

**PRELIMINARY DRAFT
FOR DISCUSSION PURPOSES ONLY**

OMP ADVISORY SESSION

DISCUSSION OUTLINE

JULY 16, 2002

Prepared for
City of Chicago Department of Aviation

Ricondo & Associates, Inc.

AGENDA

- I. INTRODUCTION
- II. SIMULATION MODELLING
- III. AIRFIELD REFINEMENTS
- IV. PROPOSED AIRFIELD REFINEMENTS UNDER REVIEW
- V. RUNWAY IMPLEMENTATION PHASING
- VI. NEXT STEPS

I. INTRODUCTION

II. SIMULATION MODELLING

1. Planning Activity Level (PAL) 2 has been input into Options 1, 2 and 5 on July 1, 2002 and is currently undergoing testing, evaluation and refinement.
2. Airspace assumptions for Option 1 have been received from Chicago TRACON (C90) and Chicago ARTCC (ZAU). These airspace assumptions are currently being tested, evaluated and refined using PAL 2. Weekly reviews and refinements of Option 1 airspace assumptions by C90 are continuing.
3. Airfield movement assumption for Options 1 and 5 have been received from Chicago O'Hare ATCT (ORD) and input into model. These airfield movement assumptions are currently being tested, evaluated and refined using PAL 2. Weekly reviews and refinements of Options 1 and 5 airfield assumptions by ORD are continuing.
4. ATC review of IFR CAT I Calibration Experiments completed. Data file and results will be sent to MITRE for review after final internal R&A review of calibration statistics. Final internal review of IFR CAT I Calibration Experiment will be completed the week of July 14, 2002.
5. C90 review of Baseline Plan W is complete. Final ORD review is to be scheduled pending completion of refinements to ground movement modeling.
6. C90 review of Baseline CAT II/III IFR experiment is complete. Final ORD review remains to be scheduled.
7. Review of operating assumptions for Baseline Plan B with C90 and ORD is complete. Initial modeling has commenced on two variants of Plan B, arriving on Runways 14R, 22R and 22L and arriving on Runways 14R, 22R and 09R.

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8. Preliminary testing of a pre-beta TAAM version 1.3 has begun. This pre-beta release is for the expressed purpose of acquiring familiarity with the functionality of the new release. It is important to note that it cannot be used for actual project work and report extraction until officially released by Preston Aviation Solutions. A release date of August 1, 2002 is currently envisioned by Preston Aviation Solutions but is subject to change should further modification be required.

III. AIRFIELD REFINEMENTS

Based on recommendations by the Advisory Planning Team, the following refinements have been implemented into the Future Airport Drawings dated July 16, 2001.

1. 1. Limited GROUP VI (New Large Aircraft – NLA) Airport Design.

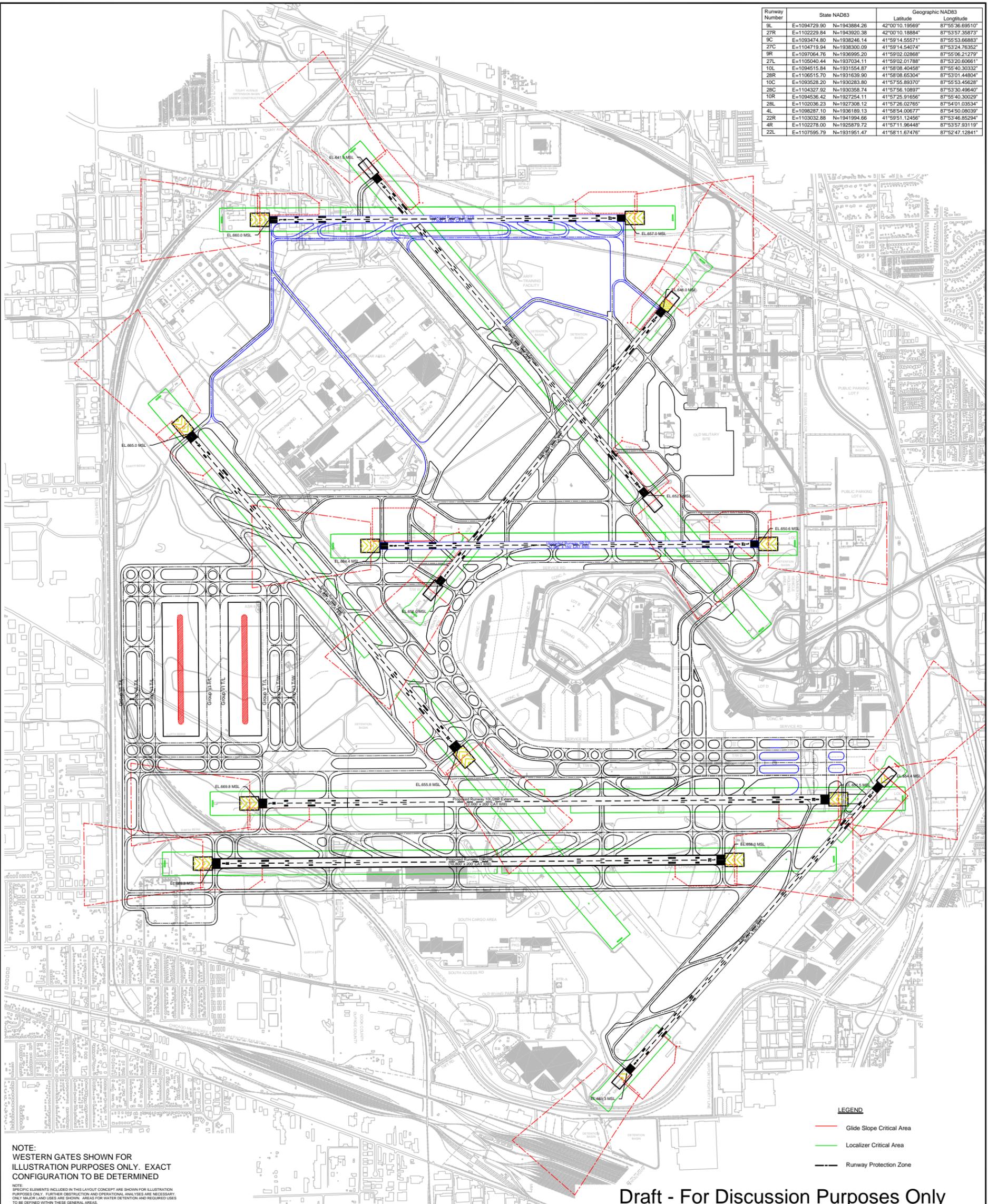
Subsequent analysis by the planning team has determined that the design parameter to build and upgrade all east-west runways to Group VI Airport Design may be overly aggressive, in terms of capability and cost, with the further recognition that a reduction in spacing to Group V requirements would widen the areas between the far outboard runways and thereby increase the available area for airport support functions (i.e., hangars, cargo facilities, etc.). The planning team has determined that the south airfield is more suitable to be designed with Group VI guidelines given the existing terminal area essentially “opens” to the south. On this basis, Group VI aircraft could enter the terminal area via the crossover taxiways and thereby avoid non-standard Group VI spacing between the inner and outer taxiways surrounding the terminal area.

