the most up to date coordinates for the facilities. Locations for the MTI and FTR reflectors are included in **Appendix B**. This information should be conveyed to the civil engineers and construction firms so they can understand what these facilities are and protect them.

21. The Sponsor must assume their portion of the responsibility for ensuring continuous operation of critical weather, communication, radar and navigational aid devices. All equipment required to support seamless, safe and efficient airport operation shall be protected from construction or airport modification until suitable replacement systems or operational plans are in place.

22. There are instances of non-standard FAA NAS facility configurations. Each non-standard configuration may have to be considered separately. Each non-standard configuration may require documented acknowledgement and justification on the part of the sponsor. Achieving the proposed ALP configuration would be contingent on the receipt of a National Change Proposal (NCP) waiver for each non-standard condition.

23. In accordance with AC 150/5300.7b, FAA Policy on Facility Relocations Occasioned by Airport Improvements or Changes, Paragraph 5, Accomplishment of Work, the FAA shall have exclusive right to determine how all facets of the relocation of an FAA facility will be accomplished. This includes, but is not limited to, engineering, site selection, procurement of equipment, construction, installation, testing, flight inspection and re-commissioning of the facility.

24. The RVR Facilities identified on the proposed ALP meet the standard siting criteria. The RVR siting criteria in AC 150/5300-13 is being updated. When the engineering for the project progresses to a point where RVR siting is necessary, coordination with the FAA must be initiated by the Sponsor's engineering staff.

COMMUNICATIONS

25. The proposed North Airport Maintenance Complex (AMC) building located near the Fuel Tank Farm may affect the Remote Transmit/Receive (RTR) -P facility. The antennas for

the RTR must have a clear line of site to the approach threshold of Runway 9L. A final determination cannot be made until the design of the AMC building is known. As soon as the height, footprint and material of the AMC building is known, the sponsor should begin airspace approval coordination with the FAA through a request for an aeronautical study.

26. In order to support the expanded communications requirements that result from the proposed ALP, it may become necessary to add RTR facilities to the overall FAA communications plan. If additional RTR facilities become necessary, it will be the sponsor's responsibility to provide a suitable location, as well as funding necessary to establish the facilities.

27. The intent is for existing O'Hare Fiber Optics Transmission System (FOTS) cable loops to remain intact throughout construction. Due to construction activities, some existing fiber cable segments will have to be rerouted because the existing service will be destroyed. Prior to construction activities that will destroy an existing fiber cable segment, and in lieu of splicing working segments after cutting, a new fiber cable will be installed between fiber patch panels and a transition to the new cable must occur. The cost of this must be borne by the Sponsor.

28. During Phases 1A and 1B, construction on the new fiber duct system and new FOTS loops may begin. Instead of creating linear point-to-point FOTS configurations (i.e., establishing a two terminal system) a third hub node may have to be established at the O'Hare International Airport (ORD) ATCT until RTR locations have been established. It is possible that when ready, the hub nodes will be relocated to the new RTR building, and connected back on the loop (will permit the node to be programmed at installation as if it were already at the new RTR location). If instead, linear point-to-point configurations were established, an entire fiber loop would have to be turned down, deprogrammed, and re-established as a multi-node ring configuration (this will take days to reconfigure). This requires the simultaneous purchase of all FOTS equipment necessary to establish each complete ring. Therefore, a FOTS plan will be needed to minimize the risk associated with conducting construction activities on an operational airport. It will be imperative that the sponsor coordinate each phase with the FAA prior to beginning construction.

FREQUENCY ANALYSIS

29. The O'Hare Modernization Program (OMP), as proposed, requires additional communication channels (frequencies). The additional air/ground communication channels must be found within the present FAA air/ground spectrum. The FAA is conducting a spectrum analysis to determine the scope of the spectrum requirements. Once this is completed, the sponsor may be asked to participate in an effort to obtain the necessary frequencies.

SECURITY & HAZARDOUS MATERIALS DIVISION, AGL-700

30. Any modifications to existing FAA facilities, or construction of new FAA facilities, are to be coordinated with the Manager, Security and Hazardous Materials Division, AGL-700. AGL-700 will review and provide guidance to ensure that appropriate physical security standards are met for the designated Security Level of the specific Federal

Facility. Coordination is to be made with this office to assist with site selection, facility location, hardware schedule, and product specifications for security related items of FAA facilities.

TRANSPORTATION SECURITY ADMINISTRATION

31. Construction and other projects impacting the security of ORD will necessitate either a notification of changed conditions affecting security, or an amendment to the ORD airport security program depending on the duration of the particular project.
32. In the event that the Sponsor has established any Exclusive Area Agreements that will be impacted by any projects related to the OMP, the Sponsor will need to ensure procedures are in place for the relevant aircraft operator or foreign air carrier to provide for alternate security measures if necessary.
33. In the event that the Sponsor has established any Airport Tenant Security Programs that will be impacted by any projects related to the OMP, the Sponsor will need to ensure procedures are in place for the relevant tenant to provide for alternate security measures if necessary.
34. The fingerprint-based Criminal History Record Check requirements outlined in 49 Code of Federal Regulations (CFR) 1542.209 must be met by all persons employed to work in an unescorted capacity within the Secured Area and/or Airport Operations Area (AOA) during all phases of projects related to the OMP.

INDIVIDUAL SHEET COMMENTS

General note: *Comments below apply specifically to the sheet where noted. However, global changes should be made to address the same comment on all sheets within the ALP set depicting the same information.*

COVER SHEET

35. The October 2003 ALP submittal is assigned an airspace case of "2003-AGL-0878-NRA" not "2003-AGL-0848-NRA". The next ALP re-submittal will be assigned a new airspace number upon its arrival.

SHEET #1: CONTENT SHEET

36. Ensure page title on content sheet matches the actual sheet title.

SHEET #2: EXISTING AIRPORT LAYOUT PLAN

37. The "banana" portion of Concourse B is incorrectly labeled "Concourse A". Please revise.

38. Several of the existing LOC critical areas are incorrectly depicted. It is important to note that the LOC serving a runway approach is located beyond the departure end of that

runway, not at the approach end. For instance, the Runway 14L LOC is located southeast of the Runway 32R end.

a. The Runway 14L, 32R, 14R and 32L LOC critical areas are depicted incorrectly.

b. The Runway 14L LOC critical area, which is located at the Runway 32R approach end, is incorrectly shown as a CAT-I critical area. Modify this to show CAT-II/III critical area criteria.

c. The Runway 32R LOC critical area, which is located at the Runway 14L approach end, is incorrectly shown as a CAT-II/III critical area. Modify this to show CAT-I critical area criteria.

d. The Runway 14R LOC critical area, which is located at the Runway 32L approach end, is incorrectly shown as a CAT-I critical area. Modify this to show CAT II/III critical area criteria.

e. The Runway 32L LOC critical area, which is located at the Runway 14R approach end, is incorrectly shown as a CAT-II/III critical area. Modify this to show CAT-I critical area criteria.

39. A mid-field RVR should be depicted for Runway 14R.

40. Label the touchdown elevation for existing Runway 9R.

41. Provide a note explaining the criteria used to determine the depicted location of the BRL.

42. Remove taxiway lights and runway shoulder markings from the ALP.

43. Provide a note explaining how survey monuments are protected.

44. Provide a note referencing the source documentation containing a list of approved modifications to FAA Airport Design Standards.

45. Show current disposition of land area currently identified as facility #801.

46. The Existing ALP labels the former decomissioned ATCT rather than the existing ATCT.

a. Identify the old tower merely as an obstruction point, without distinction.

b. The existing ATCT should be identified as existing.

c. Outline the pentagon that makes up the existing ATCT.

SHEET #3: FUTURE AIRPORT LAYOUT PLAN

47. For operational flexibility, the south turnoff from Runway 27C located west of Runway 22R (approximately 5,200' from the Runway 27C threshold) should be modified to a high-speed exit, if able.

48. The snow road that crosses Runway 4R/22L at midfield is unacceptable, due to the potential for runway incursions. Remove this road. The parallel service road, however, is still required.

49. A hold pad on the north side of Future Runway 9R is recommended to provide operational flexibility. Preferred siting of this hold pad is between the third and fourth proposed north/south access taxiways.

50. The elevation of the Runway 27R approach light plane will govern obstruction removal where it is below the 50:1 approach surface. There are two options in designing the approach light plane; both governed by the elevation of the Runway 22R 50:1 approach surface (see Sheet 15). The Runway 27R ALSF-2 light bars cannot be permitted to penetrate the Runway 22R 50:1. The Sponsor must resolve this conflict. Two of the options are:

    a. Option 1. Design the ALSF-2 such that the approach light plane is coplanar with the 50:1 approach surface out to the station 10+25 light bar. At the 10+25 bar, the steady-burning lights will be at elevation 677.0. Break the approach light plane at station 10+25, and run it out at elevation 677.0 to the end of the system.

    b. Option 2. Design the ALSF-2 with a constant slope of 1.74 percent out to an elevation of 681.5 at station 14+05. The station 14+05 steady-burning light centerlines will be 0.1' lower than the Runway 22R 50:1 approach surface at that point. Break the 27R approach light plane at station 14+05, and run it out at elevation 681.5 to the end of the system.

    The sponsor should study the obstructions that would have to be removed or lowered in each option to determine which of the two options involves less costly obstruction removal. Of particular interest are the above-mentioned streetlights and a streetlight or two along the east edge of Lee Street. Option 1 would give a lower approach light plane, and less expensive towers.

    Confirm the removal of all the trees along the East side of Lee Street; out to 210 feet both sides of the Runway 27R extended centerline. This will preclude future problems with ALSF-2 construction and tree re-growth. The ALSF-2 approach light plane design option selected will govern obstruction removal within the boundaries of the approach light plane. Outside the approach light plane, the 50:1 approach surface will govern obstruction removal.

51. Obstruction to Runway 22R Medium Intensity Approach Lighting System (MALS) with Runway Alignment Indicator Lights (RAIL) (MALSR): The outermost four Runway 27R ALSF-2 bars will penetrate the existing Runway 22R MALSR plane complex. Therefore, if the ALSF-2 were to be constructed, the MALSR profile would have to be modified to make the MALSR compatible with the ALSF-2. The MALSR modification may involve only reconstructing the five RAIL flasher towers such that:

    a. The outermost RAIL flasher light is at the same elevation as the neighboring steady-burning lights of the Runway 27R ALSF-2.

    b. The other four RAIL flasher lights are on a straight line between the outermost MALS bar lights and outermost RAIL flasher light.

52. Confirm that the Runway 10L ALSF-2 light lane crosses the railroad tracks at a right angle where the tracks are set widely apart. This non-standard spacing would require a NCP waiver.

53. The FAA requests that the City of Chicago clarify if any buildings depicted on the base mapping in the Runway 10L RPZ are places of public assembly. If the building just west of York Road remains, it appears that two of the Runway 10L ALSF-2 light bars would have to be mounted on the building. This light bar siting would present structural, access, safety, and leasing challenges.

54. The Runway 10R GS is sited 1,070 feet from threshold, to give a 55-foot Threshold Crossing Height (TCH). The GS is shown 407 feet from runway centerline, to place it outside of the runway OFA. Irving Park Road encroaches upon a small segment of the southwest corner of the GS critical area. Technically, this encroachment is a non-standard feature requiring an NCP waiver. The encroachment is indicative of a larger problem, specifically the security fence, the traffic on Irving Park Road, and railroad traffic, as they curve around to the northwest in front of the GS. These items must be math modeled by the sponsor to determine the impact on the GS signal. If there is a degradation of service, the sponsor may be required to mitigate to rectify the problem.

