



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

October 29, 2004

Ms. Rosemarie Andolino
Executive Director, O'Hare Modernization Program
City of Chicago, Department of Aviation
Post Office Box 66142
Chicago, Illinois 60666

Re: Aircraft Rescue & Fire Fighting Field Test

Dear Ms. Andolino:

The Federal Aviation Administration (FAA) has been working with the City to evaluate emergency vehicle response times and their conformity to Federal Aviation Regulation (FAR) Part 139, which requires the first vehicle to be at a designated location dispersing agent in three minutes and the remaining required vehicles in four minutes. Specifically of concern to the FAA is the response time from Aircraft Rescue & Fire Fighting (ARFF) Station #2 to the mid-point of the proposed North Runway 9L/27R.

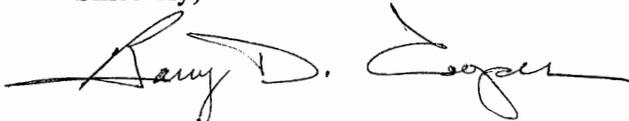
An analysis of response times was conducted by the City using modeling and further validated by the FAA performing a similar analysis. These analyses resulted in vehicle response times that were within seconds of the limits required in FAR Part 139. Therefore, the FAA requested a field test of multiple responses to replicate the proposed distances, approximate number of turns and with several different engineers driving representative response equipment.

In July, the FAA conducted a series of drills at O'Hare to determine the range of response times that could be expected when the proposed North Runway 9L/27R, if approved, is commissioned with the City's planned location of ARFF Station #2. Based on the results of the ARFF test response time runs, the first vehicle did not meet the required three minute response time in three of the four test runs. The run that did meet the minimum response time did so by arriving and dispersing agent at the proper location in exactly three minutes. As part of the certification of the proposed North Runway 9L/27R, the City will have to demonstrate actual response times that meet the FAR Part 139 requirements.

In August the FAA met with representatives of the City and reviewed the assumptions and results of these field tests. The attached document summarizes the background, test development and routings, field test runs and results, along with the conclusion based on the FAA conducted testing.

Please advise the FAA on how the City intends to ensure that the ARFF vehicles will meet the FAR Part 139 requirements. We are available to meet with representatives of your office to discuss this information or to provide any further assistance as necessary. If you have any questions or need further clarification, please contact either Richard Kula of my office at (847) 294-7507 or me at (847) 294-7812.

Sincerely,

A handwritten signature in black ink, appearing to read "Barry D. Cooper". The signature is written in a cursive style with a large initial "B" and "C".

Barry D. Cooper
Manager, Chicago Area Modernization Program Office

Attachment

Chicago O'Hare International Airport

Airport Layout Plan Review – City of Chicago's October 2003 Submittal

Federal Aviation Administration



Summary of:

Aircraft Rescue & Fire Fighting

Field Test Results

DRAFT

October 29, 2004

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

Table of Contents

	<u>Page</u>
I) Background	1
II) Test Development & Routes	3
III) Field Test Runs & Results	4
IV) Conclusions	5
Appendix A	11

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

List of Tables

	<u>Page</u>
1. O'Hare Modernization ARFF Field Test Run Results	6

List of Exhibits

	<u>Page</u>
1. ARFF Conceptual Test Run 3	7
2. ARFF Conceptual Test Run 4	8
3. ARFF Conceptual Test Run 5	9
4. ARFF Conceptual Test Run 6	10

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

I) Background

- ✦ In December 2002, the City of Chicago submitted to the Federal Aviation Administration (FAA) for review a draft Airport Layout Plan (ALP) of Chicago O'Hare International Airport.
- ✦ Over the next several months the FAA reviewed the ALP document.
- ✦ The City's proposed development of Runway 9C/27C and its north parallel taxiway would require the relocation of the existing Aircraft Rescue & Fire Fighting (ARFF) station #2. Located within the northwest maintenance area, this station currently serves as the primary ARFF station for the north airfield.
- ✦ The City of Chicago's December 2002 draft ALP depicted a single replacement site for the north airfield ARFF station, also within the northwest aircraft maintenance area.
- ✦ During its initial review of the December 2002 ALP, the FAA expressed concerns regarding the ability to satisfy the FAR Part 139 minimum emergency ARFF response times from the north airfield ARFF station location. The FAA was especially concerned about response times to the proposed Runway 9L/27R.
- ✦ In response to FAA concerns, the City prepared an analysis of ARFF response times. The methodology and results of this analysis are contained in the City of Chicago's Response to ALP Comments submitted with the revised ALP in October 2003.
- ✦ The FAA also completed an analysis of their own, evaluating the response times in relationship to the requirements established in FAR Part 139.
- ✦ During the months FAA was reviewing the revised ALP and the City's Response to ALP Comments, the FAA coordinated with the City on the ARFF issues.

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

- ✈ In February 2004, the FAA met with the City and discussed the methodology and results of the City's ARFF analysis. The FAA concerns included 1) type of rescue equipment used for the modeling, 2) the need to develop of a contingency plan should response times not meet criteria, and 3) rescue equipment routes which included runway crossings in comparison with existing conditions.
- ✈ In late February 2004, the City submitted an update to the ARFF analysis report incorporating recommended changes to modeling assumptions based on the February meeting.
- ✈ FAA reviewed the revised ARFF analysis report. The FAA determined the report was inconclusive as to whether the modeled response times could be achieved in practice. This determination was based, in part, on the fact that significant variations between equipment operators in acceleration and deceleration rates exist, and driving conditions in actual response situations are highly variable.
- ✈ In June 2004, the FAA formally requested the City perform a series of field tests to better determine the ability of the response team to reach the proposed new north runway within the required time.
- ✈ The remaining sections of this document present the test development, results and conclusion of the ARFF field test.

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

II. Test Development & Routes

- ✦ In the June 2004 letter to the City of Chicago, the FAA outlined basic guidance for use in the development of the field tests. This guidance is described in this section.
- ✦ The City of Chicago worked with the FAA to define the test routes that incorporate the following characteristics:
 - ✦ Representative distance;
 - ✦ Approximate equivalent number of turns;
 - ✦ Approximate equivalent surface types (taxiway, runway); and
 - ✦ Representative runway crossings.
- ✦ The City of Chicago (Ricondo & Associates) developed the field test run routes, and the FAA reviewed and subsequently accepted the routes.
- ✦ **Exhibits 1 through 4** depict the FAA accepted ARFF rescue response routes. The exhibits illustrate test run routes 3, 4, 5 and 6. Test run routes 1 and 2 were earlier versions of 3, 4, 5 and 6 that were modified and not carried forward for actual field testing.
- ✦ Upon agreement of the field test routes, the City of Chicago worked with the FAA to schedule up to six field trial tests, utilizing up to six different Chicago Fire Department (CFD) engineers.
- ✦ Upon the development and agreement upon the assumptions for the field test, the FAA conducted the trials and the results of this analysis are presented in **Section III – Results**.