In addition to making the south airfield Group VI capable, the planning team has determined that one north airfield runway should be Group VI capable (preferably Runway 9C-27C of Option 5). Since many Group VI aircraft are likely to be “long-haul” flights to Europe or Asia, departing from the north airfield would avoid an airspace crossing resulting in a reduction in departure capacity during such procedures.

Refinements to Group VI airfield design are summarized below:

- Option 1: **EXHIBIT III-1** Group VI aircraft limited to the south airfield Runway’s 10L-28R and 10R-28L.
- Option 2: **EXHIBIT III-2** Group VI aircraft limited to Runway’s 10L-28R, 10C-28C and 9C-27C.
- Option 5: **EXHIBIT III-5** Group VI aircraft limited to Runway’s 10L-28R, 10C-28C and 9C-27C.
- Group VI Airport Design taxiways 100’ wide to/from Group VI runways (all options).
- Group V Airport Design taxiways reduced from 100’ to 75’ to/from Runway 9L-27R and Runway 10R-28L (all options).

| Runway Number | State NAD83 | | Geographic NAD83 | |
|---------------|--------------|--------------|------------------|-----------------|
| | Easting | Northing | Latitude | Longitude |
| 9L | E=1094729.90 | N=1943884.26 | 42°00'10.19569" | 87°55'36.69510" |
| 27R | E=1102229.84 | N=1943920.38 | 42°00'10.18884" | 87°55'37.35873" |
| 9C | E=1093474.80 | N=1938246.14 | 41°59'14.55571" | 87°55'35.68883" |
| 27C | E=1104719.94 | N=1938300.09 | 41°59'14.54074" | 87°55'34.76382" |
| 9R | E=1097064.76 | N=1936995.20 | 41°59'02.02868" | 87°55'06.21279" |
| 27L | E=1105040.44 | N=1937034.11 | 41°59'02.01788" | 87°55'20.60661" |
| 10L | E=1094515.84 | N=1931554.87 | 41°58'08.40458" | 87°55'40.30332" |
| 28R | E=1106515.70 | N=1931639.90 | 41°58'08.65304" | 87°53'01.44804" |
| 10C | E=1093528.20 | N=1930283.90 | 41°57'55.89370" | 87°55'53.45628" |
| 28C | E=1104327.92 | N=1930358.74 | 41°57'56.10897" | 87°53'30.40640" |
| 10R | E=1094536.42 | N=1927254.11 | 41°57'25.91656" | 87°55'40.30029" |
| 28L | E=1102036.23 | N=1927308.12 | 41°57'26.02765" | 87°54'01.03534" |
| 4L | E=1098287.10 | N=1936189.13 | 41°58'54.00677" | 87°54'50.08039" |
| 22R | E=1103032.88 | N=1941994.66 | 41°59'51.12456" | 87°53'46.85294" |
| 4R | E=1102278.00 | N=1925879.72 | 41°57'11.96448" | 87°53'57.93119" |
| 22L | E=1107595.79 | N=1931951.47 | 41°58'11.67476" | 87°52'47.12841" |



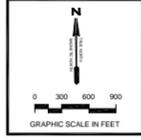
NOTE:
WESTERN GATES SHOWN FOR
ILLUSTRATION PURPOSES ONLY. EXACT
CONFIGURATION TO BE DETERMINED

NOTE:
SPECIFIC ELEMENTS INCLUDED IN THIS LAYOUT CONCEPT ARE SHOWN FOR ILLUSTRATION
PURPOSES ONLY. FURTHER OBSTRUCTION AND OPERATIONAL ANALYSIS ARE NECESSARY.
ONLY MAJOR LAND USES ARE SHOWN. AREAS FOR WATER DETENTION AND REQUIRED USES
TO BE DEFINED WITHIN THESE GENERAL AREAS.

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- LEGEND**
- Glide Slope Critical Area
 - Localizer Critical Area
 - Runway Protection Zone

| | |
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| Design by: | Checked by: |
| Drawn by: | Approved by: |
| Project No: | |
| July 16, 2002 | |
| Sheet x of x | |