55. Provide a note referencing the source documentation containing a list of proposed/planned modifications to standards expected to be approved as part of the ALP review process.

56. As presently sited, the Runway 28L touchdown RVR may not give representative visibility readings. Show the Runway 28L touchdown RVR 1,050 feet west of threshold and 370 feet south of runway centerline.

57. Future Runway 28C Approach: Move the LOC/Approach Landing System (ALS)/DME building to be more than 250 feet north of Runway 28C extended centerline. It will be near the Runway 22L GS.

58. Pavement removal hatching should be depicted in the Future Runway 28R/22L pad islands, south of "D6" (they are currently hatched as existing pavement to remain). The Phase 1 Concept and Ultimate Phase Concept plans show that this pavement will be removed.

59. Depict all abandoned pavement as removed.

60. "Relocated" is spelled incorrectly in legend ("Existing Airport Buildings In AOA To Be Relocated" label).

61. Depict 300' reserved Western Bypass corridor.

62. Please label the existing ATCT.

63. The proposed Terminal 4 (Labeled "T2") and existing (Heating & Refrigeration) H&R Building, number 450, should be evaluated to determine if the proposed building would affect the line of sight from the existing ATCT to the airport movement area.

64. Proposed building R22, future-cooling towers should be evaluated to determine if it, or plumage from it, would have any effect on the line of sight from the existing and future ATCT to airport movement areas.

65. Building numbers 437 and 438 are identified on the key as exhaust room #1 and exhaust room #2. Prior to construction, these proposed buildings as well as the predicted plumage should be evaluated to determine if it would have any effect on the line of site from the existing ATCT to airport movement areas.

66. Building number 458 is identified as a FAA Microwave Tower and building. It should be labeled as the Operational RTR antennas and building.

67. The Future Runway 27R Mark 20A CAT-II/III ILS has only one Far Field Monitor (FFM) antenna. The Runway 27R antenna can be sited on runway extended centerline 1,055 feet from threshold. This siting places the FFM antenna 30 feet east of the Station 10+25 light bar, and about 15 feet west of the edge of the airport perimeter road. The drawing should be revised to show this, and to delete the other FFM that presently is shown on the pavement of the O'Hare Express North access road.

68. The future railroad track route in the vicinity of the Future Runway 10R end needs to be adjusted slightly (see Approach Sheets 29-34 for more detail). As the track is presently shown, it is unacceptably close to the ALSF-2 outermost light bar at Station 24+50. If the track must be routed as shown, the outermost light bar will likely have to stand further from the runway threshold than 2,450 feet, to adequately clear the track. The outermost light bar cannot be sited farther from runway threshold than 2,450 feet without an NCP waiver.

    The solution is to site the outermost two ALSF-2 bars at Stations 23+40 and 24+50, and to design the railroad tracks to cross the extended runway centerline 2,395 feet from Runway 10R threshold. This design would place each light bar tower between 25' and 30' from the nearest track. An NCP waiver will be required for non-standard ALSF-2 stationing.

69. The runway/parallel taxiway separation for proposed Runway 9L/27R should be depicted as shown in the April 8, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Appendix C)**

70. The runway/parallel taxiway separation for the future Runway 9R/27L (Existing Runway 9L/27R) with an extension can be shown as depicted on the ALP drawing. Due to the presence of a second parallel taxiway, aircraft can be routed on this taxiway during CAT II/III conditions. Please see the April 8, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Appendix C)**

71. Reference runway to parallel taxiway separation standards; follow the guidance in the FAA letter on this subject dated April 8, 2004, from the Chicago Area Modernization Program Office to the City of Chicago. **(See Appendix C)**

72. Taxiway to runway centerline distance restrictions per United States Standard for Terminal Instrument Procedures (TERPS) Instruction Letter (TIL) 00-005A (effects of Height Above Touchdown (HAT) values) are as follows:

a. The minimum HAT value for CAT II operations is 100 feet where the runway centerline to taxiway centerline separation is 600 feet or greater. This value may be also achieved with:

1. Runway taxiway centerline separation of 500 feet at elevations of 4,000 feet and below, provided taxi operation are restricted to aircraft with wingspans less than 214 feet and tail heights less than 66 feet.

2. Runway taxiway centerline separation of 400 feet at elevations of 4,000 feet and below, provided taxi operation are restricted to aircraft with wingspans less than 171 feet and tail heights less than 55 feet.

3. Larger aircraft flying the approach or taxiing on parallel taxiways, or taxiway/runway separation less than stated above require a collision risk analysis to determine the minimum HAT values.

73. Proposed Simultaneous ILS operations must meet the requirements of 8260.3B Change 19, Volume 3, Appendix 2.

74. VOR/DME relocation will require revision of 22 Standard Instrument Approach Procedures (SIAPS), 5 Standard Terminal Arrival Routes (STARs), and 3 Departure Procedures (DPs).

75. In addition to the ALP items listed above, the following also need to be considered.

a. In order to maintain existing/and or expand Instrument Flight Rules (IFR) operations at this airport, refer to AC/150-5300-13, Appendix 16, Table a16-1a/precision or Table a16-1b.

b. Construction of a runway and establishment of LOC and DME equipment will require development of new and revisions of existing SIAPS at the airport. The Chicago Flight Procedures Office (FPO) requires new runway end coordinates, runway end elevations, runway touchdown zone elevation and all facility data in accordance with FAA 405 Spec. If the airport elevation changes by 1.0 foot, all SIAPS will have to be revised.

c. An update in airport and NAVAID magnetic variation is recommended. Currently the airport is using the 1980 magnetic variation of 0 degrees, the ORD VOR/DME is using the 1965 magnetic variation of –2 degrees, the current and 2005 value is also –2 degrees. There will be no change in runway numbering as a result of this update.

d. To meet publication cutoff dates a minimum of 12 months, up to 1 1/2 years, based on complexity and current workload, may be required to revise existing and develop new SIAPS. Any new runway pavement will have to be flight checked for day/night operations: Reference United States Standard Flight

Inspection Manual OAP 8200.1, Chapt.100, Sect.104, Types and Priorities of Flight Inspections.

e. A copy of the data described above will need to be forwarded to the National Flight Data Center, ATA-110 and Flight Inspection Technical Support Branch, AVN-210. This data will be used to amend and publish instrument approach procedures at this airport.

76. An approved ALP does not constitute a request for procedure revision and/or development. These must be requested separately by the sponsor.

77. Timely notification of estimated project completion, (minimum of 1 year prior) to the Chicago FPO is necessary to ensure procedure development and publication coincident with commissioning of runways and facilities.

78. The runway/parallel taxiway separation for future proposed Runway 10L/28R (Existing Runway 9R/27L) with extension can be shown as depicted on the ALP drawing. Due to the presence of a second parallel taxiway, aircraft can be routed on this taxiway during CAT II/III conditions. However, due to the heavy volume of traffic, both aircraft and service vehicles, the FAA recommends that the City tunnel the service road north of Taxiway M between Taxiway ZT and Taxiway ZV through north of Taxiway LL between Taxiway ZZ and Taxiway S. A north/south service road should be maintained at the exit of the east side of the tunnel.

79. The plan proposes that the Runway 22R LOC move to the Runway 4L RSA. Due to the location of the proposed West Terminal and the air traffic requirements of existing and future taxiway infrastructure in this area, this location appears to be the only feasible and prudent siting alternative available. All efforts should be made to site this outside of the RSA.

80. Modify the fence line location to effectively move ARFF station #3 airside to allow ARFF response in accordance with Federal Aviation Regulation (FAR) Part 139 to Runway 10L and Runway 9R.

SHEET #4: AIRPORT DATA SHEET

81. "Existing" is spelled incorrectly in all wind coverage tables.

82. The City of Chicago has utilized a survey completed in October 2001 for the Local Area Augmentation System (LAAS) antenna as the basis for the Latitude and Longitudes of the existing and proposed runways. National Oceanic & Atmospheric Administration (NOAA) completed a survey in September 2002. The FAA continues to review both sources of information. Additional information will be provided to the City at the completion of the review.

SHEET #5: EXISTING TERMINAL AREA PLAN - CORE

83. Guard Post point 9, (GP9) or the ATCT height information should be moved slightly so that the ATCT top elevation is visible. The ATCT height elevation is needed for planning purposes.

SHEET #8: FUTURE TERMINAL AREA PLAN - CORE

84. Guard Post point 9, (GP9) or the ATCT height information should be moved slightly so that the ATCT top elevation is visible. The ATCT height elevation is needed for planning purposes.

SHEET #9: FUTURE TERMINAL AREA PLAN - EAST

85. Ensure consistency of apron/gate markings and use of loading bridge symbols between future terminal area plan sheets

SHEET #10: PHASE 1A CONCEPT PLAN

86. To facilitate labeling consistency, remove Runway 4L LOC critical area label.

87. The Runway 14L Inner Marker (IM) is shown on the runway pavement. Move the IM 210 feet northeast of Runway 14L centerline. This IM siting will require NCP waiver.

88. Future Runway 10L/28R is incorrectly labeled. Please revise.

89. The 24' x 68' Runway 14L ALSF-2 building is not shown. Show it 1,000 feet northwest of the Runway 14L displaced threshold with its length perpendicular to Runway 14L. Place the southwest wall of the building 410 feet northeast of Runway 14L centerline.

90. The Runway 32R LOC antenna array is correctly shown centered approximately 1,094 feet from the northwest end of Runway 14L pavement. It shall be permitted to leave the array at its present location if the new perimeter road north of it is relocated. The plan should be modified to show the straight segment of the perimeter road northeast of the array extended 150 feet to the west before it curves southerly. Do not curve the road any farther south than perpendicular to the Runway 14L extended centerline.

91. The perimeter road in the vicinity of the Runway 32R LOC is shown encroaching through the north corner of the LOC critical area. Vehicles parked, or moving slowly through this area could degradate the LOC service. The FAA recommends that the service road skirt around the LOC critical area. Alternatively, leaving the road within the northeast tip of the critical area would be allowed provided that the DOA meet the following requirements:

    a. Signs must be posted to protect the LOC critical area. The signs shall contain language warning against stopping or parking in the LOC critical area.

    b. Each contractor intending to use this road as a haul route shall be notified, before, and throughout the project, that parking, stopping or staging of vehicles is not permitted and may interrupt critical navigation devices.

    c. An agreement between the FAA and the DOA should be reached and documented prior to expending funding on engineering and/or construction.

92. Rerouting the perimeter road in the vicinity of the Runway 32R LOC will create the space needed for the Runway 14L FFM antennas between the array and the road. The FFM's are not shown. Show the FFM's on Runway 14L extended centerline 25 feet and 75 feet, respectively, northwest of the antenna array centerline.

93. The existing Runway 32R LOC building must be shown in its existing location, and as re-sited. Reconstruct the Runway 32R LOC building about 125 feet northwest, parallel to Runway 14L extended centerline. This will place the shelter about 25 feet from the perimeter road. The building will stand on grade excavated to a slope of about 4.5 percent, which is acceptable. So sited the building and its lightning rods will clear under the touchdown area 7:1 transitional surface.

94. Show the Runway 14L mid-RVR 3,550 feet southeast of the Runway 14L displaced threshold and 270 feet northeast of Runway 14L centerline.

95. Show the future Runway 27L mid-RVR east of the VOR/DME access road, about 825 feet east of where it is presently shown on Sheet #11 of the ALP document.

96. The future Runway 27L and Runway 28R LOC critical areas should be depicted as CAT II/III critical areas.

97. All but two or three of the light bars and flashers of the Runway 14L ALSF-2 will have to be semi-flush. Equipment limitations may require the flasher junction boxes and Individual Control Cabinets (ICC) to be less than 200 feet from Runway 14L extended centerline. If so, NCP waivers will be required for the penetration of the approach light plane by these items.