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

III – Field Test Runs & Results

- ✦ On July 21 and July 22, 2004, the FAA conducted the field test runs. This section presents to the results of the tests.
- ✦ Rescue 1 and Rescue 2 personnel at Chicago O'Hare International Airport performed the test runs during daylight hours and dry pavement conditions.
- ✦ Three vehicles participated in each test run, including one Oshkosh Striker 3000.
- ✦ The CFD personnel who participated in these field test runs were not notified in advance.
- ✦ When the test began, CFD personnel were given the following:
 - ✦ Instruction to advise when they were ready to receive the route via radio,
 - ✦ The proposed route over the radio,
 - ✦ Time to review the route, and
 - ✦ Direction to advise when they were ready to commence the test runs.
- ✦ Additionally, the CFD personnel were assured prior to commencing the runs that there were no contractors or any other obstructions on the airfield or on the dedicated ARFF road that would affect their run.
- ✦ Finally, CFD personnel did not have to wait for clearance to cross any runway.
- ✦ **Table 1** depicts the results for each ARFF timed test.

**Chicago O'Hare International Airport
Aircraft Rescue & Fire Fighting Field Test Results Summary**

IV - Conclusions

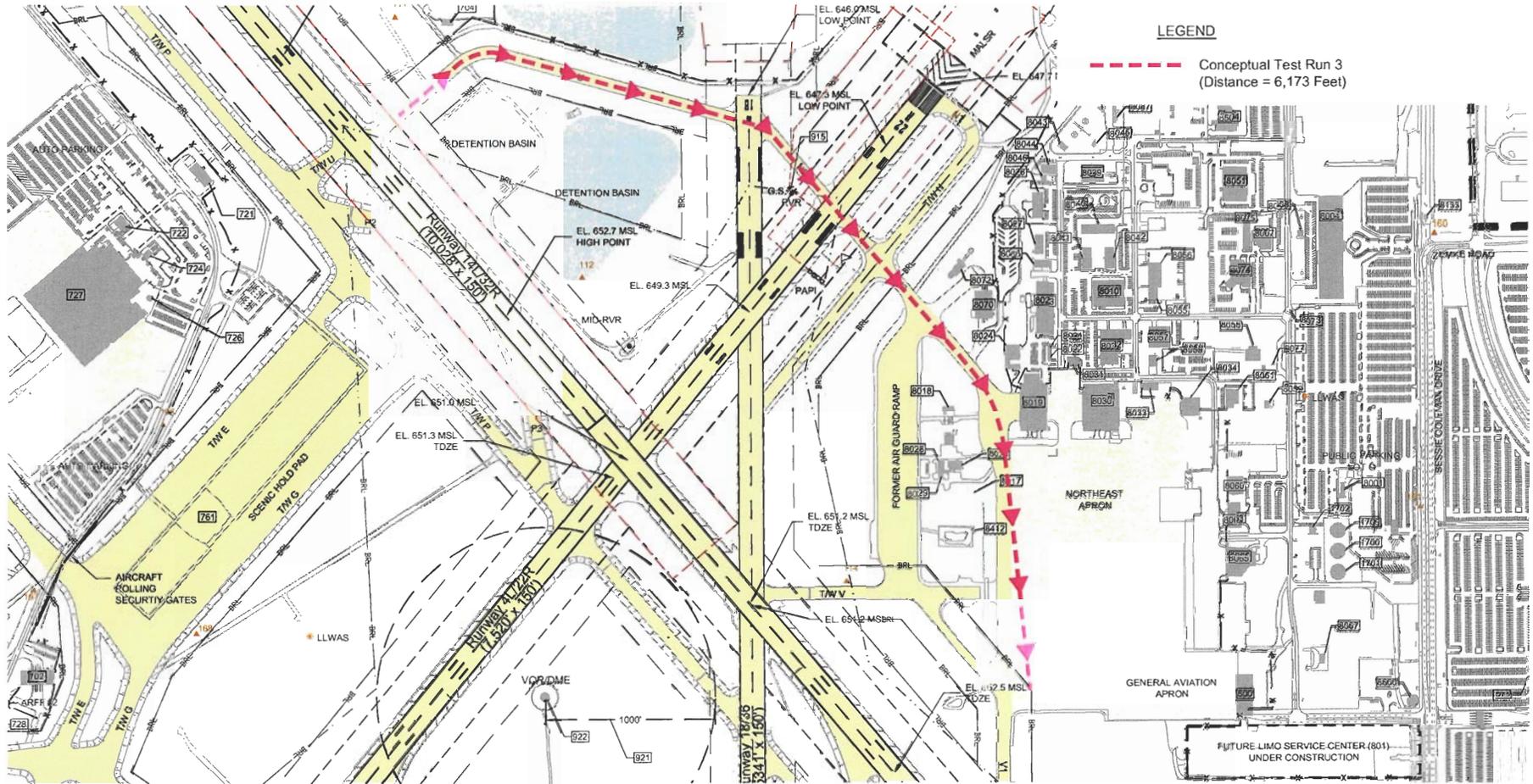
- ✈ Based on the results of the ARFF field test response time runs, the first vehicle did not meet the required three minute response time in three of the four test runs. The run that did meet the minimum response time did so by arriving and dispersing agent at the proper location in exactly three minutes. As part of the certification of the proposed North Runway 9L/27R, and to meet the FAR Part 139 requirements, the Sponsor will have to demonstrate actual response times that meet the necessary requirements.

- ✈ The field test runs represented the distance and approximate turns that are expected, however, they did not factor into account the proposed ARFF roadway and the amount of time it would take each vehicle to cross the various airfield pavement surfaces proposed in Phase 1A.

Table 1
Chicago O'Hare International Airport
O'Hare Modernization Program
ARFF Field Test Runs*

ARFF Field Test No	Predetermined Starting Position	Scene Vehicle #1	Scene Vehicle #2	Scene Vehicle #3	Agent Vehicle #1	Agent Vehicle #2	Agent Vehicle #3
Run 3	Taxiway U North of Runway 14L	01:49	01:53	01:55	02:00	02:03	02:06
Run 4	Taxiway E at Rolling Security Gates	01:59	02:02	02:03	N/A	N/A	N/A
Run 5	Taxiway Z short of Taxiway E	02:14	02:35	02:50	02:25	02:45	02:52
Run 6	Post Office Road abeam 14R Localizer	02:05	02:16	02:18	02:11	02:20	02:21

*Times do not include the assumption that 60 seconds are required from the time the sirens ring to the time the truck rolls, as stated in a Ricondo & Associates Memorandum from Shawn Kinder to Richard Kula dated February 25, 2004, Exhibit 1. Sixty-seconds should be added to the last 3 columns above to determine the overall response time.



LEGEND

--- Conceptual Test Run 3
(Distance = 6,173 Feet)