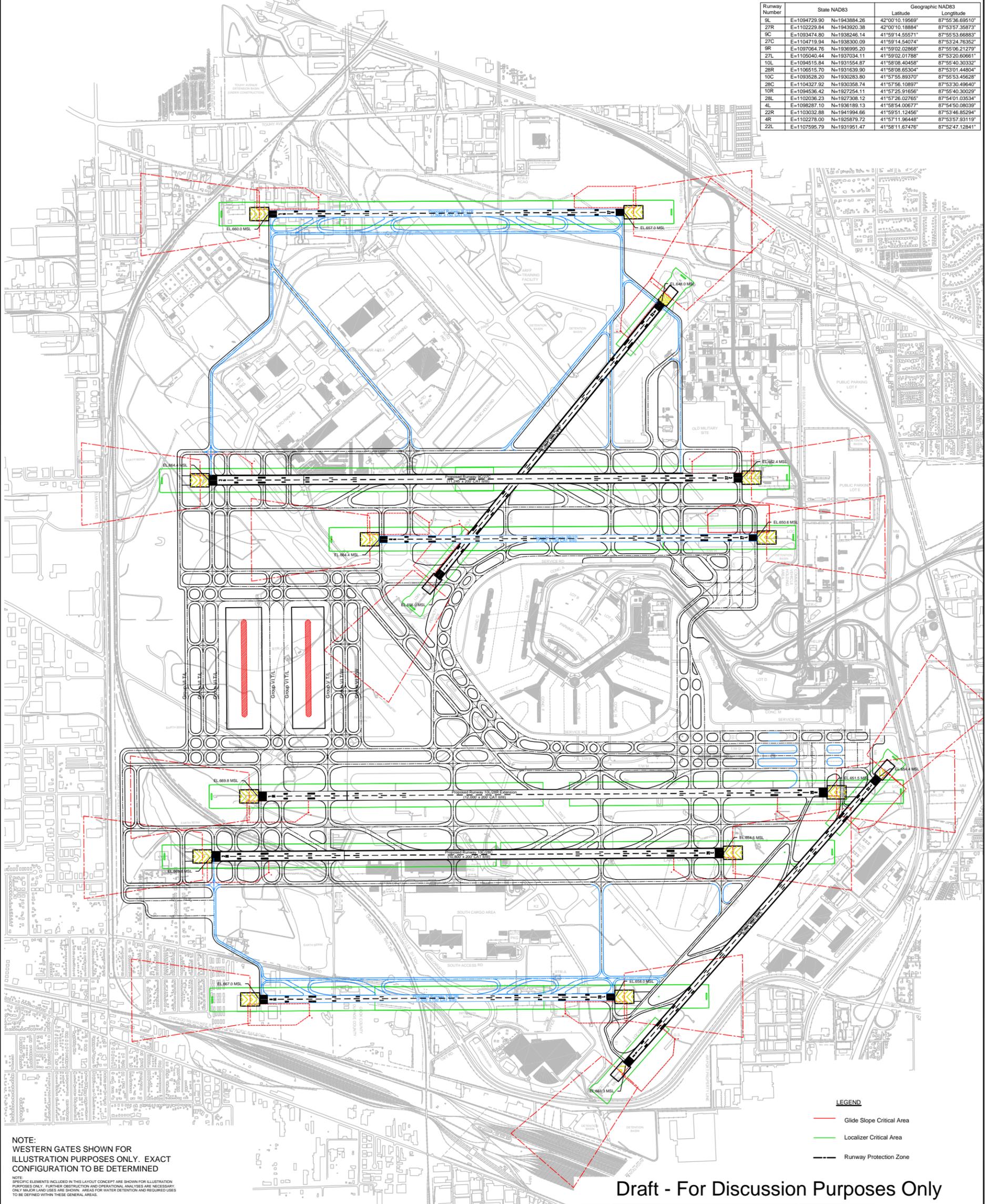
O'Hare
International
Airport

| No. | Revisions | Date |
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| | | |
| | | |

FUTURE AIRPORT DRAWING Option 1



| Runway Number | State NAD83 | | Geographic NAD83 | |
|---------------|--------------|--------------|------------------|-----------------|
| | Easting | Northing | Latitude | Longitude |
| 9L | E=1094729.90 | N=1943884.26 | 42°00'10.19569" | 87°55'36.69510" |
| 27R | E=1102229.84 | N=1943920.38 | 42°00'10.18884" | 87°53'57.35873" |
| 9C | E=1093474.80 | N=1938246.14 | 41°59'14.55571" | 87°55'53.66883" |
| 27C | E=1104719.94 | N=1938300.09 | 41°59'14.54074" | 87°53'24.76352" |
| 9R | E=1097064.76 | N=1936995.20 | 41°59'02.02868" | 87°55'06.21279" |
| 27L | E=1105040.44 | N=1937034.11 | 41°59'02.01788" | 87°53'20.60661" |
| 10L | E=1094515.84 | N=1931554.87 | 41°58'08.40458" | 87°55'40.30332" |
| 28R | E=1106515.70 | N=1931639.90 | 41°58'08.65304" | 87°53'01.44804" |
| 10C | E=1093526.20 | N=1930283.90 | 41°57'55.89370" | 87°55'53.45628" |
| 28C | E=1104327.92 | N=1930358.74 | 41°57'56.10897" | 87°53'30.49640" |
| 10R | E=1094536.42 | N=1927254.11 | 41°57'25.91656" | 87°55'40.30029" |
| 28L | E=1102036.23 | N=1927308.12 | 41°57'26.02765" | 87°54'01.03534" |
| 4L | E=1098287.10 | N=1936189.13 | 41°58'54.00677" | 87°54'50.08039" |
| 22R | E=1103032.88 | N=1941994.66 | 41°59'51.12456" | 87°53'46.85294" |
| 4R | E=1102278.00 | N=1925879.72 | 41°57'11.96448" | 87°53'57.93119" |
| 22L | E=1107595.79 | N=1931951.47 | 41°58'11.67476" | 87°52'47.12841" |



NOTE:
WESTERN GATES SHOWN FOR ILLUSTRATION PURPOSES ONLY. EXACT CONFIGURATION TO BE DETERMINED

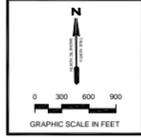
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LEGEND

- Glide Slope Critical Area
- Localizer Critical Area
- Runway Protection Zone

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| Drawn by: | Approved by: |
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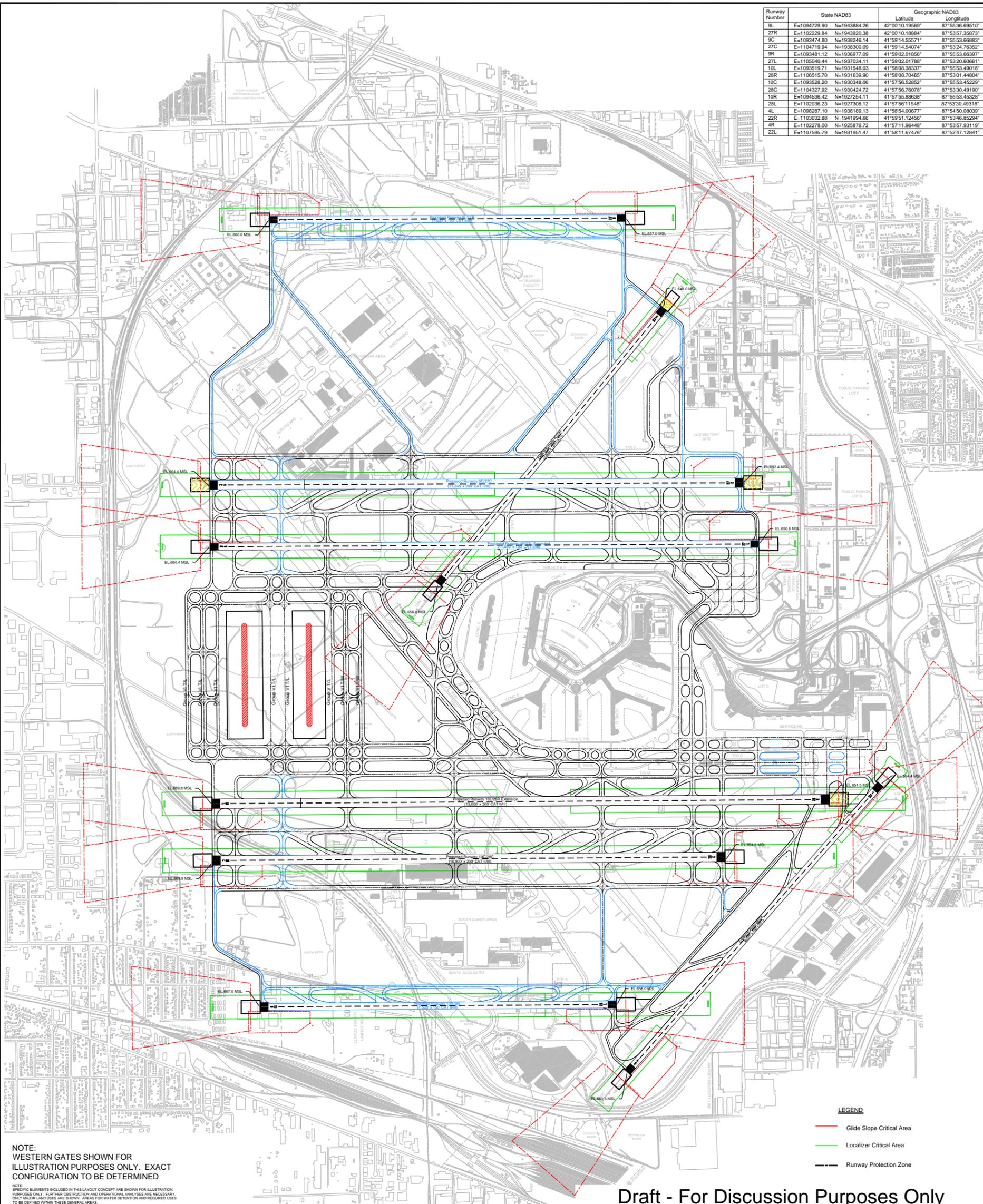
O'Hare International Airport