98. Provide a clear distinction between the existing and future property lines.

SHEET #11: PHASE 1 CONCEPT PLAN

99. Comments #89-#97 from Sheet #10 also apply to Sheet #11.

100. Modify the fence line location to effectively move ARFF station #3 airside to allow ARFF response in accordance with FAR Part 139 to Runway 10C.

101. As depicted on Sheet 3 (Future Airport Layout Plan), the Existing Runway 9R hold-pad needs to be retained in its current location to provide operational flexibility. Ensure consistent depiction of this pavement throughout the ALP.

102. It appears that some linework and/or labels are missing from the Phase 1 Concept Plan (Sheet #11) when compared to the Phase 1A Concept Plan (Sheet #10) (i.e., apron outlines in the north airfield area, concourse labels from the existing core terminal area, and Taxiway Object Free Area (TOFA) in the southwest Cargo Area). Revise accordingly.

103. Show the Runway 14R mid-RVR 4,050 feet from the Runway 14R threshold, and 410 feet southwest of runway centerline.

104. The Runway 32L GS is shown 1,225 feet from threshold and about 360 feet southwest of runway centerline. This siting will give too high a TCH, and will place the facility within the OFA. Site the facility with the GS antenna mast 1,050 feet from threshold, for a nominal TCH. The desired GS antenna mast lateral distance is 410 feet southwest of runway centerline. If the antenna mast is so placed, the CAT-I GS grading criteria require a small segment of the future detention basin to be filled. Please revise shape of future detention basin to achieve the same surface area. Set Point A 50 feet southwest of the antenna mast. Set Point B 560 feet southwest of the Runway end at runway centerline. Draw a line between Points A and B. The resulting Line AB cuts off a small wedge of basin near the northeast edge of the basin. Northeast of Line AB, the grade must be high enough to be dry at all times. Reconfigure the GS critical area accordingly. Also, reposition the RVR red dot 40 feet northwest of the GS antenna mast.

105. As shown, the relocated Runway 32L MALSR has three too many light stations. Delete the three southernmost black rectangles of the MALSR. The outermost black rectangle of the MALSR will be the one 2,500 feet southeast of the relocated Runway 32L threshold. Also, the triple bar (thousand-foot bar) is in the wrong place. Make the light bar that is shown at Station 10+55 the triple bar, not the Station 8+45 bar. The MALS threshold light bar would be a 23-light bar, with 220 feet between the outboard lights. Do not depict this threshold bar with the small rectangle that represents the other MALSR stations. The scale of the drawing is so small that it might be best not to show the MALS threshold bar.

106. The relocated Runway 32L MALSR light bars and flashers would be on frangible mounts, except for part or all of the MALS threshold bar, the Station 8+45 MALS bar, and the Station 20+75 RAIL flasher, which will be semi-flush. The profile of the frangible portion of the MALSR will be as low as feasible, to preclude being an obstruction to airplane engine nacelles near the taxiways. The northeast end of the MALS threshold light bar will extend into the high-speed turnoff taxiway. MALS threshold lights in that taxiway will have to be semi-flush.

107. Relocated Runway 32L MALSR plane penetration and clear line of sight. It is predicted that the top of the Runway 14R LOC antenna array will be 7 feet above the chevron pavement. If the antenna array is centered at Station 15+65 (1,570' from 32L threshold), and the outermost MALS light bar is at Station 14+65, then:

   a. The array will penetrate the relocated Runway 32L MALSR approach light plane complex, which the siting criteria permit.

   b. The array will not penetrate clear line of sight to the Station 14+65 MALS bar, or to any other light of the MALSR.

108. Runway 14R LOC/32L MALSR and EG Building(s): There are three buildings at the existing Runway 14R LOC site. The existing LOC equipment is in a 12' x 16' building. The existing Runway 32L MALSR equipment and DME are housed in a separate 10' x 12' building. The LOC EG has its own 12' x 16' building. When the Runway 32L threshold is relocated 4,856 feet, the DME should be relocated to the existing Runway 32L LOC building beyond the northwest end of the runway. That will leave the Runway 14R LOC/Runway 32L MALSR building(s) to be reconstructed or relocated. The option exists to:

a. Relocate the existing 12' x 16' buildings.

b. Construct two new separate 12' x 16' buildings, one for the LOC and MALSR, one for the EG.

c. Construct one 16' x 24' building with an equipment room and an EG room. In the following discussion, it is assumed that this option is taken.

The new LOC/MALSR/EG building is not shown on Sheet #11, and it must be shown. The EG will require a 500-gallon underground diesel fuel tank near the EG room. There are two viable sites, as follows:

a. Site 1. The building is centered 330 feet north of the Runway 10L centerline (170 feet south of the parallel taxiway centerline), and 270 feet southwest of the Runway 14R extended centerline. Here, the building would be inside the Runway 10L OFA, but outside the OFA of the parallel taxiway. At this site, the building would not receive jet blast.

b. Site 2. The building is centered 265 feet northeast of Runway 32L centerline and midway between the centerlines of the two parallel taxiways north of Runway 10L. The 24' building length is oriented parallel to Runway 14R. So sited, the building is outside the OFA's of all taxiways. The LOC/MALSR/EG building would be subjected to 70-mph breakaway thrust jet blasts from B-747's during the facility life. For this reason, constructing the building of concrete should be considered. This site is near existing Structure 959, the North Pump Station.

109. Runway 32L Precision Object Free Area (POFA). The Runway 32L future POFA, which is prominently outlined with a black rectangle, has an existing high-speed taxiway running through it. FAA is willing to accept an operational restriction during conditions that warrant the activation of the POFA.

GENERAL COMMENTS ON APPROACH SURFACE SHEETS (SHEETS #15 - #44)

110. On each of the following approach surface sheets, there appears to be required obstruction evaluation points that are not depicted or evaluated per 14CFR77.23(b)]. Verify that all required obstruction evaluation points are depicted and properly analyzed on these sheets: *15-17, 19-28, 36-42, 44.*

111. To facilitate easy location recognition, label all off-airport roadway names on all sheets.

INDIVIDUAL APPROACH SURFACE SHEET COMMENTS

Sheet #15: Existing/Future Runway 22R Approach Surface

112. Depict and label existing property line in addition to future property line.

Sheet #16: Existing/Future Runway 4R Approach Surface

113. Label property line as Existing/Future.

Sheet #17: Existing/Future Runway 22L Approach Surface

114. Top elevations of objects R21 and R28 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

Sheets #18-19: Future Runway 9L Approach Surface

115. Delete the text "APPROACH LIGHT PLANE SURFACE" from the text labeling the FAR Part 77 50:1 inner approach surface. The approach light plane surface text implies that the approach light plane will be coplanar with the 50:1 approach surface to the end of the ALSF-2, which is misleading (both sheets).

116. Top elevations of objects RR1 through RR4 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view (sheet #19). Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

117. Add a certification stating: "ALL RAILROAD TRACKS CLEAR UNDER THE FAR PART 77 50:1 APPROACH SURFACE BY A MINIMUM OF 23.0 FEET". (sheet #19).

Sheet #20: Future Runway 27R Approach Surface

118. Top elevations of objects R11 and FR-2 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

119. Several objects in the lower profile do not appear to line up vertically between plan and profile views. Please revise.

120. Point RR2 appears to be depicted in an incorrect location on the plan view. Please revise.

121. Point FR4 does not appear to be depicted in the profile view. Please revise.

122. The plan view scale is about 1" = 224.5'. The horizontal scale of the profile views is 1" = 200'. The non-standard scale of the plan view makes it difficult to work with, and the disparity in scales makes the drawing hard to read and interpret. Please revise the plan view to a more common scale.

123. Access Road to O'Hare Express North. Construction of the access road from Lee Street to the O'Hare Express North buildings is either complete or near completion. Verify that the new streetlights along the west edge of that road do not penetrate the 50:1 approach surface. The streetlight's top elevations and distances from Runway 27R threshold should be evaluated. Lee Street, the O'Hare Express North access road, and the future service road will all cross the Runway 27R extended centerline. The distances between these roads require nonstandard light bar spacing for which an NCP waiver is required.

Sheet #21: Future Runway 9C Approach Surface

124. Road points R1 and R2 are determined to be Part 77 penetrations, although the resolution is labeled "N/A". The roads causing these penetrations do not appear on the Ultimate Phase Concept Plan (Sheet #12). If these roads are to be removed, the resolution should read "Remove".

Sheet #22: Future Runway 27C Approach Surface

125. Top elevations of objects R17 and R21 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

Sheet #23: Future Runway 9R Approach Surface

126. Top elevation of objects RR4 through RR6 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

127. Please verify/revise the location of FW1 on the plan view.

Sheet #24: Future Runway 27L Approach Surface

128. Top elevation of objects R17 through R21 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

129. Depict all future roads in the plan view. It is unclear what future road points FR1 through FR9 evaluate. Please clarify.

130. It appears that point RR8 is labeled as R8 in the plan view. Please revise.

131. It appears that point RR9 is labeled as RR2 in the profile view. Please revise.

Sheet #25: Future Runway 10L Approach Surface

132. Top elevations of objects R16 through R20 and RR4 through RR6 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

133. Label the future railroad.

Sheet #26: Existing Runway 27L/Future Runway 28R Approach Surface

134. Top elevation of object R8 in the "Approach Surface Obstruction" table does not appear consistent with the object depiction in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

135. Re-label the runway end in the profile view to read "Existing Runway 27L/Future Runway 28R".

Sheet #28: Future Runway 28C Approach Surface

136. Road points R1 through R4 are determined to be Part 77 penetrations, although the resolution is labeled as "N/A". The roads causing these penetrations do not appear on the Ultimate Phase Concept Plan (Sheet #12). If these roads are to be removed, the resolution should read "Remove".

Sheets #29-34: Future Runway 10R Approach Surface

137. Label the future Bensenville drainage ditch and relocated railroad (Sheets #29 through #34).

138. Top elevations of objects R17 through R27 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view (Sheet #30). Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

139. Top elevations of objects RR2 through RR5 and RR9 through RR11 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view (Sheet #31). Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

140. Points FW1 through FW3 and G1 are duplicated in the table (Sheet #32). Please revise.

141. On the plan view, change the word airline to line (sheet #33).

Sheet #35: Future Runway 28L Approach Surface

142. Top elevation of object R19 in the "Approach Surface Obstruction" table does not appear consistent with the object depiction in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

143. Road points R1 and R2 are determined to be Part 77 penetrations, although the resolution is labeled as "N/A". The roads causing these penetrations do not appear on the Ultimate Phase Concept Plan (Sheet #12). If these roads are to be removed, the resolution should read "Remove".

144. Top elevations for objects R23 and R24 appear to be switched. Please revise.

Sheet #36: Existing Runway 9L Approach Surface

145. Future roads (FR1 and FR2) should not be evaluated on an existing sheet.

146. Top elevation of object F1 in the "Approach Surface Obstruction" table does not appear consistent with the object depiction in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

147. Revise the line type at the end of the RSA/OFA for consistency with other approach sheets.

148. Label the Part 77 Approach Surface for consistency with other approach sheets.

Sheet #37: Existing Runway 27R Approach Surface

149. Future roads (FR1 through FR15) should not be evaluated on an existing sheet.

Sheet #38: Existing Runway 9R Approach Surface

150. Top elevations of objects R1 through R15, RR1 through RR4, and R18 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

151. Remove the double line at the 680' grid.

152. Label NAVAIDS (i.e., LOC, MALSR)

Sheet #39: Existing Runway 14L Approach Surface

153. Object R16 does not appear to be depicted on the plan or profile views. Please revise.

Sheet #40: Existing Runway 32R Approach Surface

154. Top elevations of objects R15 and R30 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

Sheet #41: Existing Runway 14R Approach Surface

155. Top elevations of objects R2 and R13 through R15 in the "Approach Surface Obstruction" table do not appear consistent with the object depictions in the profile view. Please revise and ensure top elevations of all other evaluation points are consistent between the profile view and data table.