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

▶ = DIRECTION OF TRAVEL

Exhibit 1

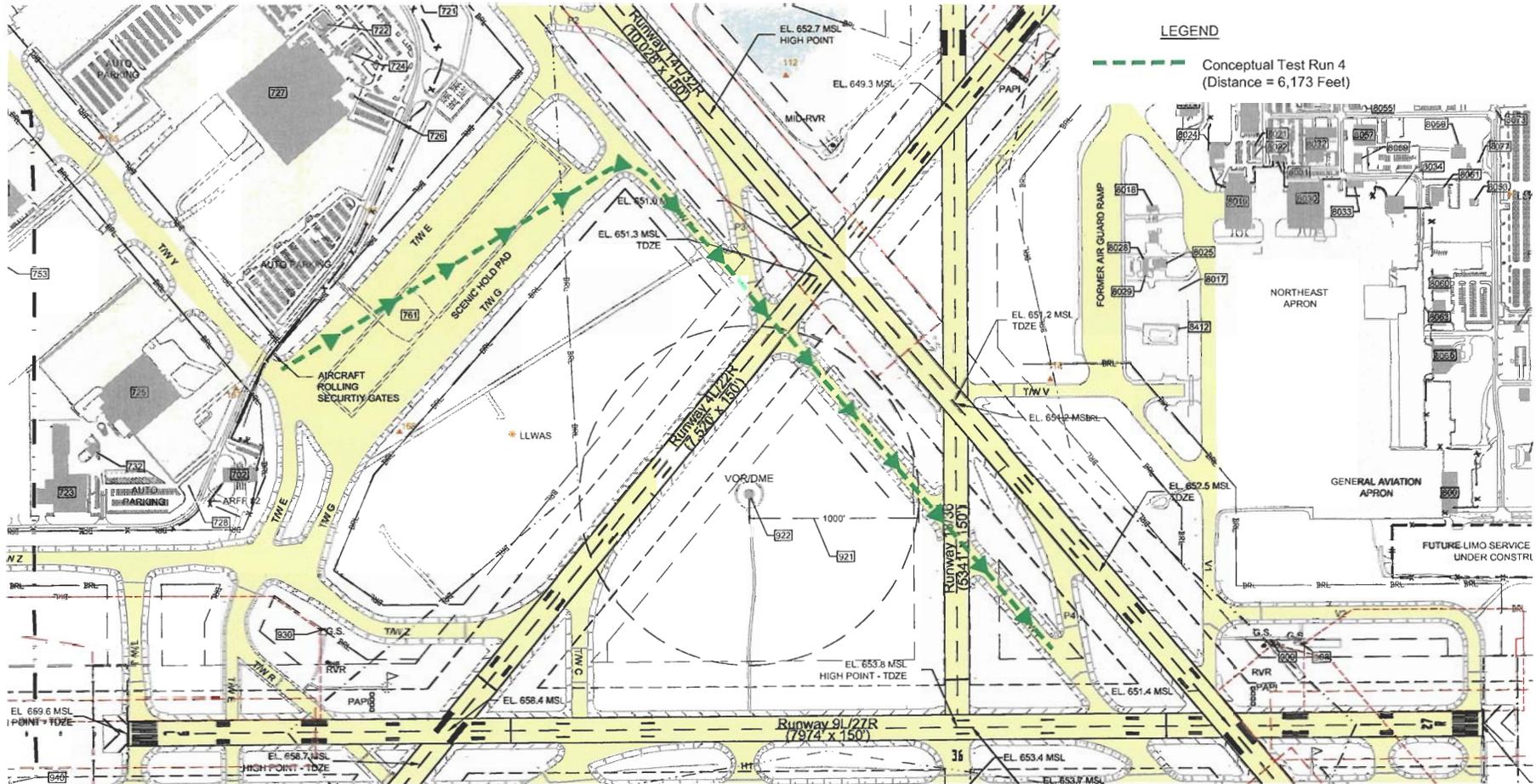


ARFF Conceptual Test Run 3

Drawing: D:\CHare\p\Features\Cad\Airport\ARFF_Conceptual Test Runs\ARFF Routes Modeling\Runs 3, 4, 5, 6-07-02-01.dwg, Layout: ARFF MODEL RUN 3, Oct 20, 2004, 9:58am

Aircraft Rescue and Firefighting (ARFF)

July 2004
DRAFT



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

▶ = DIRECTION OF TRAVEL

Exhibit 2

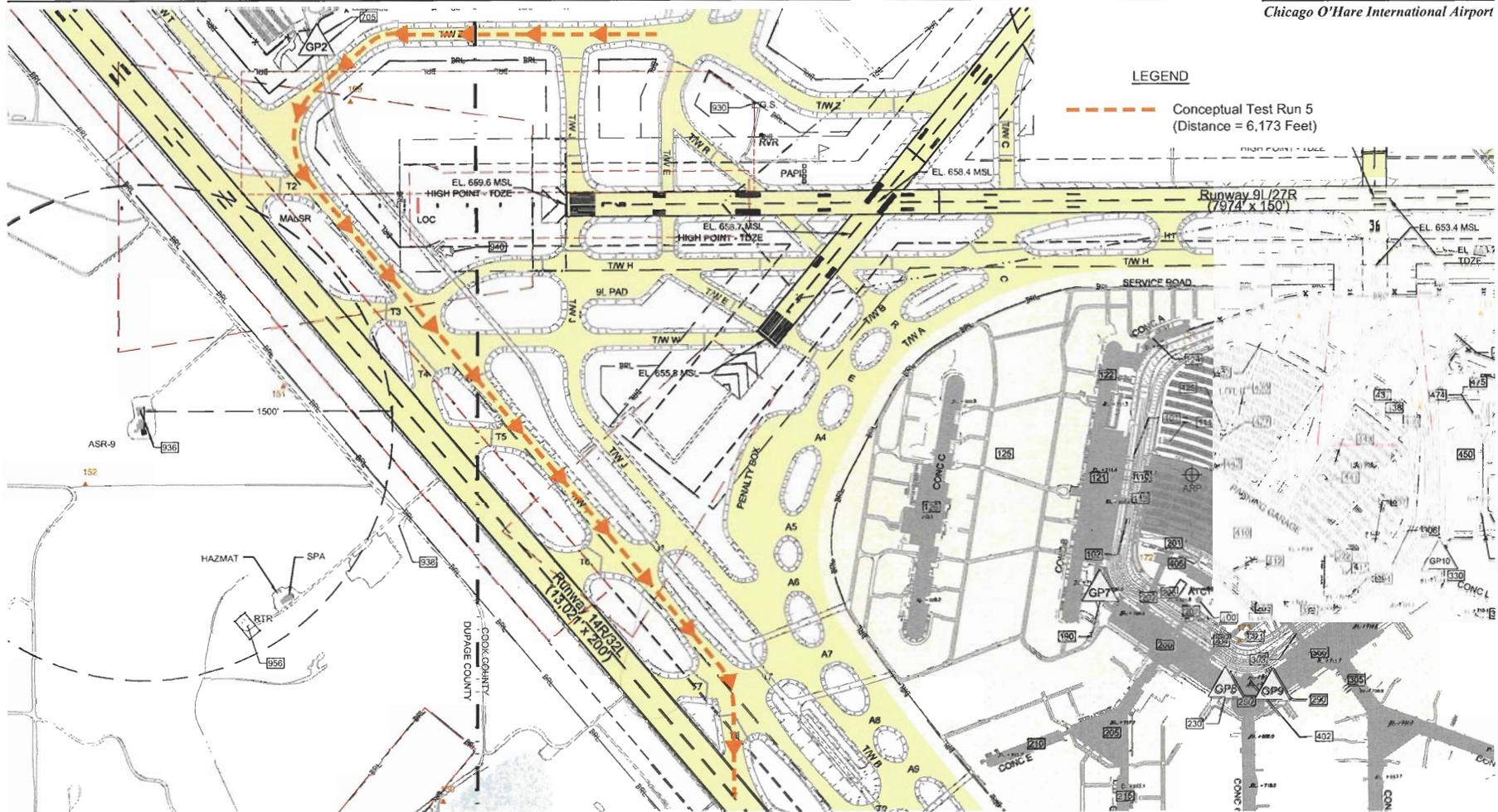


ARFF Conceptual Test Run 4

Drawing: D:\CH\A\A\Features\Cad\Airport\ARFF_Conceptual_Test_Runs\ARFF_Routes_Modeling_Runs_3_4_5_6-07-02-04.dwg, Layout: ARFF_MODEL_RUN_4, Oct 20, 2004, 9:22am