| No. | Revisions | Date |
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FUTURE AIRPORT DRAWING Option 2



| Runway Number | State NAD83 | | Geographic NAD83 | |
|---------------|--------------|--------------|------------------|-----------------|
| | Easting | Northing | Latitude | Longitude |
| 9L | E=1094729.90 | N=1943884.26 | 42°00'10.19569" | 87°53'36.69510" |
| 27R | E=1102229.84 | N=1943920.38 | 42°00'10.18884" | 87°53'37.35873" |
| 9C | E=1093474.80 | N=1938246.14 | 41°59'14.55571" | 87°53'36.68883" |
| 27C | E=1104719.94 | N=1938300.09 | 41°59'14.54074" | 87°53'24.76352" |
| 9R | E=1093481.12 | N=1936977.09 | 41°59'02.01856" | 87°53'36.68397" |
| 27L | E=1105040.44 | N=1937034.11 | 41°59'02.01788" | 87°53'20.60661" |
| 10L | E=1093519.71 | N=1931548.03 | 41°58'08.38337" | 87°53'36.69510" |
| 28R | E=1106515.70 | N=1931639.90 | 41°58'08.70465" | 87°53'01.44804" |
| 10C | E=1093528.20 | N=1930348.06 | 41°57'56.52852" | 87°53'36.68883" |
| 28C | E=1104327.92 | N=1930424.72 | 41°57'56.76078" | 87°53'30.49190" |
| 10R | E=1094536.42 | N=1927254.11 | 41°57'55.88638" | 87°53'36.68397" |
| 28L | E=1102036.23 | N=1927308.12 | 41°57'56.11548" | 87°53'30.49318" |
| 4L | E=1098287.10 | N=1936189.13 | 41°58'54.00677" | 87°54'50.08039" |
| 22R | E=1103032.88 | N=1941994.66 | 41°59'51.12456" | 87°53'46.85294" |
| 4R | E=1102278.00 | N=1925879.72 | 41°57'11.96448" | 87°53'57.93119" |
| 22L | E=1107595.79 | N=1931951.47 | 41°58'11.67476" | 87°52'47.12841" |



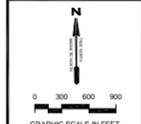
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- LEGEND**
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| Design by: | Checked by: |
| Drawn by: | Approved by: |



O'Hare
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Airport

| No. | Revisions | Date |
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FUTURE AIRPORT DRAWING Option 5



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2. Reduce taxiway-to-runway separations to 400' on far north/south runways for landside development.

The runway-to-taxiway centerline separations for Runway 9L-27R (Option 1) and Runway's 9L-27R and Runway 10R-28L (Option's 2, 5) originally 600' designed for Group VI has been reduced to 400' to accommodate additional landside and retention development.

Category II minimums apply for runway-to-taxiway centerline separations of 400 feet at elevations of 4,000 feet and below, provided taxi operations are restricted to aircraft with wingspans of 171 feet and tail heights less than 55 feet. FAA Local Air Traffic has submitted operational requirements in IFR East and West configurations, indicating that bak-taxi operations on the parallel taxiway are not planned for landing or departing aircraft either in IMC or VMC. Aircraft arriving on the outboard runways will exit at the high-speed or runway ends and taxi on the north-south taxiways to the terminal area.

3. Runway 10L-28R (Option 5) extended to 13,000 feet

This runway was originally shown as a 12,000-foot runway based on preliminary information from the airlines on runway length requirements. The airlines have since conducted detailed analyses that have concluded a requirement for a minimum of 12,250 feet of runway length for "long-haul" Asian market departures. A modification to Option 5 has been made that maintains the existing east end location of the runway and extends the west end to co-locate the thresholds of Runway's 10L and 10C. The resultant 13,000-foot runway provides runway lengths as requested by the airlines while preserving the existing airfield runway length of 13,000 feet (existing Runway 14R-32L). Furthermore, the FAA ATCT has indicated that they will conduct intersection departures on this runway in certain airport configurations. Sufficient runway length is provided for departing aircraft from an intersection such that arrivals on the outboard runways can taxi behind the departures unrestricted.

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4. Runway 9C-27C (Option 5) extended to 11,245 feet.

This runway was previously assumed to be an arrival runway and was planned for 10,000 feet of runway length. Based on FAA ATCT operational requirements, Runway 9C-27C will be used as an intersecting departure runway in certain ATC configurations. Sufficient runway length is provided for departing aircraft from a runway intersection such that arrivals or departures on the outboard runway can taxi behind the departures unrestricted.

IV. PROPOSED AIRFIELD REFINEMENTS UNDER REVIEW

The following airfield refinements have been proposed however, have not yet been incorporated into the airfield diagrams pending further analyses and FAA review.