156. The base overlay mapping appears to be off from the aerial photograph. Please revise.

157. It appears that object RR7 is incorrectly labeled as R7 in the profile view. Please revise.

158. Provide a leader from the Middle Marker (MM) label to the location of the MM.

Sheet #42: Existing Runway 32L Approach Surface

159. Provide a leader from the MM label to the location of the MM.

SHEETS #45-#47: FUTURE AIRPORT LAYOUT PLAN PART 77 SURFACE DRAWINGS

160. Approach profiles presented on Sheet #47 only depict the first 10,000 feet of the approach surface for future runways. The length of the approach surfaces for all proposed future runways (except Runway 4L) is 50,000 feet. Depict the approach profiles for the full length of each runway's approach surface.

161. It appears on Sheet #45 that there are Part 77 penetrations beyond the first 5,000 feet of the approach surface by at least one object on both the Runway 9C and 10R ends. It appears these penetrations may be objects B5 and B6 depicted on the "Future Airport Layout Plan Inner Part 77 Surfaces" sheet; if so, they should be identified as such on Sheet #45. If not, the penetrations should be depicted on the Part 77 Surfaces Drawing(s).

162. Verify that the FAA's Digital Obstruction File (or comparable database) and/or the most recent NOAA Airport Obstruction Chart (OC #166, published 7/03)/National Geographic Survey Aeronautical Data Sheet was used to identify and depict objects that penetrate Part 77 surfaces. Provide disposition information for objects that penetrate Part 77 on the existing OC and will continue to do so in the future configuration. Also, provide a note on appropriate sheets stating the source of data used to identify objects for Part 77 evaluation.

SHEETS #48-#50: EXISTING/FUTURE ON-AIRPORT LAND USE AND EXISTING OFF-AIRPORT LAND USE DRAWINGS

163. Add RPZ line type to the legend on Sheets #48 and #49.

164. The RPZ line color varies between the Existing (Sheet #48) and Future (Sheet #49) On-Airport Land Use Plans. Please revise.

165. The property line in the legend of the Existing On-Airport Land Use Plan (Sheet #48) does not match the line type used on the drawing. Please revise.

166. Depict the VOR critical area on the Existing On-Airport Land Use Plan (Sheet #48).

167. The depiction of future terminal buildings on the Future On-Airport Land Use Plan (Sheet #49) appears inconsistent. For example, the Future Terminal 6 and Future Terminal 4 expansions are outlined with a dashed line, while the Future Concourse K expansion is outlined with a solid black line. The Future West Terminal is outlined with

a thin solid black line, similar to the outline around the existing terminal facilities. There is no outline depicted in the legend. Revise for consistency.

168. Future On-Airport Land Use Plan (Sheet #49) water detention color still does not match the color used in the legend. Please revise.

169. Add the hatching line types used on Sheet #49 to the sheet legend.

APPENDIX A

U. S. Department
of Transportation

**Federal Aviation
Administration**

Great Lakes Region
Illinois, Indiana, Michigan,
Minnesota, North Dakota
Ohio, South Dakota, and
Wisconsin

2300 E Devon Avenue
Des Plaines, Illinois 60018

June 9, 2004

Mr. Michael Boland
First Deputy Director
O'Hare Modernization Program
Department of Aviation
Post Office Box 66142
Chicago, IL 60666

Re: Workscope for Aircraft Rescue & Fire Fighting (ARFF), Jet Blast, Service/Access Road, and Phasing Drawings

As you are aware, the Federal Aviation Administration (FAA) is currently in the process of reviewing the Airport Layout Plan (ALP) for O'Hare International Airport as submitted by the City of Chicago in October 2003. As part of this process, it has been determined that additional information is necessary to assist us in completing our review. Based on the complexity of the project and the aggressive implementation schedule, the FAA is requesting the City of Chicago provide a field test of the Aircraft Rescue & Fire Fighting station located on the north airfield, a jet blast study, additional service/access road information and more detailed phasing drawings.

On May 20th the FAA met with representatives of the City of Chicago and discussed the requirements of each analysis. At this meeting the FAA committed to developing the workscope associated with each of the above requests. Attached you will find a detailed workscope for each analysis as well as the timeframe during which the FAA would like to see completed materials available for review and comment.

We are available to meet with representatives of your office to discuss the workscope and to provide assistance in facilitating each of the requests. If you have any questions or need any additional information, please contact Richard Kula of my office at (847) 294-7507.

Sincerely,

Barry D. Cooper
Manager, Chicago Area Modernization Program Office

Chicago O'Hare International Airport

O'Hare Modernization Program Airport Layout Plan Review

Workscope for Aircraft Rescue & Fire Fighting (ARFF), Jet Blast, Service/Access Road, and Phasing Drawings

Based on preliminary Federal Aviation Administration (FAA) comments on the 2nd Draft Airport Layout Plan submitted to the FAA by the City of Chicago in October 2003, the FAA requests additional information to assist during the ongoing review process. Specifically, the FAA is requesting a field test for the north Aircraft Rescue & Fire Fighting (ARFF) station, a Jet Blast Study, additional Service/Access Road information and additional Phasing information.

The following sections define the scope of the work that the FAA requests of the City of Chicago for each of the above listed analyses.

Aircraft Rescue & Fire Fighting (ARFF) Field Study

Based on an analysis that the City of Chicago has completed and the concurrent evaluation that the FAA has undertaken, the first vehicle response times to the proposed new north runway are too close to the Part 139 Requirement to make a determination based on modeling alone. Variations between equipment operators in acceleration and deceleration rates, as well as driving conditions in actual response situations can vary significantly. Therefore, we are requesting a field trial of a representative distance based on the information provided in the October 2003 draft Airport Layout Plan.

In preparation for a field trial of the ARFF response times, the City of Chicago will work with the FAA to define a test route that incorporates an representative distance, number of turns, approximate surface types (taxiway, runway), and representative runway crossings if applicable.

Upon agreement of the field test route, the City of Chicago will work with the FAA to schedule up to six field trial tests, utilizing six different Chicago Fire Department engineers.

The FAA will conduct the field trials and utilize the results of this test to make a final determination.

The City of Chicago and FAA will work together to determine the timeframe for this analysis.

Jet Blast Analysis on Future Navigational Aids (NAVAIDs)

The location of existing and future NAVAIDs is critical in maintaining a safe and efficient operation not only for aircraft, but also for persons and equipment on the ground. This study is necessary due to the complexity of the airport configuration and phasing of the project. In addition, FAA Advisory Circular 150/5300-13 states in Chapter 6 – Site Requirements for NAVAID and Air Traffic Control (ATC) Facilities, paragraph 600 –d, "Jet Blast/Exhaust. NAVAIDs, monitoring devices, and equipment shelters should be located at least 300 feet (90 m) behind the source of jet blast to minimize the accumulation of exhaust deposits on antennas."

Although the FAA does not require a Jet Blast Study as part of the Airport Layout Plan approval, the FAA is requesting the City perform the analysis in two phases. Initially the City of Chicago will perform a jet blast analysis of the NAVAIDs potentially affected at the conclusion of the Phase 1 construction of the City's Proposed Layout, followed by analysis of the NAVAIDs potentially impacted at the conclusion of the Phase 2 construction.

Specifically, the FAA requests the following information for each phase of the analysis:

- Written assessment and a visual depiction of the predicted jet blast levels,
- The predicted, worst case scenario, jet blast levels at FAA Navigational Aid Facilities, to include potential impacts to:
    - Facility structural integrity,
    - Maintenance equipment,
    - Maintenance vehicles,
    - Maintenance personnel,
- The aircraft type.
- The anticipated traffic level and traffic interval by configuration at the locations under evaluation using the highest forecast aviation activity level.
- The actual distance, in feet, from the closest predicted jet blast source, to the closest point of navigational aid facilities or appurtenances.
- The actual height, in feet, of the maximum predicted jet blast, if this is a factor.
- If excessive levels of jet blast are noted, the sponsor should make recommendations for modifications, operational procedures or concessions that will be made to reduce jet blast to safe levels.

The following table depicts the facility, runway and phase of construction to be evaluated:

Jet Blast Study – NAVAID Facility

Phase of Project	Runway	Facility
1	10L	Glide Slope
1	10C	Glide Slope
1	28C	Glide Slope
1	10L	Runway Visual Range
1	10C	Runway Visual Range
1	28C	Runway Visual Range
1	NA	Temporary Rwy 14R Localizer Antenna Array
1	NA	Runway 22RLOC from jets proceeding southeast on Taxiway J to Taxiway J1
1	NA	Airport Surface Observation System (ASOS) which is co-located with the Runway 27L Glide Slope
Phase of Project	**Runway**	**Facility**
2	9C	Glide Slope
2	9R	Glide Slope
2	27L	Glide Slope
2	27C	Glide Slope
2	22R	Glide Slope
2	9C	Runway Visual Range
2	9R	Runway Visual Range
2	27L	Runway Visual Range
2	27C	Runway Visual Range
2	22R	Runway Visual Range

Phase 1 of this analysis should be available for FAA review and comment no later than August 15, 2004. Phase 2 of this analysis should be available for FAA review and comment no later than November 30, 2004.

Airfield Service/Access Road

Although the City of Chicago has performed an Airfield Service Road Analysis Study as part of the initial ALP review and there are additional roads that have been added to the draft ALP submitted to the FAA in October 2003, there are still locations on the airfield where it is not indicated how personnel and equipment would get to various facilities.

The City of Chicago will work with designated FAA representatives to define and depict all airfield service and access roads on each set of phase drawings included in the ALP. Items to be included will be the following:

- Graphic depictions of locations where aircraft will be staged,

- Primary taxiflows,
- Aircraft parking locations,
- Primary queuing locations,
- Turning points.

Revised draft ALP sheets incorporating these service and access roads will be prepared and then submitted to the FAA for a full team review and comment.

The FAA requests this task be completed and submitted to the FAA for review and comment no later than July 11, 2004.

Phasing Drawings

Although the City of Chicago has provided the FAA with additional phasing information as requested during the ALP Review Process, additional data is needed prior to completing the review of the ALP document.

Specifically, in addition to the information already provided the FAA is requesting the City of Chicago to incorporate the following items into the phasing information:

- Include the relocation of the ASR-9. Information on the duration of the relocation event should be included.
- Include information on the railroad relocation.
- Expanded information for the West Terminal Development.
- For any temporary closures, please provide duration information. Also, provide information as to when planned projects are to be completed during day shifts, night shifts, 24/7, or any combination thereof.
- Include projects relating to the 20-Year Capital Improvement Program. Specifically, include airfield rehabilitation projects including six runways, eight taxiways and numerous apron projects.

The FAA requests that this task be completed and submitted to the FAA for review and comment no later than July 11, 2004.