Aircraft Rescue and Firefighting (ARFF)

July 2004
 DRAFT



LEGEND
 - - - - - Conceptual Test Run 5
 (Distance = 6,173 Feet)

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

▶ = DIRECTION OF TRAVEL

Exhibit 3



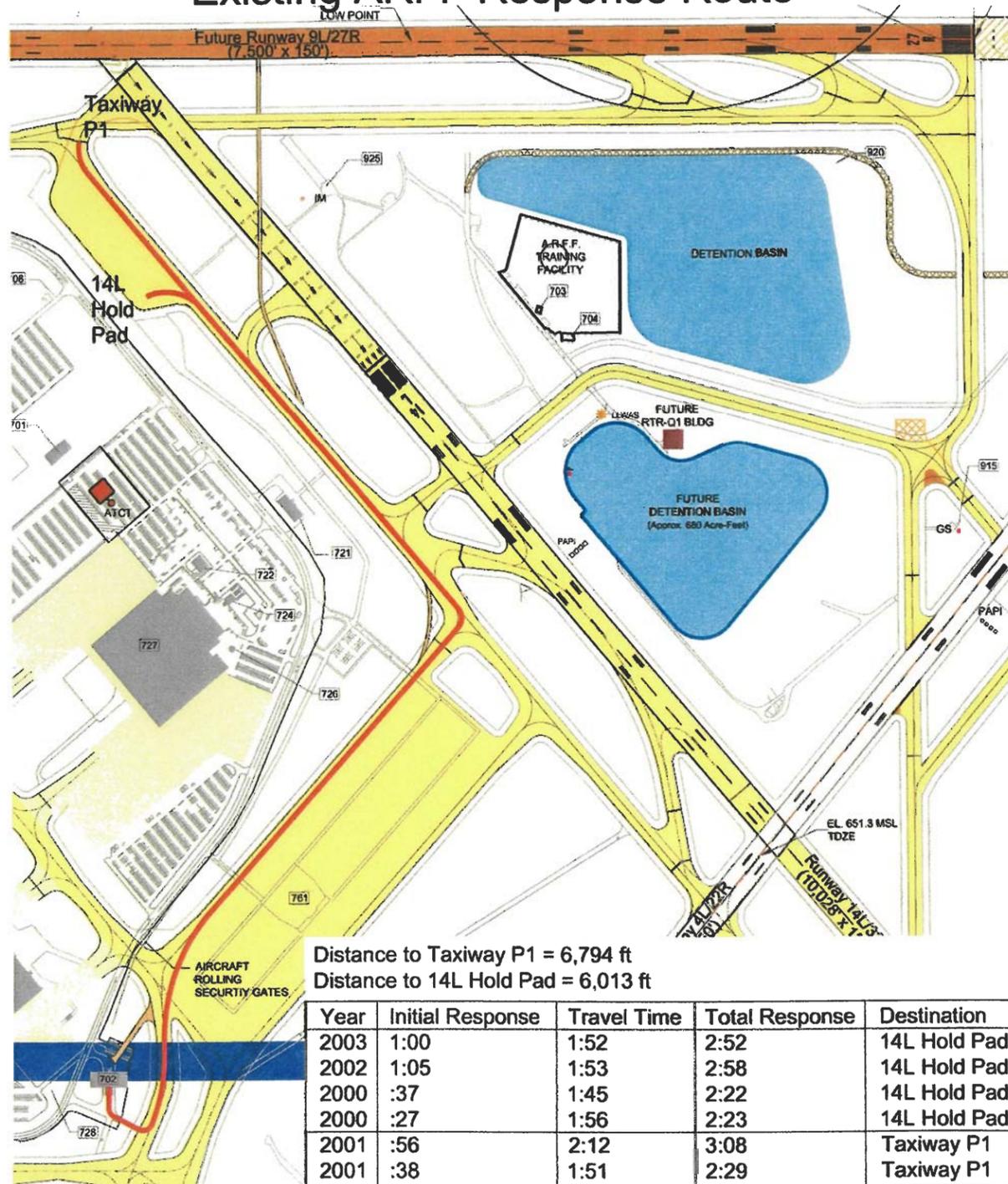
ARFF Conceptual Test Run 5

Drawing: D:\O'Hare\p\features\Cad\Airport\ARFF_Conceptual_Test_Runs\ARFF_Routes_Modeling_Runs_3_4_5_6-07-02-04.dwg_Layout ARFF_MODEL_RUN_5_Oct 20, 2004, 9:24am

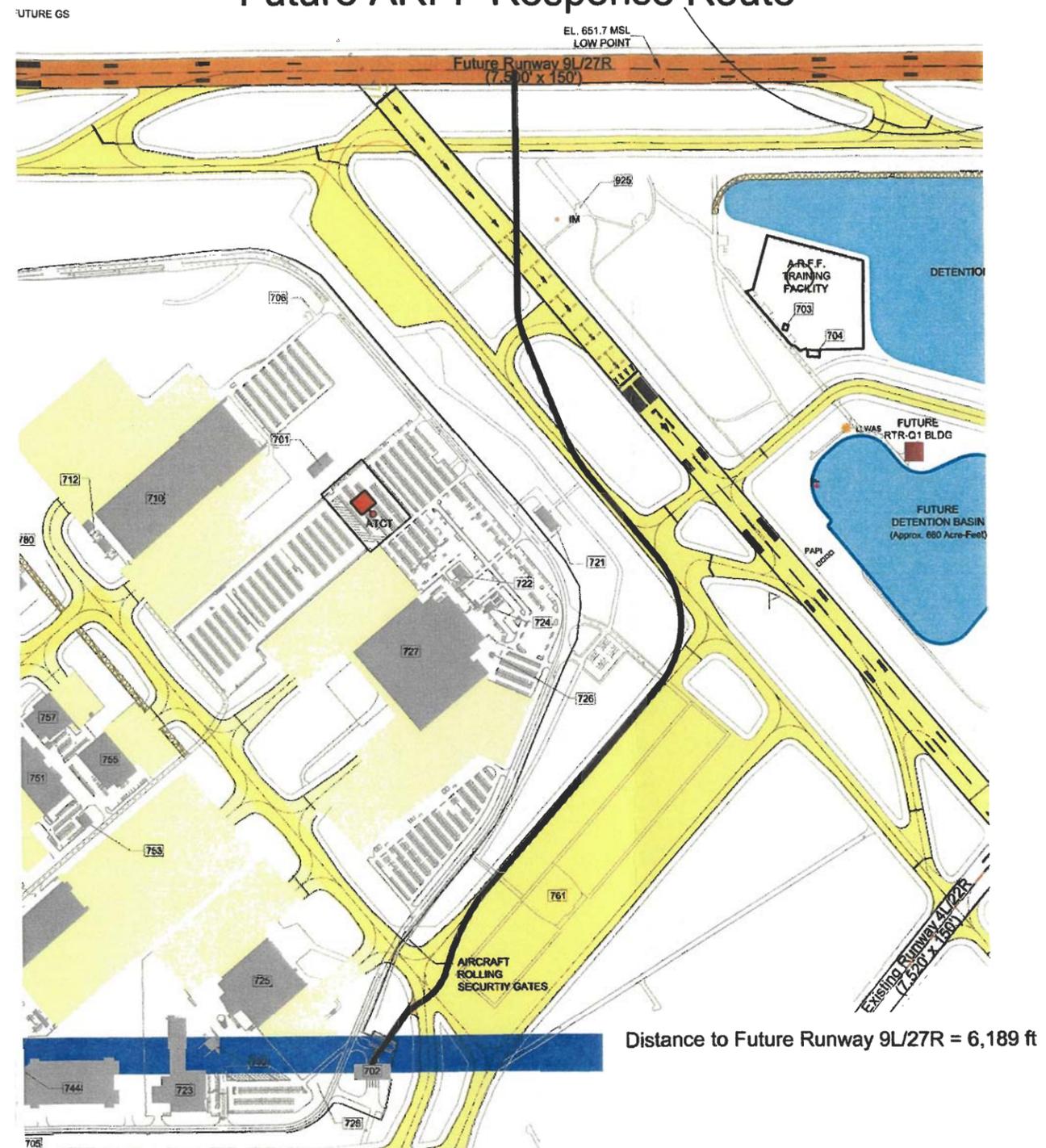
Aircraft Rescue and Firefighting (ARFF)