1. Approach Criteria and Surfaces

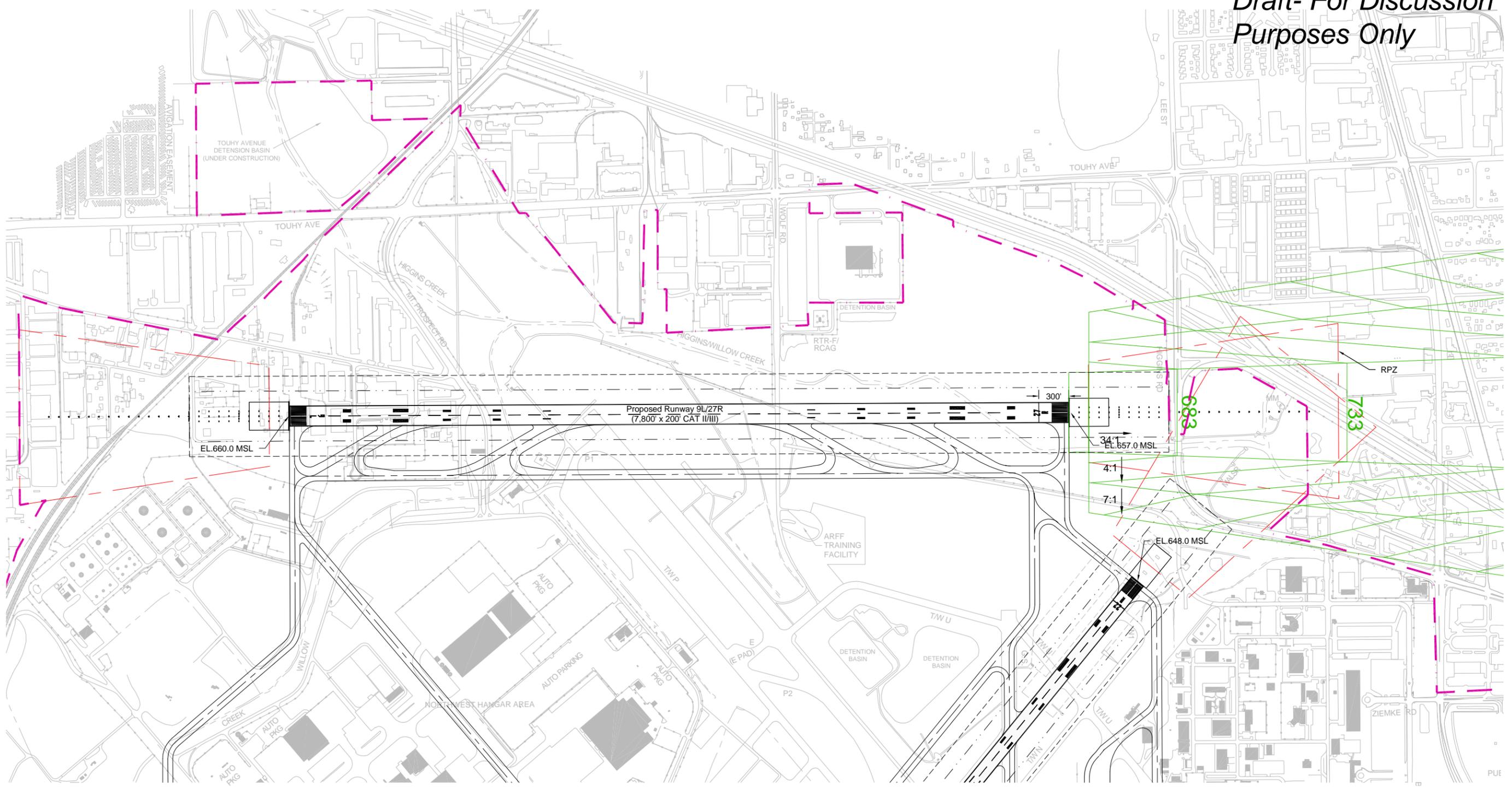
The siting of runway ends thus far has generally protected for the standard 50:1 approach surface as specified in FAR Part 77 for a precision instrument runway. The only deviation to this standard has been for the approach to Runway 10R of Option 5 where the runway end elevation was lowered 17.5 feet (from 684.5' MSL to 667.0' MSL) by application of the latest TERPS criteria found in Order 8260.36A. The narrow center 34:1 approach surface element to the prescribed approach surface, combined with the proposed location of the relocated rail line, eliminated what otherwise would be a rather steep 0.35 percent uphill grade to the west that the airlines expressed concern about. The purpose of this "Line Item" is to request concurrence to the validity of our establishing the runway end location (and elevation) in this manner. It is anticipated the plan and profile drawings ultimately produced as part of the ALP Drawing Set would illustrate both the FAR Part 77 surface as well as the TERPS surface. Obstructions would be shown penetrating the Part 77 surface, but not the TERPS surface.

2. Extend the outboard runways

The far outboard runways of airfield Option 5 (Runways 9L-27R and 10R-28L) have been previously planned for 7,500 feet in length. The runways would primarily be used for arrivals and it has been suggested by the Advisory Planning Team that additional length may increase the acceptance of this runway for arrivals by a larger portion of aircraft types. In response to this potential, an evaluation was performed looking into the expansion potential of these runways.

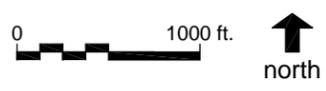
Exhibit IV-1, shows that approach end of Runway 27R could be extended 300 feet to the east, for an overall length of 7,800 feet, provided a 34:1 TERPS approach surface is used rather than the FAR Part 77 50:1 approach surface. The amount of extension is

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Exhibit IV-1



Option -5
Runway 27R End Extension

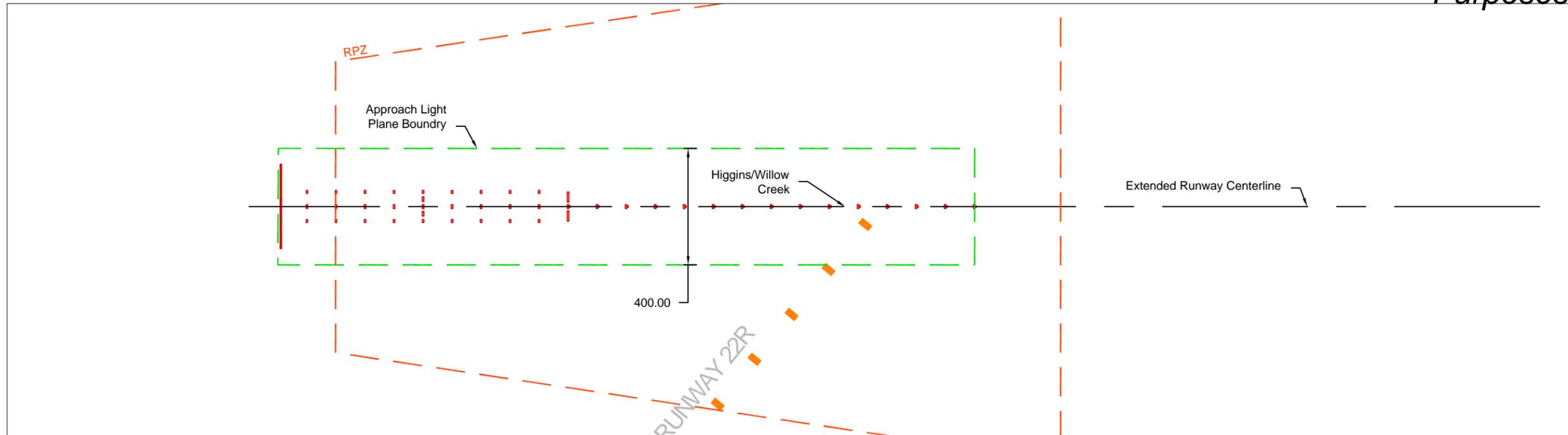
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limited by the existing Higgins Road and no extension beyond 300 feet would be possible without relocating the road. About 28 acres of the RPZ for the extended runway would be located off-airport, which would mostly encompass Interstate-90 and local roadways. A few land parcels and a single building located off-airport may require easement and/or acquisition.