APPENDIX B

APPENDIX B

MTI and FTR Locations

Facility Identifier	*Facility Type*	*Auxiliary Device*	*Facility Numeric Identifier*	*Runway Association or Location*	*Latitude*	*Longitude*
ORD	**ASR-9**	**N/A**	N/A	N/A	N 41° 58' 48.5769"	W 87° 55' 39.9536"
ORD	**ASR-9**	**MTI Reflector**	1	Runway 14R	N 41° 59' 35.3337"	W 87° 56' 10.5156"
ORD	**ASR-9**	**MTI Reflector**	2	Runway 27R	N 41° 59' 2.0449"	W 87° 53' 15.0956"
ORD	**ASR-9**	**MTI Reflector**	3	Runway 22R	N 41° 59' 54.4755"	W 87° 53' 43.2595"
ORD	**ASR-9**	**MTI Reflector**	4	Runway 32L	N 41° 57' 21.3"	W 87° 53' 39.1"
ORD	**ASR-9**	**CPME**	1	ORD ATCT	N 41° 58' 33.3"	W 87° 54' 11.2"
ORD	**ASR-9**	**CPME**	2	Downers Grove	N 41° 44' 58.2856"	W 88° 1' 57.6288"
ORD	**ASDE**	**N/A**	N/A	ORD ATCT	N 41° 58' 33.3"	W 87° 54' 11.2"
ORD	**ASDE**	**FTR**	1	N/A	N 41° 59' 5.9"	W 87° 53' 39.6"
ORD	**ASDE**	**FTR**	2	N/A	N 41° 57' 58.5"	W 87° 52' 56.1"
ORD	**ASDE**	**FTR**	3	N/A	N 41° 57' 23.2"	W 87° 53' 36.8"
ORD	**ASDE**	**FTR**	4	N/A	N 41° 57' 55.0"	W 87° 54' 22.4"
ORD	**ASDE**	**FTR**	5	N/A	N 41° 57' 13.8"	W 87° 55' 55.3"
ORD	**ASDE**	**FTR**	6	N/A	N 42° 00' 1.7"	W 87° 54' 41.5"

FTR- Fixed Target Reflector
MTI- Moving Target Indicator
ASR- Airport Surveillance Radar
CPME- Calibration Performance Monitoring Equipment
ORD- O'Hare International Airport
ASDE- Airport Surface Detection Equipment
ATCT- Air Traffic Control Tower
N/A- Not Applicable

N- North **R- Right**
W- West **L- Left**

APPENDIX C

U. S. Department
of Transportation

**Federal Aviation
Administration**

Great Lakes Region
Illinois, Indiana, Michigan,
Minnesota, North Dakota
Ohio, South Dakota, and
Wisconsin

2300 E Devon Avenue
Des Plaines, Illinois 60018

April 8, 2004

Mr. Michael Boland
First Deputy Director
O'Hare Modernization Program
Department of Aviation
Post Office Box 66142
Chicago, Illinois 60666

Re: Runway/Parallel Taxiway Separation Guidance & Update on the Status of FAA Advisory Circular 150/5300-13; Change 8

Dear Mr. Boland:

As you are aware, the FAA has been evaluating the runway/parallel taxiway separation issues associated with the draft October 2003 Airport Layout Plan submitted by the City of Chicago. The FAA's Airport Obstruction Standards Committee (AOSC) Decision Document #1, published December 18, 2003, requires that the runway/parallel taxiway separation be 500' when aircraft are arriving and departing the runway in CAT II/III weather conditions. There are three locations on the draft ALP where the runway/parallel taxiway separation is less than this standard.

In addition, the FAA has been using Change 7 of the Advisory Circular 150/5300-13, Airport Design, in the review of the City of Chicago's draft October 2003 Airport Layout Plan (ALP). There has been concern that potential changes in this advisory circular, as referenced in Change 8 to be released later this year, could impact the ALP review process.

The purpose of this letter is to inform you of the FAA decisions regarding each of the non-standard runway/parallel taxiway situations as well as to provide guidance on the potential impact of the release of Change 8 of Advisory Circular 150/5300-13.

Runway/Parallel Taxiway Separation Standards

Proposed New North Runway 9L/27R

The City of Chicago's proposed new north runway, as depicted on the draft October 2003 ALP, has a full-length parallel taxiway. The taxiway/runway centerline separation for the western most 2,750 feet is depicted at 500', with the remaining easterly 4,750' depicted as 400'. This is primarily due to the location of the north detention basins. The FAA has examined a total of 7 alternatives (including the proposed draft ALP layout) to determine the most feasible solution to this runway/parallel taxiway location issue. Based on the results of this analysis, and the

proposed flow of aircraft on the taxiway network, the FAA has concluded that removing a portion of the parallel taxiway from the intersection of Runway 14L east to the first high speed runway exit preserves the operational efficiency of the airfield **(see Exhibit 1).** This alteration in the taxiway network will require the City to submit a request for a Modification to Standards.

Future Runway 9R/27L (Existing Runway 9L/27R) with Extension

The City of Chicago has proposed a 3,594 foot runway extension to the west on Future Runway 9R/27L. The runway/parallel taxiway separation between the existing runway and parallel taxiway (Taxiway H) is 367'. For the length of the runway extension, the separation is increased to 400 feet. The existing taxiway would not be relocated. However, a second parallel taxiway is located on the west end of the runway that provides a 700' runway to taxiway centerline separation. The FAA has determined that with the proposed runway/taxiway layout, as depicted on the draft October 2003 ALP, during CAT II/III conditions, Airport Design Group (ADG) V aircraft would be restricted from operating on the closest taxiway (400' spacing) and the existing Taxiway H when the runway is used for mixed operations. ADG V aircraft would be required to taxi on the second parallel taxiway whose centerline is located 700' from the runway centerline. No modification to the proposed taxiway network is required in this area.

Future Runway 10L/28R (Existing Runway 9R/27L) with Extension

The City of Chicago has proposed a 2,859 foot runway extension to the west on Future Runway 10L/28R. The runway/parallel taxiway separation between the existing runway and parallel taxiway (Taxiway M) is 500' along the entire length of the runway. Due to air traffic operational needs and forecast service road traffic volumes, a service road and an additional taxiway may be required on the east end of the runway. The FAA continues to review information provided by the City as it relates to aircraft and service vehicle movements in this area. Additional information will be provided to the City as the FAA continues with the analysis of this section of the ALP.

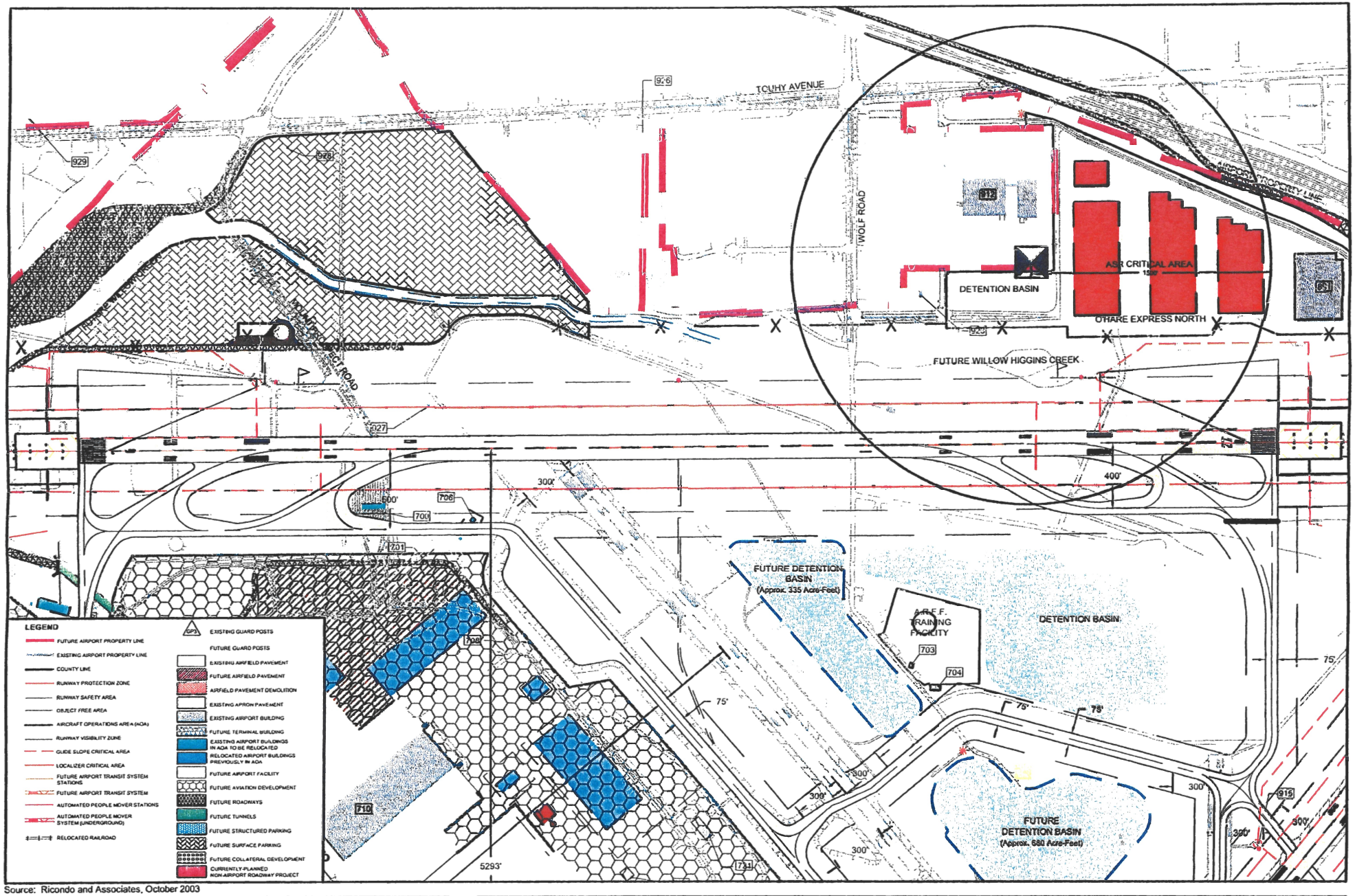
Status of Change 8, FAA Advisory Circular 150/5300-13

Currently, FAA Advisory Circular 150/5300-13, Change 7 is valid and is being used for review of the Chicago O'Hare Modernization Program ALP. Coordination with the Airports Division at the National level revealed that there are no changes with the upcoming Change 8 that would impact our review.

We are available to meet with representatives of your office to discuss the above issues. If you have any additional questions or need any information, please contact Richard Kula of my office at (847) 294-7507.

Sincerely,

Barry D. Cooper
Manager, Chicago Area Modernization Program Office



Source: Ricondo and Associates, October 2003

Chicago O'Hare International Airport
Preliminary Draft

O'Hare Modernization Environmental Impact Statement

Runway 9L-27R Concept
Parallel Taxiway at 400 / 500 ft. Centerline Separation

Exhibit 1

D:\OHareAp\Features\Cad\Airport\2004-03-23-9L27RImpactAssessment\RWY Impact Assessment-9L-27R\2004-03-25-ORD-Future-9L-27R-Alt1-FAA-Presentation.dwg

APPENDIX D

APPENDIX D
Items from Previous ALP Review

*(**General Note:** Comments below apply to FAA comments and the City's Response provided to the FAA in October 2003. Please refer to that document for the original FAA comment and the City's response.)*

A-1 g: Please identify the location of the VOR test facility (VOT) on the Proposed ALP.

A-3: The proposed Runway 9L/27R will influence the operation of the Runway 32R LOC. The future ALP does not clearly identify a plan for minimizing this impact. The sponsor shall continue to coordinate with the FAA to determine the most effective alternative.

A-5: Due to the complexity of the project and the aggressive implementation schedule, the FAA must be coordinated with during development of the proposed phasing plan.