July 2004
 DRAFT

Existing ARFF Response Route



Future ARFF Response Route



Source: Ricondo & Associates, Inc., Response time data from FAA Airports Division, Great Lakes Region.
Prepared by: Ricondo & Associates, Inc.

Exhibit 3

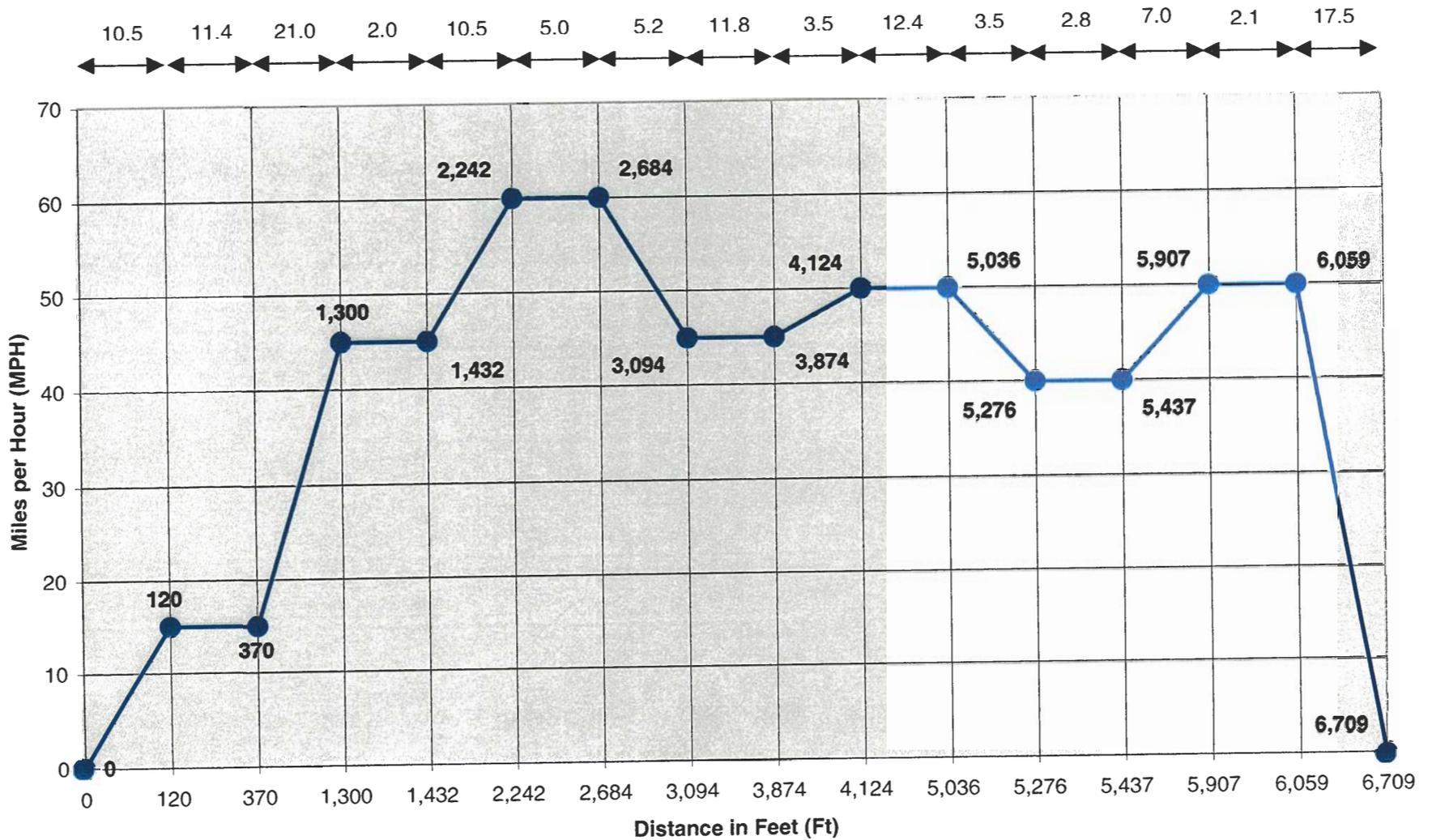


ARFF Existing and Future Response Route

Drawing: Z:\Chicago\ORD\O'MPI\ARFF\ARFF Routes 2-17-04\ARFF Routes- ALP Phase-1-Concept Plan.dwg, Layout: 11X17_Feb 25, 2004, 1:31pm