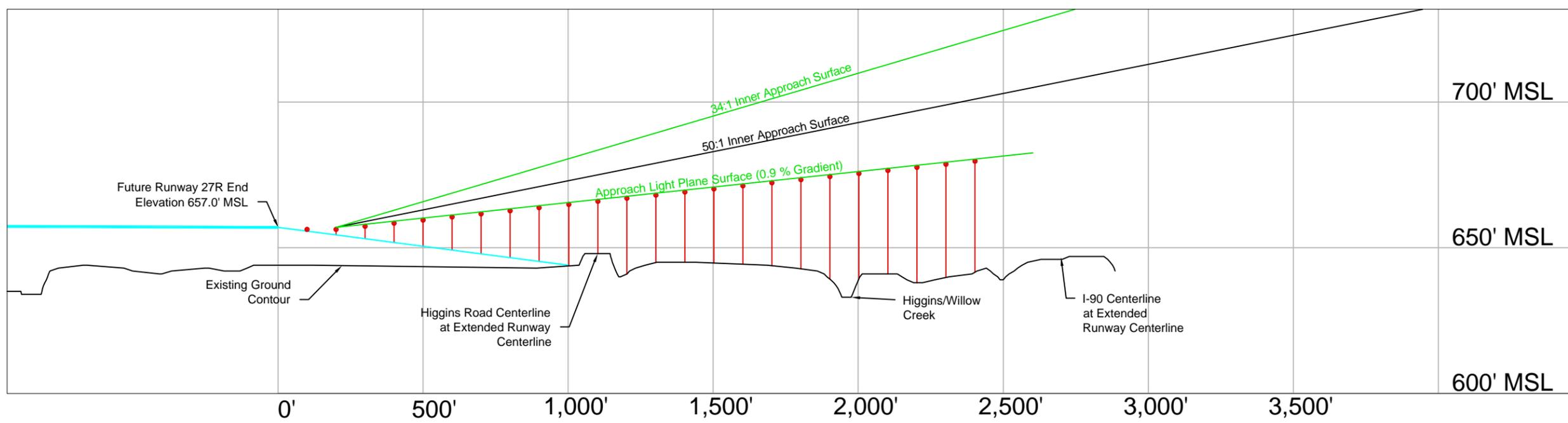
Exhibit IV-2 illustrates the profile of the revised approach surface to Runway 27R with the 300-foot extension in place. A review shows the approach surface crosses the roadway with adequate margin and the placement of the approach lighting system (ALSF-2) meets current criteria for slope and maintenance of visibility.

Exhibit IV-3 illustrates the potential to extent Runway 10R-28L 550 feet to the east for an overall new length of 8,050 feet. As illustrated, the Runway 28L end could be extended to the west of existing parallel Taxiway S still allowing the full use of the taxiway. A 50:1 approach surface would be maintained for the extended runway with no penetration of structures to the east with both the OFA and RSA remaining within the airport's existing boundaries. A portion of the blast pad for the extended runway would require integration with the parallel Taxiway S using additional fillets and potential reinforcement of the pavement to ensure safety and efficiency of operations. The existing Taxiway S2, a high-speed exit off Runway 22L, would need to be relocated by about 1,200 feet to the south to minimize the potential for aircraft incursions in the area. The relocated taxiway shown is designed with a wide throat for more efficient turning of the aircraft from the runway onto the parallel taxiway.

Exhibit IV-4 shows a profile view of the revised Runway 28L approach end. In-pavement lighting would be required for the section of the approach lighting system crossing over Runway 4R-22L. Furthermore, the approach light system needs to rise at a maximum 2 percent grade (i.e., 50:1) to clear Irving Park Road by adequate margins. Finally, the final two light bars would need to be placed on the top of an existing industrial building if it is decided to maintain the building at this location within the relocated RPZ. The relocated RPZ includes about 15 acres of property located off-airport requiring either acquiring or obtaining navigational easements for several industrial buildings.