A-17: Excessive snow or any other change in grade in front of a GS facility could significantly change the GS signal. To facilitate snow removal, GS snow removal areas are recommended. FAA Order 6750.49A, Maintenance of ILS Facilities requires that snow deeper than 18 inches be removed in front of a GS, to prevent signal distortion, or, if the snow is not removed the approach minima will be raised to LOC-only minima for category "D" aircraft and CAT II/III service will be unavailable. To facilitate snow removal, the FAA and the sponsor have agreed to hard-surfaced snow removal areas, constructed in front of each GS facility. The snow removal areas depicted on the proposed ALP meet the FAA criteria. Before construction, each snow removal area should be reviewed by the FAA.

A-24: As Runways 4R/22L and 4L/22R are existing runways (and not proposed to be modified) that are landlocked by major surface streets. It is neither practical nor prudent to relocate the LOC antennas. Therefore, no remedial action is required in this area. However, the FAA recommends re-evaluating this area in the future if changes are proposed to these runways.

A-25: ILS holding position markings (hold line) at GS critical area. It is sometimes necessary to prevent airplanes from entering a GS critical area as they taxi on a parallel taxiway that runs past the GS facility. To define the point at which the airplanes must hold short of the edge of the GS critical area, an ILS hold line is painted across the parallel taxiway. The point at which the ILS hold line is painted across the parallel taxiway is the intersection of the edge of the critical area with the inner edge of the taxiway. The inner edge of the taxiway is the edge closest to the runway that the GS serves. If the new GSs are all 1,050 feet from runway threshold, the ILS holds lines will be between 820' and 850' from threshold. Present guidance on use of the ILS hold lines is as follows:

a. If weather conditions are less/worse than 800-2, airplanes must hold behind the ILS hold line.

b. If weather conditions are 800-2 or better, airplanes may taxi past the ILS hold line.

A-26: The ALSF-2s of future Runways 9L, 9C, 9R, 10L, 10C, 10R, 27L, 27C, 27R, and 28R, are all shown crossing public roadways.

a. Permits for these crossings will be required from the government bodies administering these roadways.
b. To facilitate the issuance of permits for construction within the rights of way of these roadways, it is essential that the DOA begin planning with the responsible entities now, if that planning is not already in progress.

A-27: The ALSF-2s of future Runways 9L, 9C, 9R, 10L, 10C, and 10R are all shown crossing railroad tracks. Permits for these crossings will be required from the railroad. To facilitate the issuance of permits for construction within the railroad right of way, it is essential that the DOA begin planning with the railroad now, if that planning is not already in progress.

A-28: Elements of the ALSF-2s of future Runways 9C, 9R, 10L, and 10C are shown west of York Road on land that is shown off airport property. It is the DOA's responsibility to furnish all the interests in real estate required for the establishment of NAVAIDs. For ALSF-2, the interests include land on which to install light bar structures, cable ducts and cables, access roads and walkways, personnel ingress and egress, security, appurtenances, and avigation easements to protect the approach light planes from penetration. These avigation easements will be for airspace below the 14CFR77, 50:1 approach light plane. For the Runways 9C and 10L ALSF-2s, facility elements will have to be constructed on existing buildings off airport property. If these buildings are to remain, then the DOA must obtain special real estate interests that will be mutually acceptable to the owner of the ALSF-2 and of the buildings, which are to be depicted on the Future On-Airport Land Use Plan.

A-30: A meteorological study has been conducted to determine the optimal locations for the Low Level Wind Shear Alert System (LLWAS) sensors. The sponsor must furnish interests in real estate required for the establishment of NAVAIDs. For LLWAS, the interests include land on which to install the LLWAS tower and sensor, cable ducts and cables, access roads and walkways, personnel ingress and egress, security, appurtenances, and avigation easements to protect the LLWAS facility from interference.

A-31: It the previous evaluation it was identified that buildings R11 and R10 obscured the line of sight from the existing ATCT to existing or proposed movement areas. To mitigate this item as well as numerous other concerns, additional ATCTs have been proposed. If all line of sight impacts are mitigated, the FAA would have no objections from a line of sight perspective. Construction of the proposed North ATCT will remove this particular objectionable condition.

A-43: Facility data (e.g., LOC, DME, GS) will still need to be provided in a timely manner in order to ensure publication timelines are met. Realistically, a minimum of 12 to 18 months is needed in lead-time.

A-49: An extensive NAVAIDs frequency allocation study is being performed by the FAA since frequency allocation options in the Chicago area are extremely limited. This study must be completed before an operational ILS frequency plan can be made to implement the runway configurations as proposed in the OMP. VHF LOC frequencies in the Central United States are extremely limited. Presently, 34 out of 38 available frequencies are in use within 60 nautical miles of ORD. The radio frequency environment surrounding ORD is exceedingly complex and limits which of the 38 frequencies can be assigned at ORD.

A-49) b)
Results of an extensive NAVAID frequency allocation study may indicate the following:

iv) The plan will require spectrum engineering to change ILS/DME frequencies at other airports to provide ILS/DME as requested on the proposed 6 east - west runways. The ILS/DME frequency change impacts due to the proposed modernization of O'Hare International Airport will require mitigation, and the costs of making these changes at other airports may have to be covered by the sponsor.

v) Specific ILS approaches may have to be restricted if interference is predicted or the operation on these approaches will have to be mitigated in other ways, i.e. use of radar.

A-49) c)
After the proposed new Runway 9L-27R is added in Phase 1A, ILS/DME frequency assignments for proposed new east-west runways may require the shutdown of ILS/DME NAVAIDs on Runways 14L-32R and 14R-32L. These frequencies may be required to establish ILS/DME NAVAIDs for proposed new east-west runways. The phasing for Runways 14L-32R and the 14R-32L NAVAID shut down is critical for the assignment of ILS/DME frequencies at the other proposed new future east-west runways during the later phases of the project.

A-52: Impacts to FAA facilities and infrastructure due to the proposed modernization of O'Hare International Airport will require mitigation, the costs of which must be covered by the sponsor through reimburseable agreements with the FAA. A complete evaluation of the communication plan for O'Hare ATCT, TRACON and Air Route Traffic Control Center (ARTCC) as it relates to the planned airport development must be completed before the FAA can fully identify the extent of these impacts. Costs may include work both on and off airport property, additional equipment and infrastructure, and phasing the placement of communication facilities on an interim basis. No existing communication or fiber facilities or infrastructure will be removed from service or impacted by airport development without prior coordination with the FAA and new or interim communication services and/or facilities being in place and ready for operation.

A-52) a) i)
RTR-ORD is presently located in the area identified as the future location of the West Terminal Satellite Concourse (T4) and will require relocation.

A-52) a) ii)
RTR-A will require relocation due to its proximity to the future proposed Runway 10R/28L. An interim and/or final location for the equipment and services provided from this facility must be identified and evaluated.

A-52) a) iii)
RTR-B will require relocation due to its proximity to the future proposed Runway 10C/28C. An interim and/or final location for the equipment and services provided from this facility must be identified and evaluated.

A-52) a) iv)
The future ALP shows a four level rental car facility at the location P3 requiring removal or relocation of RTR-C. This impact was not identified in early planning documentation. This parking structure is identified as "unphased". FAA can only assume that this indicates that this portion of the plan has yet to be tied to the Phasing Plan. Early planning documents did not indicate any work, which would place current RTR-C (feature 902) in jeopardy. The frequencies currently housed in RTR-C must be relocated as a result of planned construction. While it may be possible that communication facilities from RTR-C can be accommodated in other RTR sites, there is no guarantee. This particular item requires resolution. The FAA requests additional details on the plans for this parking area for further evaluation. An interim and final location for the equipment and services provided from this facility must be identified and evaluated.

A-52) a) v)
RTR-D will require relocation due to the construction of Terminal #4. An interim and/or final location for the services provided from this facility must be identified and evaluated.

A-52) a) vi)
The FAA has documented that the ORD Remote Communication Air/Ground (RCAG) does not penetrate TERPS. Consequently, there is no requirement to relocate this particular facility. The sponsor incorrectly identified the communication facility on the north border of the airport property as RTR-F. The sponsor should change the facility designator from RTR- F to ORD RCAG- the actual location identifier of ORD and the facility type of RCAG.

A-52) a) vii)
No automatic assumptions should be made regarding the ability of existing facilities to accommodate equipment and services from communication facilities targeted for removal from the airport. Further evaluation and planning will be required, as staging plans become more specific for airport development.

A-52) a) viii)
The proposed site, RTR-U has been shown within the footprint to the West Terminal Satellite Concourse (Building T4 on the future ALP). The FAA will require additional information as the concourse is engineered, to determine if co-locating RTR-U with the concourse is feasible. Close coordination, regarding this facility, will be necessary to ensure all structural, space; access and infrastructure requirements are met. The FAA requires 24-hour, un-impeded access to this facility.

A-52 b) i)
Further evaluation will be required to determine on and off airport impacts to communication facilities directly or indirectly impacted by the configuration at the airport. Additional work or facilities may be required off the airport in support of Chicago ATCT, TRACON, or ARTCC requirements to properly provide air traffic services. When the communication plan for O'Hare ATCT, the TRACON and ARTCC air traffic control operations are further defined and coverage and frequency plans are studied, it will be determined if the conceptual locations of communication facilities are adequate or if any alternate facilities may be required. The costs of work both on and off airport will be the responsibility of the airport to cover through the reimburseable agreement.

A-52) b) ii)
Four new RTRs are depicted to the northwest (RTR-P), the northeast (RTR-Q1), the southwest (RTR-R) and the southeast (RTR-S). The proposed runway configuration supports the requirement for two additional RTRs in the area of the West Terminal Concourse (RTR-U) and the existing ATCT (RTR-T). Space and funding should be reserved for the construction of RTR-U and RTR-T, associated towers and infrastructure in the event that a co-location with other buildings such as the concourse or the tower cannot be accommodated. The ALP should be modified to include RTR access roads. There is a heightened regard for the movement of vehicles on and around the AOA. The following comment made by the sponsor is incorrect: "Response to ALP Comments" Page 22, Reference number 52b) ii. "It has been determined by the NAVAIDS Working Group that an additional site for RTR-T will not be required." RTR-T may in fact be required.

A-52) b) iii)
While resolution of this item is not expected as part of the ALP determination, the FAA requests details on both the concourse (T4) and parking structure (P3), as they become available for possible incorporation of FAA co-location requirements. Resolution of this item will be required to achieve milestones in implementation of the overall plan. The plans for the parking structure and the terminal building are still unclear. It will be necessary to evaluate the plan in depth before any construction in either of these areas begins. Space, power, utilities, cabling and antenna location may be completed in conjunction with airport work if facilities are acceptable to FAA requirements. Regardless of the final configuration, it will be necessary for the sponsor to accommodate the communications facilities needed to support the proposed airport configuration.

A-52) b) iv)
RTR-Q1 is shown very close to Runway 14L/32R. The facility tower plans and phasing should be closely monitored to ensure that communication tower locations and phases are not detrimental to the operation of Runway 14L/32R.

A-52) b) v)
The proposed location of RTR-S must be evaluated with respect to the timing of RTR-A and RTR-B removals, and shortening of Runway 14R/32L. Placement and timing will be important with respect to the removal of Runway 14R/32L.

A-52 b) vi)
Additional equipment and materials may need to be obtained to support the new or transitional communication or fiber requirements associated with the airport development and in the mitigation of any operational impacts.

A-52) b) vii)
An integrated FAA and sponsor phasing plan will be needed. Detailed integrated scheduling for the construction of all new communication facilities must be developed to ensure services are continued without disruption. The FAA may determine that some work can be consolidated with airport activity. Details of this nature and associated responsibilities will be outlined in the future reimbursable agreement with the airport.