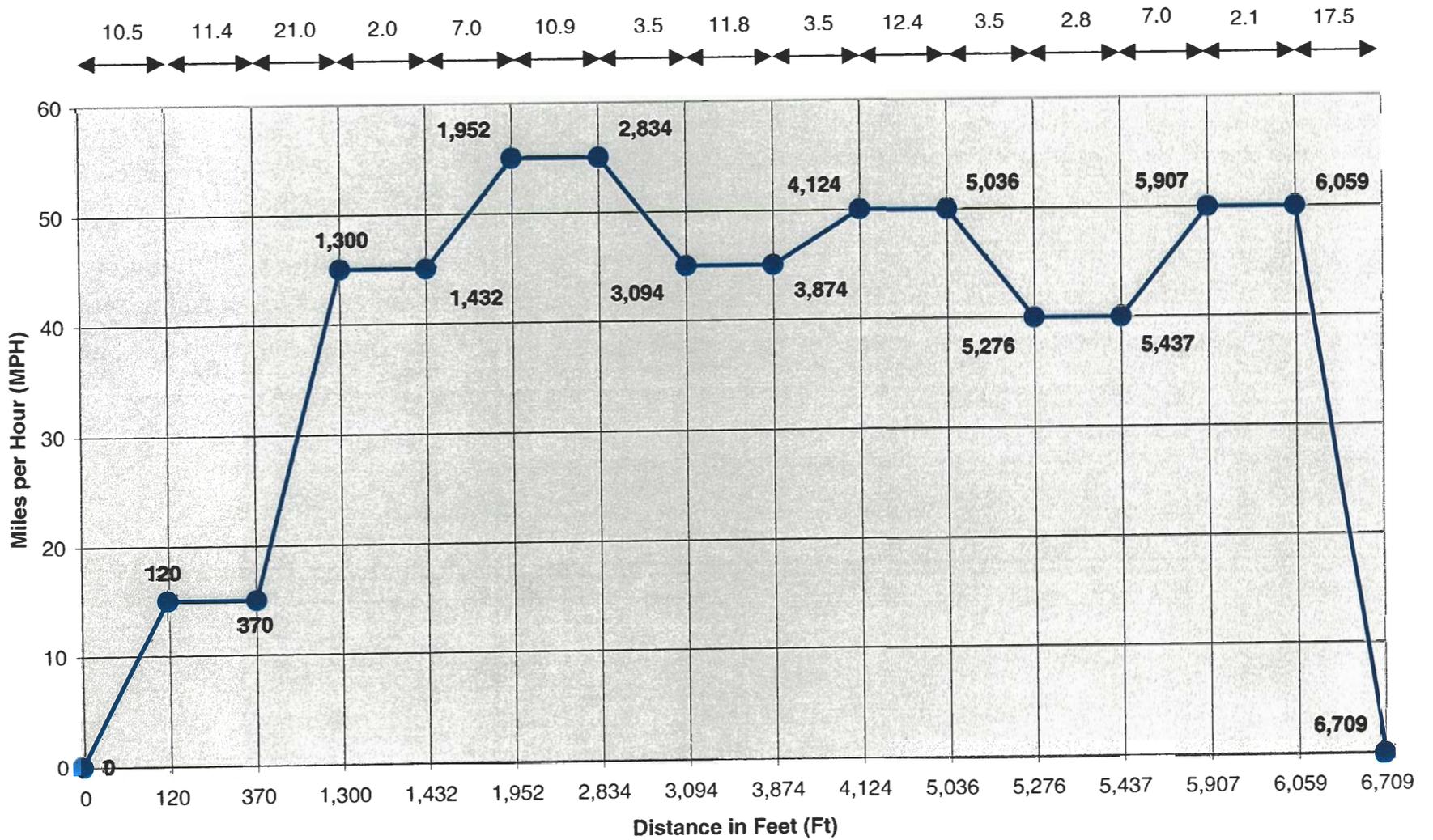
Striker 3000 Max Speed 60 MPH

**Existing ARFF Station #2 South Exit
Striker 3000 Travel Time to Future Runway 9L/27R - 3 min 06 sec**



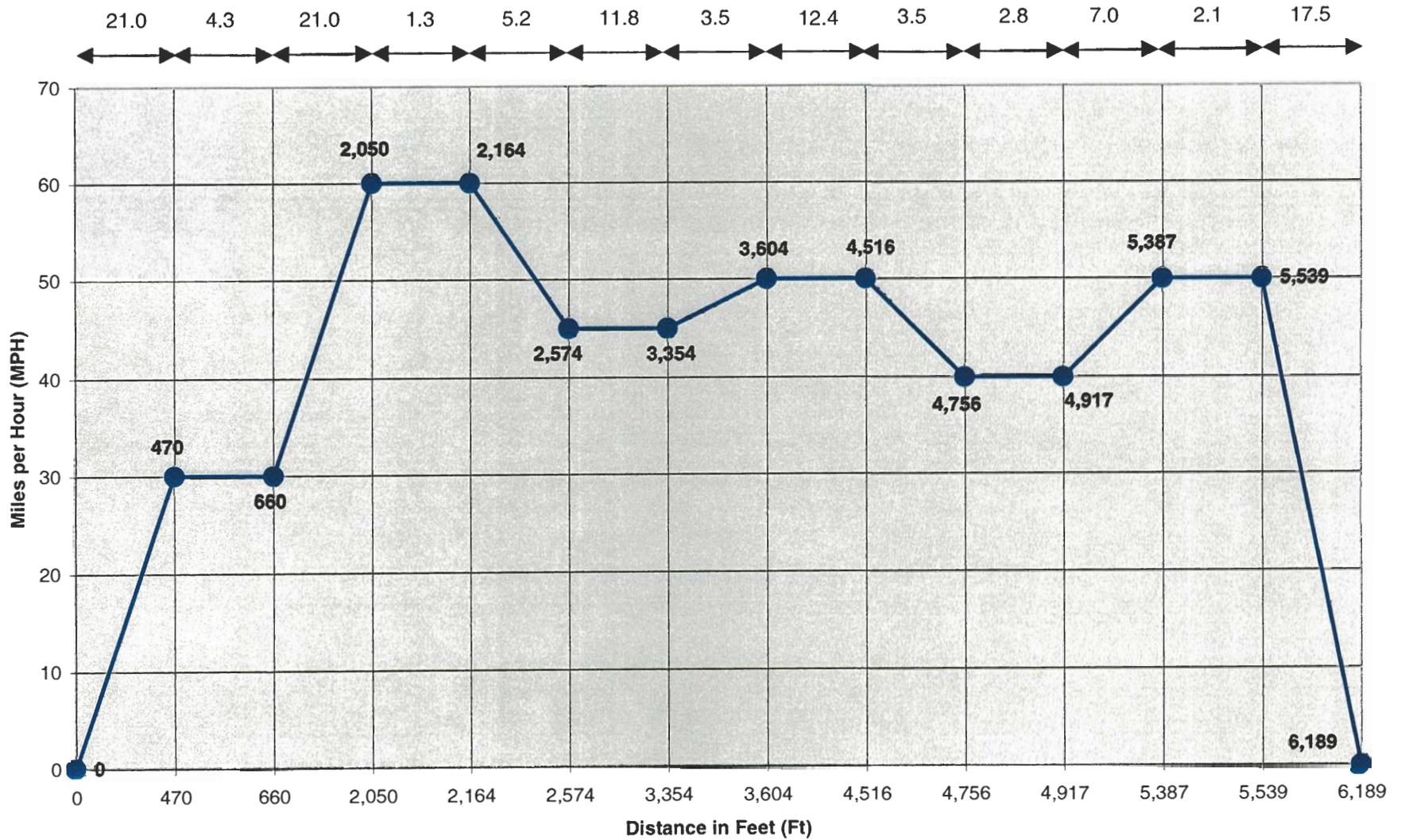
T3000 Max Speed 55 MPH

**Existing ARFF Station #2 South Exit
T3000 Travel Time to Future Runway 9L/27R - 3 min 07 sec**