Legend:
 • Approach Light
 ~ Existing Ground Elevation Along Runway Centerline



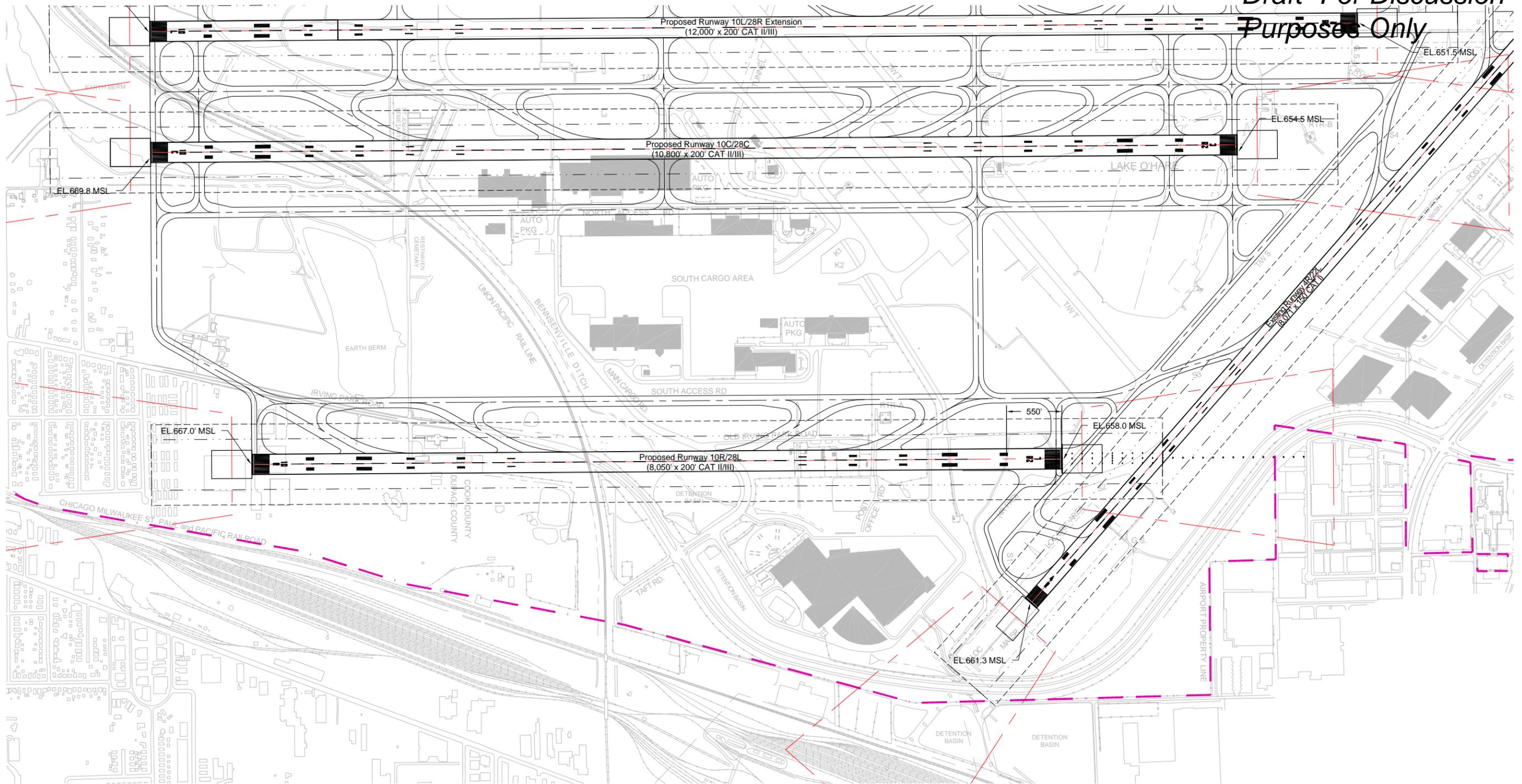
Source: Ricondo & Associates Inc.
 Prepared by: Ricondo & Associates Inc.

Exhibit IV-2



Option- 5
Runway 27R End Extension - Elevation Profile

P:\Chicago\ALP Update\ACAD\Option-5-Issues\North South Rwy Ext\Exhibit 2(9L-27R-Ext-Profile).dwg

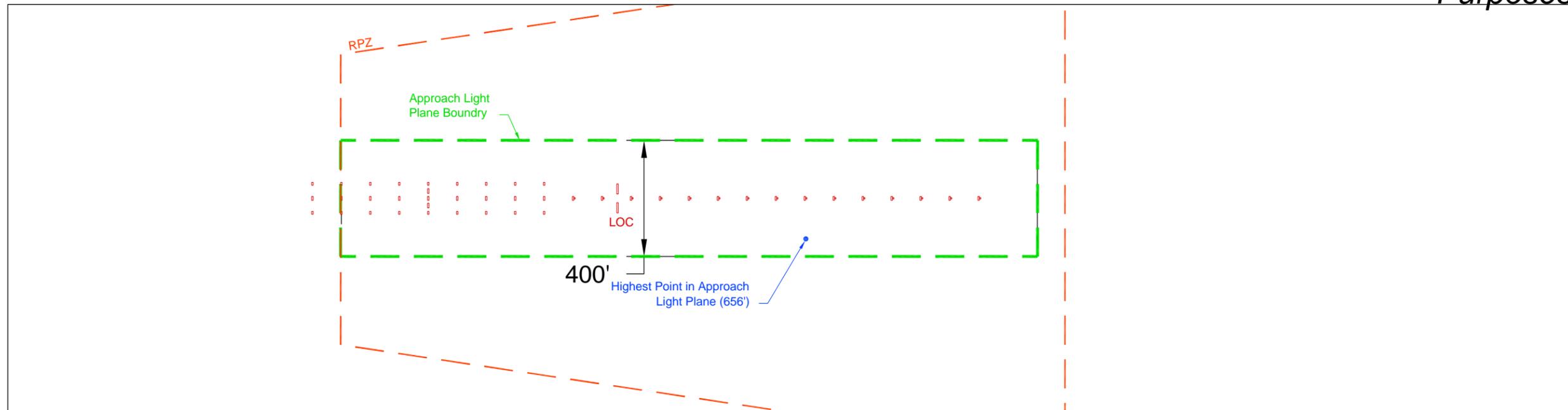


Source: Ricondo & Associates Inc.
 Prepared by: Ricondo & Associates Inc.

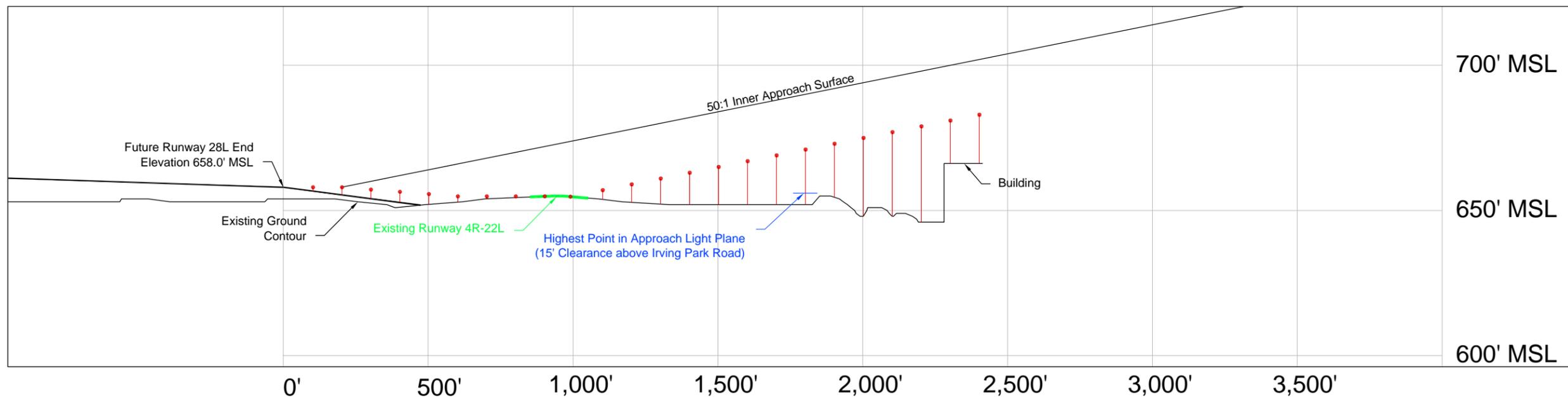
Exhibit IV-3



Option- 5
Runway 28L End Extension



- Legend:
- Approach Light
 - ~ Existing Ground Elevation Along Runway Centerline



Source: Ricondo & Associates Inc.
 Prepared by: Ricondo & Associates Inc.