A-52) b) viii)
Fibre optic cables, ductwork, conduit and equipment requirements must be included/planned for connecting all new communication facilities to the existing ATCT and two future ATCTs. It will be necessary for the Sponsor and the FAA to work together to define the work and reimbursable agreement responsibilities.

A-52) b) ix)
Further planning will be required within the FAA and with the airport to determine specific plans and timing of when new fiber network requirements need to be in place. The FAA will determine where and when new fiber optic capabilities must be established prior to any impact to the existing FOTS infrastructure.

A-52) b) x)
Two separate manholes must be provided for physical diversity of power, control, and communication cables, etc. for each new communication facility. Design responsibilities still need to be discussed and agreed to between the FAA and the Sponsor, then documented in a reimbursable agreement.

A-52) b) xi)
The airport must construct access roads, grading and subsurface work to and from each facility to include each communication facility. This will require additional coordination with the sponsor both on responsibilities and schedule integration. While the FAA is concerned about the plans for access roads and access procedures to each facility, RTR-R and RTR-U are of particular concern. Access to all facilities must meet or exceed the SMO expectations. RTR-U,

which is proposed on top of the new West Terminal, will pose unique access complications and new procedures. Concerns for secured and exclusive access, parking, movement of heavy or oversized equipment to and from the facility, will have to be addressed, negotiated and resolved.

A-52) b) xii)
FOTS presence at O'Hare. The established FOTS systems provide operational service communications between on airport FAA sites and the ORD ATCT. Further, it is important to establish awareness as soon as possible, that construction activities must consider first the existing FOTS infrastructure, then new and/or revised runway and site transitions. Listed below are some items to keep in mind prior to construction:

a. All FAA operational on airport services, between the ORD ATCT and NAVAIDs, radio transmitter, or radar site locations are provided over a FOTS system.
b. There is a future FOTS plan, in association with the OMP and any runway construction activities should consider associated FOTS requirements (e.g., conduit, duct, and fiber optic cable and equipment requirements).

In addition, any runway or site relocation (e.g., LOC, GS, ALSF, MALSR, ASR-9, and RTR) presently connected via a FOTS system, will need to be established at the new location before disconnection occurs at the current location. The duct or conduit will be traceable back to the ORD ATCT. Fiber Optic Cable and FOTs equipment will be used for all FAA on airport operational services between the ORD ATCT and FAA sites. Detailed discussions will be required to address the plans to minimize impacts to existing facilities while preparing future infrastructure needed for new facilities.

Construction activities, especially from Runway 9L/27R and south, may put fiber optic cable at risk. Damage to cable will result in loss of service.

A-53: The dedicated ARFF access roads that cross movement areas need to have controlled access. If they are accessible to all traffic, they should be incorporated into the service road system and reviewed as such.

The travel time for the first responding vehicle to proposed new north runway is too close to the regulation. The FAA, with cooperation from the City's contractor, will develop a field test that closely replicates the proposed distance including turns and driving over the crown of runways. A field test will be conducted in near future.

A-55: The FAA continues to review information provided by the City as it relates to storm water (detention/retention) facilities. Additional information will be provided to the City as the FAA completes the analysis of the data.

A-56: The FAA continues to work with the City of Chicago on the service and access roads depicted on the ALP. Specifically, this work will resolve access roadway

issues as identified in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago.

A-58: The FAA continues to work with the City of Chicago on the access roads for the NAVAIDs on the future ALP. Specifically, this work will resolve access roadway issues as identified in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago.

A-60: The study focuses on the primary service road system, which for the most part succeeds in reducing movement area crossings. The FAA requests to see plans for the secondary roads, such as the access roads to the NAVAIDs and visual aids. The FAA would like to emphasize the elimination of the potential need for vehicles to stop on the roadway as it crosses a movement area, e.g., a roadway intersection with a taxiway. Issues associated with these comments will be addressed as identified in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago.

A-61: Due to the heavy volume of traffic, both aircraft and service vehicles, the FAA recommends the City tunnel the service road north of Taxiway M between Taxiway ZT and Taxiway ZV through north of Taxiway LL between Taxiway ZZ and Taxiway S.

A-62: The FAA continues to support the inclusion of this service road bridge in the earliest phases of the project. This will help eliminate unnecessary ground vehicle movements across the taxiway bridges to the north airfield.

A-64: During Phase 1A, the FAA recommends use of one interim Runway 14L/32R configuration from Runway 9L/27R construction start until Runway 14L/32R decommissioning. During Phase 1B, the FAA is uncertain if the Runway 32L end will be displaced or relocated. Please provide clarity on the phasing of the proposed development.

A-66: Prior to commencing any construction related to development in the project, the City of Chicago shall complete a Wildlife Hazard Assessment (WHA) to evaluate each separate phase of the construction plan. USDA Wildlife Services is an acceptable party to conduct this assessment based on their expertise with animal damage control at airports, in addition to their specific expertise at O'Hare. If the WHA is not conducted by USDA Wildlife Services, the FAA will need to be consulted to evaluate the qualifications of the person(s) conducting the assessment prior to approval.

A-67: The FAA continues to review information provided by the City as it relates to storm water (detention/retention) facilities. Additional information will be provided to the city as the FAA completes the analysis of the data.

B-4: It appears that Runway 14L/32R will be temporarily closed and the pavement near Runway 9L/27R removed. The FAA is unsure if Runway 14L/32R will be re-opened as it currently exists. Please provide the necessary phasing information. The FAA recommends all abandoned pavement be removed.

B-5: The Runway 14R CAT II/III approach facilities, to include the ILSs, ALSF-2, and RVR, should be protected from construction, in order to maintain CAT II/III service to this runway.

B-6 In preliminary information provided by the City of Chicago, it was stated that, "The future GS-RVR building will be temporarily relocated to enable the use of Runway 14R/32L". The complications associated with the option of operating Runway 14R/32L, during the extension construction of Runway 9L/2R must be resolved to the satisfaction of the FAA. The concern for incorrect information is considered a project phasing concern and will be addressed as such. However, it should be understood that the GS building has an operational requirement to be within 10 feet of the GS antenna building.

B-7: *B-7) a)*
Trains on the railroad track are a concern for the operation of the GS facility performance. The City of Chicago, DOA, is accomplishing further study. Results of this study have not yet been released to the FAA.

B-7) c)
The ALSF-2 stationing as seen on Proposed ALP of 10/2003 meets standard stationing requirements and no longer requires a NCP waiver.

B-8: The Runway 27R ALSF-2 light plane design has not been resolved through the proposed ALP of 2003-AGL-0878-NRA, or surrounding discussions. It is highly recommended that this complication receive attention as soon as practical so that resolution is clearly defined.

B-8) d)
Portions of the DOA response to Airspace case number 2002-AGL-0848-NRA, B-8d are acceptable; however, there may be a typographical error in the DOA response. "9L ALSF-2 Light bar…" change to "27R ALSF-2 Light bar…"If this is not the case, this comment will require re-evaluation by the FAA.

B-10: *B-10) b)*
The proposed new ATCT site must meet FAA Order 6480.4, Air Traffic Control Tower Siting Criteria.

B-10) c) vi)
The proposed new ATCT sites must be large enough to accommodate for employee parking, Government Owned Vehicle (GOV) parking, a base building and support equipment.

B-22: *B-22) b)*
Runway 10L ALSF-2- A waiver will be required for a non-standard spacing configuration that's results when crossing the railroad and when accommodating existing structure. DOA should acknowledge in writing that they are aware of the Non-standard Configuration. Written justification for this configuration may be required.

The railroad tracks on the 10L approach are two sets of two tracks each, separated by a wide median. In that median, there is ample room to install a light bar tower. If a light bar tower is installed in the railroad median, an access road grade crossing would be necessary across the two tracks on which railroad cars would block the crossing for the shortest duration. Even with the light bar in the railroad median, a couple of light bar intervals would deviate from the standard siting criteria. This non-standard spacing requires corrective action or a NCP waiver. With the light bar in the railroad median, an ALSF-2 bridge would not be required, but a special turnoff on the east side of York Road might be necessary to access the light bar. If a light bar tower is sited between the tracks and York Road, a special turnoff on the east side of York Road would definitely be needed. Alternatively, if an ALSF-2 bridge across York Road and the tracks were constructed, the turnoff on the East Side of York Road would not be necessary.

B-22) c)
If the building just west of York Road remains, one or two ALSF-2 light bars would have to be mounted on the building. This light bar siting would be a structural, access, safety, and leasing challenge that would have to be solved. The FAA and the Sponsor will work together for a solution to this complex configuration.

B-23: *B-23) b)*
Runway 28R ALSF-2- A waiver will be required for a non-standard spacing configuration that results when crossing Runway 22L and Taxiway "Q". Prior to construction, DOA should acknowledge in writing that they are aware of the Non-standard Configuration. Written justification for this configuration may be required.

A waiver will be required for a non-standard equipment type- Semi-flush Steady Burning Lights. DOA should acknowledge in writing that they are aware of the non-standard configuration. Written justification for this configuration may be required.

B-23) c)
Based on the future configuration, the Runway 28R approach IM and LOC, FFMs would be non-standard. A waiver will be required for a non-standard spacing configuration. DOA should acknowledge in writing that they are aware of the Non-standard Configuration. Written justification for this configuration may be required.

B-23) d)
Based on the future configuration, the Runway 28R IM antenna would be installed about 205 feet south of the Runway 28R centerline and 205 feet southeast of the Runway 22L centerline. This non-standard configuration will require corrective action to meet current FAA standards. If this is not corrected, a waiver will be required for a non-standard spacing configuration. DOA should acknowledge in writing that they are aware of the Non-standard Configuration. Written justification for this configuration may be required.

B-23) g)
Irving Park Road/York Road Intersection Reconstruction:
Elements of the ALSF-2's of future Runways 9C, 9R, 10L, and 10C are shown west of York Road on land that is shown off airport property. It is the DOA's responsibility to furnish all the interests in real estate required for the establishment of NAVAIDs. For ALSF-2, the interests include land on which to install light bar structures, cable ducts and cables, access roads and walkways, personnel ingress and egress, security, appurtenances, and avigation easements to protect the approach light planes from penetration. These avigation easements will be for airspace below the FAR Part 77 50:1 approach light plane. For the Runways 9C and 10L ALSF-2s, facility elements will have to be constructed on existing buildings off airport property. If these buildings are to remain, then the DOA must obtain special real estate interests that will be mutually acceptable to the owner of the ALSF-2 and of the building.

B-38: The FAA continues to work with the City of Chicago concerning the location of service and access roads for the Runway 10C instrumentation. This task needs to be completed as part of the workscope contained in the June 9, 2004 letter from the Chicago Area Modernization Program Office to the City of Chicago. **(See Appendix A)**

B-39: The configuration of the Runway 28C IM is non-standard and will require an NCP waiver. The sponsor may be asked to provide written justification for the non-standard configuration. The Runway 10C LOC/Runway 28C ALSF-2 building must be repositioned on the ALP. In addition, it is desired to move the Runway 28C GS, RVR, PAPI, and included connector taxiway 44 feet east of position shown on ALP, to give a GS TCH of 56.5 feet. Option in NAVAIDs design must be studied by the FAA with the option in the location of the Runway 32L threshold.

B-40: Relocation of Runway 32L threshold north of Taxiway M would eliminate the intersection with the high-speed taxiway, per the phasing plan currently being developed by the City of Chicago. FAA will review and comment on the phasing drawings when submitted by the City of Chicago.