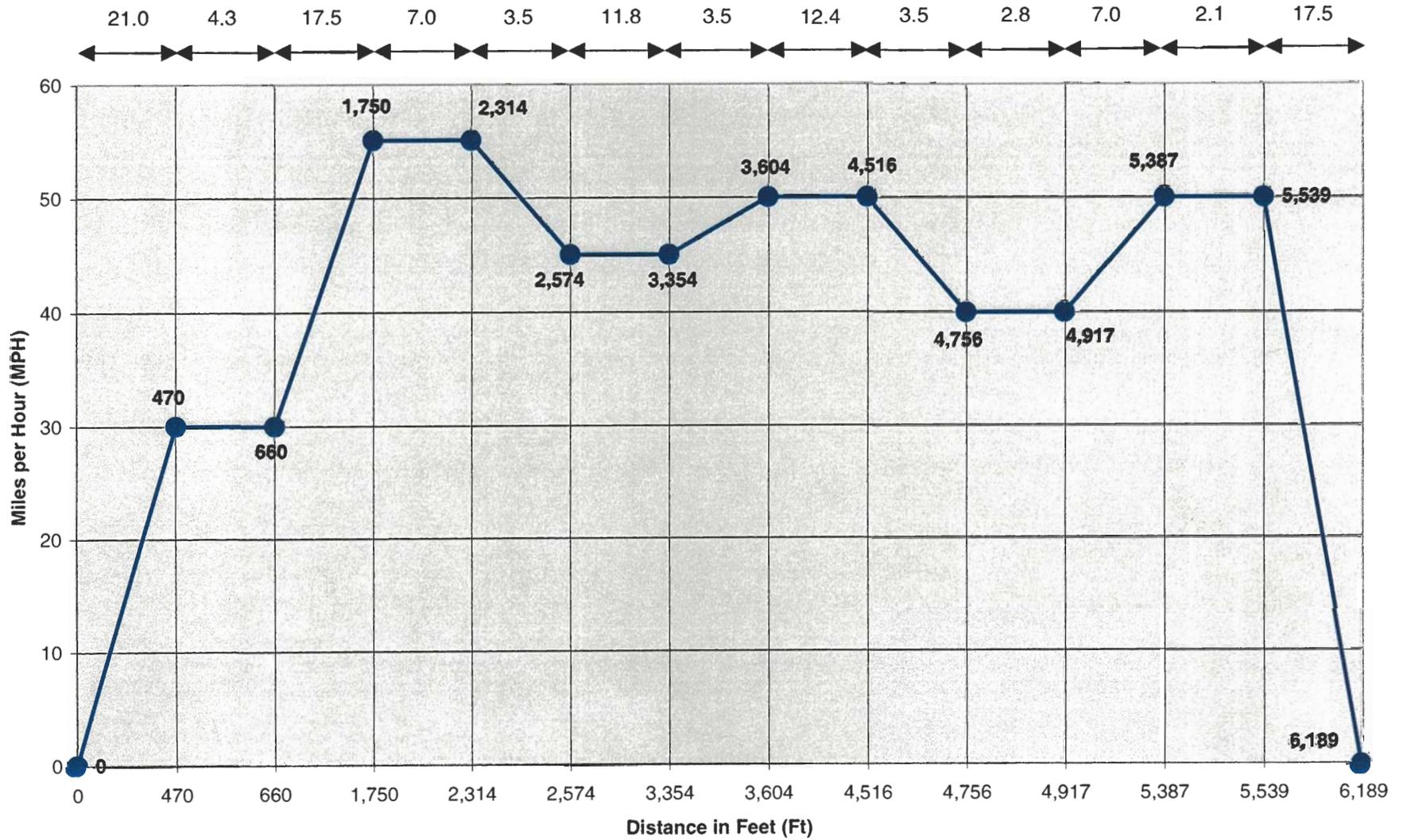
Striker 3000 Max Speed 60 MPH

**Existing ARFF Station #2 North Exit
Striker 3000 Travel Time to Future Runway 9L/27R - 2 min 53 sec**



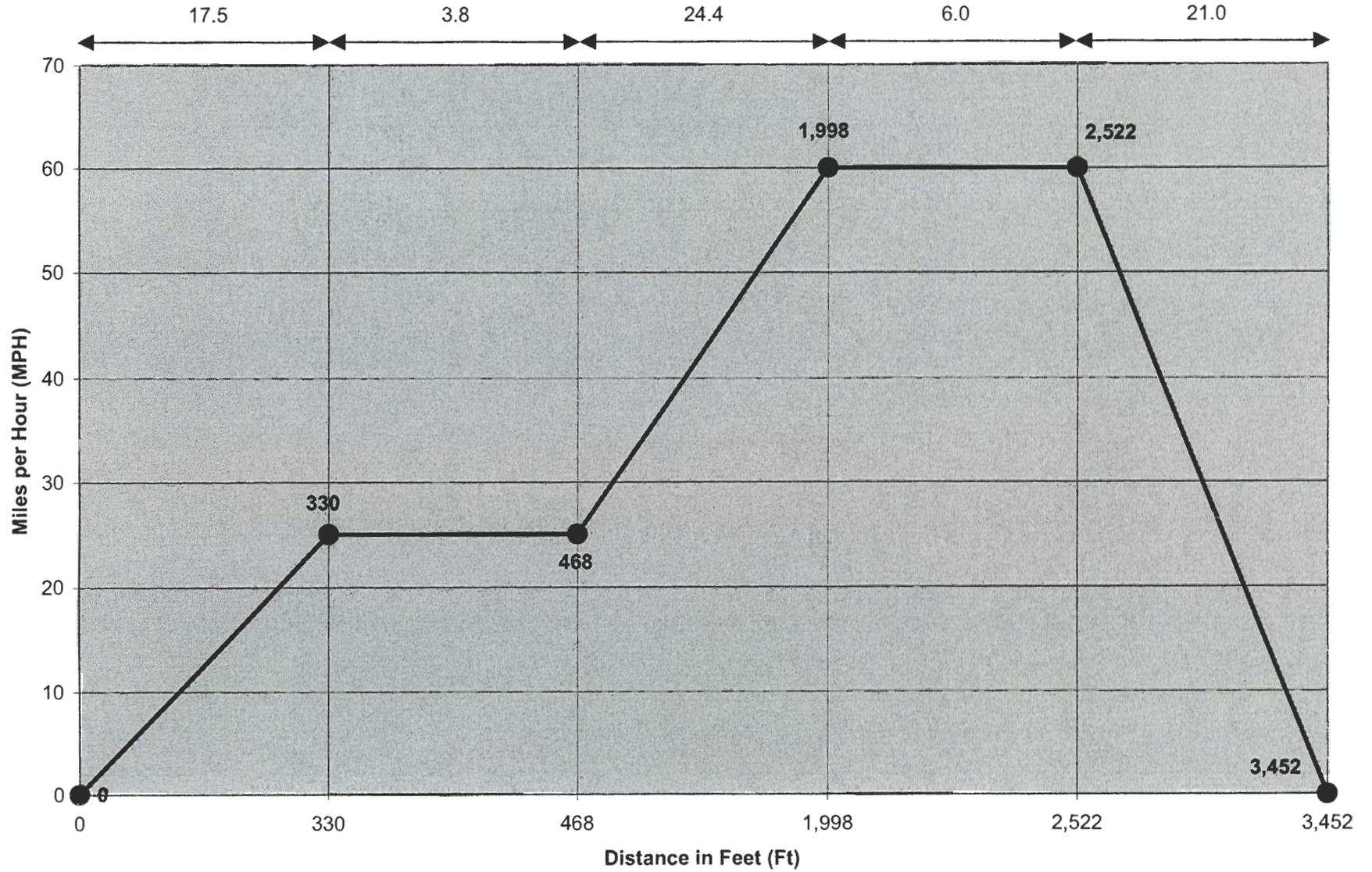
T3000 Max Speed 55 MPH

Existing ARFF Station #2 North Exit
T3000 Travel Time to Future Runway 9L/27R - 2 min 54 sec