Exhibit IV-4



Option- 5
Runway 28L End Extension - Elevation Profile

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3. Mitigation of ATCT Line of Site “shadows” to far north and far south runways.

A preliminary study of line-of-sight capabilities from the existing ATCT to the far north and far south runways indicated that shadows were shown to exist across the north and south runways and their respective parallel taxiways. The existing tower at 910 MSL (260' AGL) needs to be increased to 1273.2' MSL (623.2' AGL) for an unobstructed line-of-sight on the RWY 9L end. The tower should even be higher at 1479.5' MSL (829.5') for a clear line-of-sight to the parallel taxiway 600' south of RWY 9L/27R. A tower of these heights may not be feasible to design and operate.

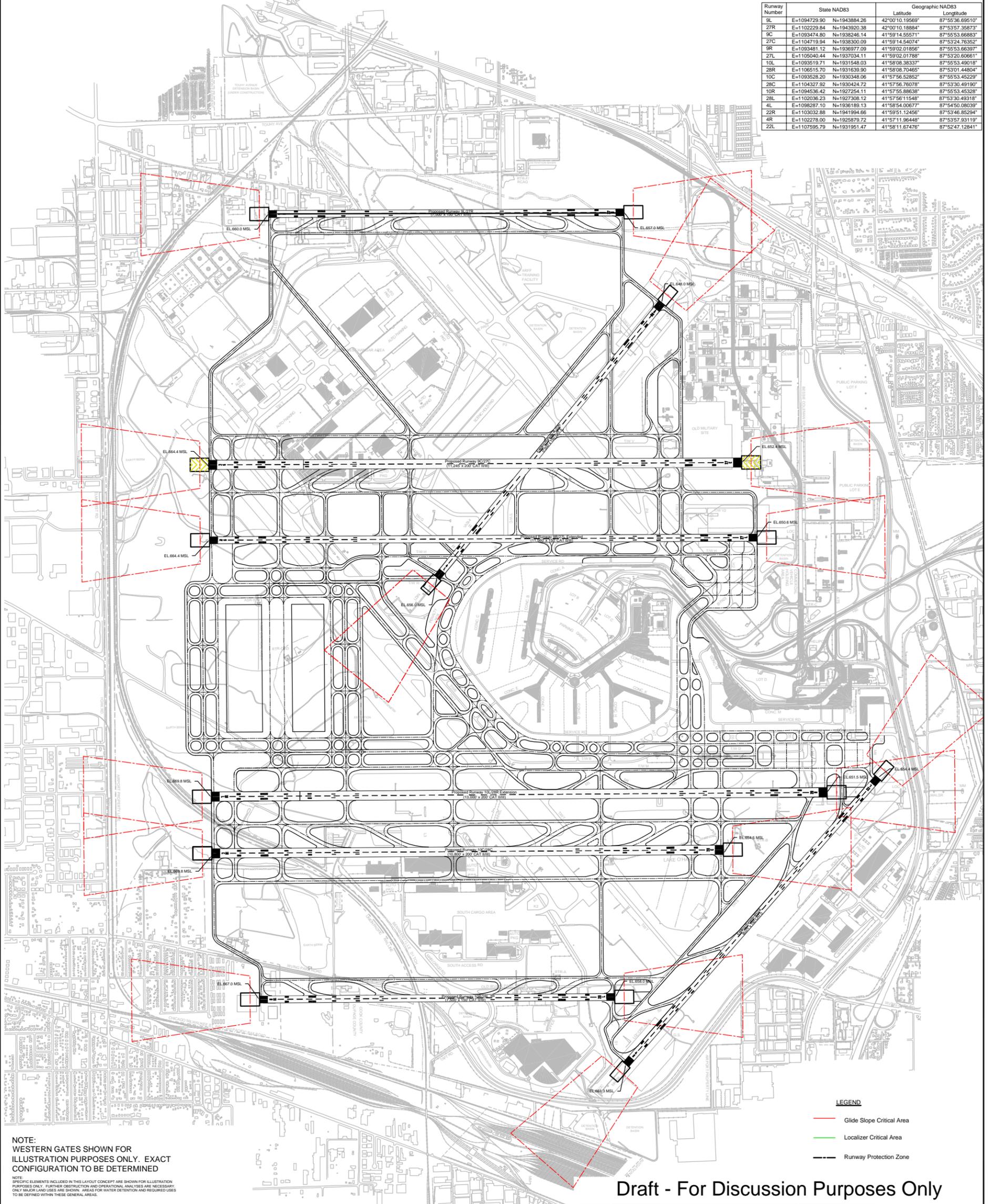
4. Dual T/W system on north airfield inner core

Option 3, **EXHIBIT III-3** is a concept to allow for a Dual T/W to be built on the north airfield and was identified as an option for a second round of simulations pending results of the simulation analyses currently underway. Initial work performed to date on Options 1 and 5 do not suggest an operational need for the dual taxiway system north of the terminal area.

5. Taxiway revisions have been proposed by the FAA ATCT that would reduce runway occupancy times.

FAA ATCT has provided input to the location of high-speed angled taxiways based on FAA standards in addition to practical application. Changes based on the input provided are being made and will be provided to the FAA Local ATCT and FAA Region for further review.

| Runway Number | State NAD83 | | Geographic NAD83 | |
|---------------|--------------|--------------|------------------|-----------------|
| | Latitude | Longitude | Latitude | Longitude |
| 9L | E=1094729.90 | N=1943884.26 | 42°00'10.19569" | 87°53'36.69510" |
| 27R | E=1102229.84 | N=1943920.38 | 42°00'10.18884" | 87°53'37.35873" |
| 9C | E=1093474.80 | N=1938246.14 | 41°59'14.55571" | 87°53'36.68883" |
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| 4L | E=1098287.10 | N=1936189.13 | 41°58'54.00677" | 87°54'50.08039" |
| 22R | E=1103032.88 | N=1941994.66 | 41°59'51.12456" | 87°53'46.85294" |
| 4R | E=1102278.00 | N=1925879.72 | 41°57'11.96448" | 87°53'37.93119" |
| 22L | E=1107595.79 | N=1931951.47 | 41°58'11.67478" | 87°52'47.12841" |



V. OMP DEVELOPMENT PHASING OPTIONS

1. One vs. Two runways constructed in Phase One

The airlines have requested that we review the operational merits of two possible options for the initial phase of development for runway components of the O'Hare Modernization Program. One option involves development of the independent north 9-27 runway as the initial phase of development. The second option involves development of the independent north 9-27 runway and the closely spaced dependent south 9-27 runway comprising the initial phase of development.

VI. NEXT STEPS