B-46: Due to the heavy volume of traffic, both aircraft and service vehicles, Air Traffic recommends the City should tunnel the service road north of Taxiway M between Taxiway ZT and Taxiway ZV through north of Taxiway LL between Taxiway ZZ and Taxiway S. A north/south service road should be maintained at the exit of the east side of the tunnel.

B-49: The FAA requests that the City of Chicago clarify if any buildings depicted on the base mapping in the Runway 10C RPZ are places of public assembly. Additionally, please confirm if any of the buildings depicted in the Runway 10L or Runway 9C RPZ's are places of public assembly.

B-59: The existing ASR shall be relocated and operational prior to construction activity and earthwork for Phase 1 – West Satellite and Phase 2-West Terminal.

B-68: *B-68) a)*
The proposed Runway 9R ALSF-2 configuration is non-standard and requires an NCP waiver. The optimal Runway 9R GS and PAPI configuration is: GS 1,171' from threshold, 58.1' TCH; PAPI 1,521' from threshold, 75.4' TCH.

B-68) b)
The ALSF-2 light lane must cross the railroad tracks at a right angle where the tracks are set widely apart. The railroad tracks on the approach to Runway 9R are two sets of two tracks each, separated by a wide median. In that median, there is ample room to install a light bar tower. If a light bar tower is installed in the railroad median, an access road grade crossing would be necessary across the two tracks on which railroad cars would block the crossing for the shortest duration. Even with the light bar in the railroad median, a couple of light bar intervals would deviate from the standard siting criteria. The DOA may be asked to acknowledge in writing that they are aware of the Non-standard Configuration. Written justification for this configuration may be required.

With the light bar in the railroad median, an ALSF-2 bridge would not be required, but a special turnoff on the east side of York Road might be necessary to access the light bar. If a light bar tower is sited between the tracks and York Road, a special turnoff on the east side of York Road would definitely be needed. Alternatively, if an ALSF-2 bridge across York Road and the tracks were constructed, the turnoff on the east side of York Road would not be necessary. The non-standard configuration, would be approved by the FAA pending the approval of the NCP waiver. The DOA may be asked to acknowledge in writing that they are aware of the Non-standard Configuration. Written justification for this configuration may be required.

The City of Chicago, DOA, responded to the FAA Comment B-68b, in part by referencing the "Access routes have been detailed". The FAA responded to the City, by stating that the detail of the service road and facility access provided on the ALP was not acceptable and that additional information would be required. The City responded to the FAA, stating that the level of detail would be included in the Service Road Access Plan. The FAA has since determined that the document does not meet the need of the FAA. A new access study has been requested.

B-69: *B-69) d)*
The sponsor should revise the language within response to OMP DRAFT ALP Comment number B-69d. The language should specify Bessie Coleman Drive instead of Mannheim Road.

B-71: The City states it will assess complex intersections that may exist at each interim phase. The City needs to identify and address these interim conditions before construction starts.

B-75: Taxiway R south of Runway 4L/22R is not operationally necessary.

B-81: *B-81) a)*
The Runway 27C GS Distance from Threshold should be 1070'.

B-90: The City states it will assess complex intersections that may exist at each phase of construction. The City needs to identify and address these interim conditions before construction starts.

B-93: Providing Yankee Echo Gate (Post 14) and Yankee Tango Gate (Post 15) remains in place, the FAA accepts vehicular traffic crossing Taxiway Y.

B-104: B-104 Runway 10R Instrumentation:

B-104) c)
Runway 10R ALSF-2. The future Bensenville ditch, the airport security fence, future relocation Irving Park Road, and rerouted railroad tracks are all shown crossing through the ALSF-2. These items must be designed to accommodate standard stationing of the ALSF-2 light bars.

B-104) c) i)
The previous recommendation was to route the Railroad Tracks around the end of the ALSF-2 lights. This was not accomplished. If possible, the sponsor should reroute the railroad tracks around the end of, instead of through, the ALSF-2. Ideally, the tracks should amply clear the outermost light bar tower of the ALSF-2. If the tracks must cross the ALSF-2, the track design must include ALSF-2 ducts under the tracks, and a grade crossing for the access road.

The proposed ALP illustrates the relocation of the Railroad between the last ALSF-2 light bar and the second to last ALSF-2 Light bar. This creates additional problems for maintaining a light bar so close to an active rail.

1) A grade crossing will be required to access the outermost light bar.

2) The Railroad must be relocated to equal-distance between the last and second to last light bars, to accommodate safe facility maintenance.

B-105: *B-105) a)*
The previous recommendation was to route the fence outside of the Runway 28L GS Critical Area. This has been accomplished on the ALP; however, the proposed fence runs parallel to the GS Critical area edge for approximately 150'. This configuration could seriously influence the operation of the proposed GS. The sponsor should have the proposed GS signal modeled to ensure that there will be no impacts as a result of the proposed fence configuration. The FAA has no objections provided the sponsor accepts all responsibility to mitigate any impacts associated with such a configuration.

B-105) b) ii)
The FAA has no objections provided Frangible lights are to be installed only where they fall on runways or taxiways. The practice of installing semi-flush lights in a threshold-to-taxiway infield (see Runway 28R below) should not be repeated. The best visual guidance, the greatest facility reliability, and the greatest ease of maintenance derive from frangible lights, not semi-flush lights.

B-105) b) iii)
The FAA has no objections provided semi-flush: (1) Steady-burning lights are installed for all three light bars at station 7+00, and for at least one light bar of stations 5+00 and 6+00, in Taxiway "S" (2) Steady burning and flashing lights are installed at stations 13+00, 14+00, 15+00, and 16+00, in Taxiway S2 and Runway 4R-22L. In crossing Runway 4R-22L and Taxiways "S" and "S2", the ALSF-2 approach light plane will have to stay very close to the ground.

B-105) c)
The proposed configuration results in a penetration of the Approach Light Plane, which will require an NCP waiver.

B-105) e)
The FAA offers the following guidance for the proposed South ATCT: The requirements for two additional ATCT facilities are valid from a line of sight perspective. The Air Traffic Division, AGL-510 and the Chicago NAS Implementation Center, ANI-400 will determine and approve the appropriate locations.

i) The new ATCT site must meet FAA Order 6480.4, Air Traffic Control Siting Criteria.

ii) The City of Chicago, DOA must submit an ATCT Siting report indicating the following information:

(1) Distance and depth perception to runway ends.
(2) Maximum to Avoid (MTA) elevations at each site.
(3) Shadow studies at each site.
(4) Look down angle radius at each site.
(5) A narrative for each site addressing sunrise and sunset impacts, glare and light reflection impacts and employee access.
(6) The new site must be large enough (2+ acres) for employee parking, Government Owned Vehicle (GOV) parking a base building and support equipment.

B-116: The ATCT has indicated that they do not need Taxiway R south of Runway 4L/22R. Please remove from the ALP.

B-119: The ALP depicts the Runway 4L LOC approximately 720' from the runway end. Due to the constraints located in this area, this location appears to be the only feasible and prudent siting alternative available. If future modifications are proposed on this runway, all efforts should be made to site this LOC outside of the RSA.

B-120: The ALP depicts the Runway 22R LOC approximately 890' from the runway end. Due to the location of Taxiway J, this location appears to be the only feasible and prudent siting alternative available. If future modifications are proposed on this runway, all efforts should be made to site this LOC outside of the RSA.

B-125: The ALP depicts the Runway 4R LOC approximately 530' from the runway end. Due to the location of Mannheim Road, this location appears to be the only feasible and prudent siting alternative available. If future modifications are proposed on this runway, all efforts should be made to site this LOC outside of the RSA.

B-126: The ALP depicts the Runway 22L LOC approximately 860' from the runway end. Due to the location of Irving Park Road, this location appears to be the only feasible and prudent siting alternative available. If future modifications are proposed on this runway, all efforts should be made to site this LOC outside of the RSA.

C-109: In response to Comment C-109 the City states that the 34:1 TERPS Approach Obstacle Clearance Surface was added to the Runway 9L inner approach profile drawing. However, the referenced TERPS surface is not depicted on either Sheet #18 or Sheet #19.

C-126: Future Runway 27R (sheet #20) does not appear to be centered laterally in the plan view.

TRANSPORTATION SECURITY ADMINISTRATION

O'Hare International Airport will be required to comply with all regulations governing civil aviation security throughout the OMP process, inclusive of all points identified below. All comments associated with the October 2003 document remain valid, as do the City's responses. These comments are as follows:

A-68: TSA Comment: All new facilities must have an adequate infrastructure to accommodate an access control system as well as personnel screening facilities since all new construction will either be contained within, or provide access to, the secured area of O'Hare International Airport.

> **City Response:** TSA and FAA security requirements will be incorporated during engineering design.

A-69: TSA Comment: Terminal and cargo buildings must be designed with sufficient space to handle screening equipment for passengers, employees, baggage, and cargo.

> **City Response:** TSA and FAA security requirements will be incorporated during engineering design.

A-70: TSA Comment: Relocation and modification of perimeter gates must be designed to accommodate an area where screening of vehicles and occupants can take place.

> **City Response:** TSA and FAA security requirements will be incorporated during engineering design.

A-71: TSA Comment: The increase in the number of employees will necessitate additional capacity in the access control and identification badge computer systems.

> **City Response:** TSA and FAA security requirements will be incorporated during engineering design.

APPENDIX E

APPENDIX E
ACRONYMS

AC	Advisory Circular
AF	Airway Facilities
ALP	Airport Layout Plan
ALS	Approach Lighting System
ALSF-2	High-Intensity Approach Lighting System with Sequenced Flashing Lights in the Category II Configuration
AMC	Airoprt Maintenance Complex Building
AOA	Airport Operations Area
ARFF	Airport Rescue & Fire Fighting
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observation System
ASR	Airport Surveillance Radar
ATCT	Air Traffic Control Tower
BRL	Building Restriction Line
CAT	Category
CFR	Code of Federal Regulations
CSSP	Construction Safety Phasing Plan
DME	Distance Measuring Equipment
DOA	Department of Aviation (City of Chicago)
DP	Departure Procedures
EG	Engine Generator
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FFM	Far Field Monitor
FOTS	Fiber Optics Transmission System
FPO	Flight Procedures Office
FTR	Fixed Target Reflectors
GOV	Government Owned Vehicle
GS	Glide Slope
HAT	Height Above Touchdown
H&R	Heating & Refrigeration
ICC	Individual Control Cabinets
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IM	Inner Marker
LAAS	Local Area Augmentation System
LOC	Localizer
LLWAS	Low Level Wind Shear Alert System
MALSR	Medium Approach Landing System
MTA	Maximum to Avoid
MTI	Moving Target Indicator (MTI)
NAS	National Airspace System
NAVAIDs	Navigation Aids
NCP	National Change Proposal
NOAA	National Oceanic & Atmospheric Association
NWS	National Weather Service

OC	Obstruction Chart
OFA	Object Free Area
OMP	O'Hare Modernization Program
ORD	O'Hare International Airport
PAPI	Precision Approach Path Indicator (PAPI)
POFA	Precision Object Free Area
RAIL	Runway Alignment Instrument Lights
RCAG	Remote Communication Air/Ground
ROD	Record of Decision
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RTR	Remote Transmit Receive
RVR	Runway Visual Range
SIAPS	Standard Instrument Approach Procedures
SMO	System Management Office
STARs	Standard Terminal Arrival Routes
SW	Southwest
TCH	Threshold Crossing Height
TIL	TERPS Instruction Letter
TERPS	United States Standard for Terminal Instrument Procedures
TOFA	Taxiway Object Free Area
TRACON	Terminal Radar Approach Control
TSA	Transportation Security Administration
VHF	Very High Frequency
VOR	Very High Frequeny Omni-Direction Range