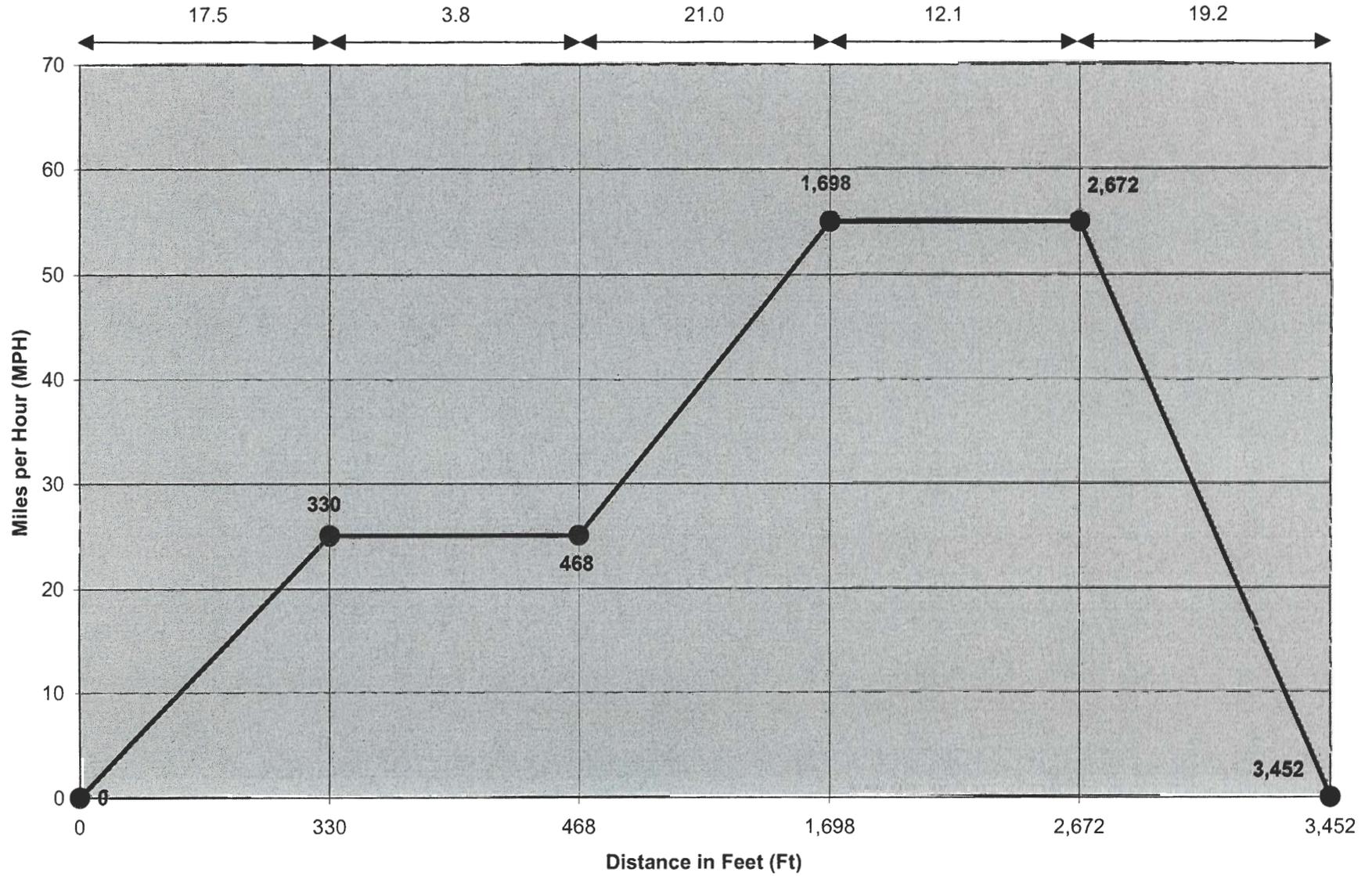
Striker 3000 Max Speed 60 MPH

ARFF Station #2 - Alternative #2 Future Runway 9L/27R - 2 min 13 sec



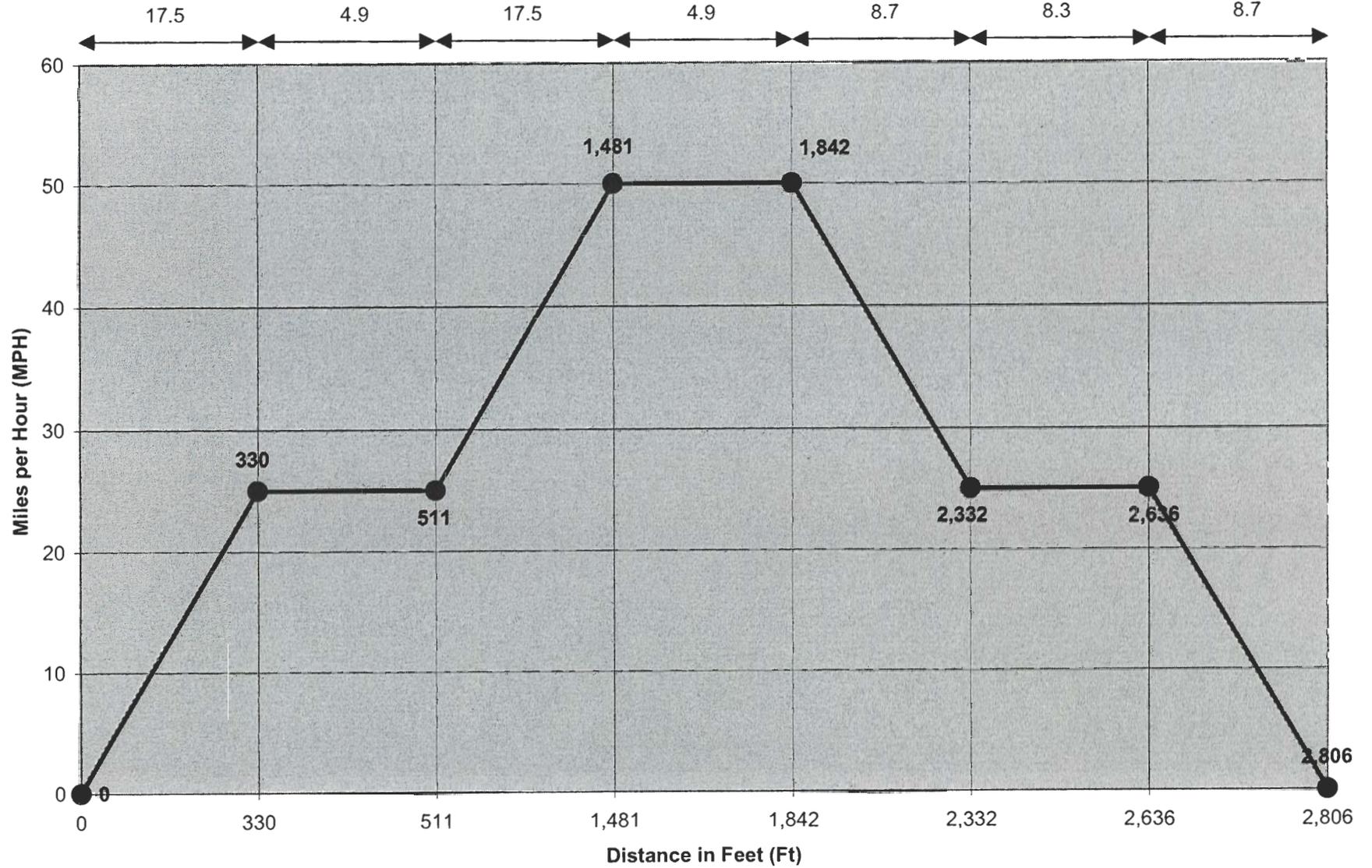
T3000 Max Speed 55 MPH

ARFF Station #2 - Alternative #2 Future Runway 9L/27R - 2 min 14 sec



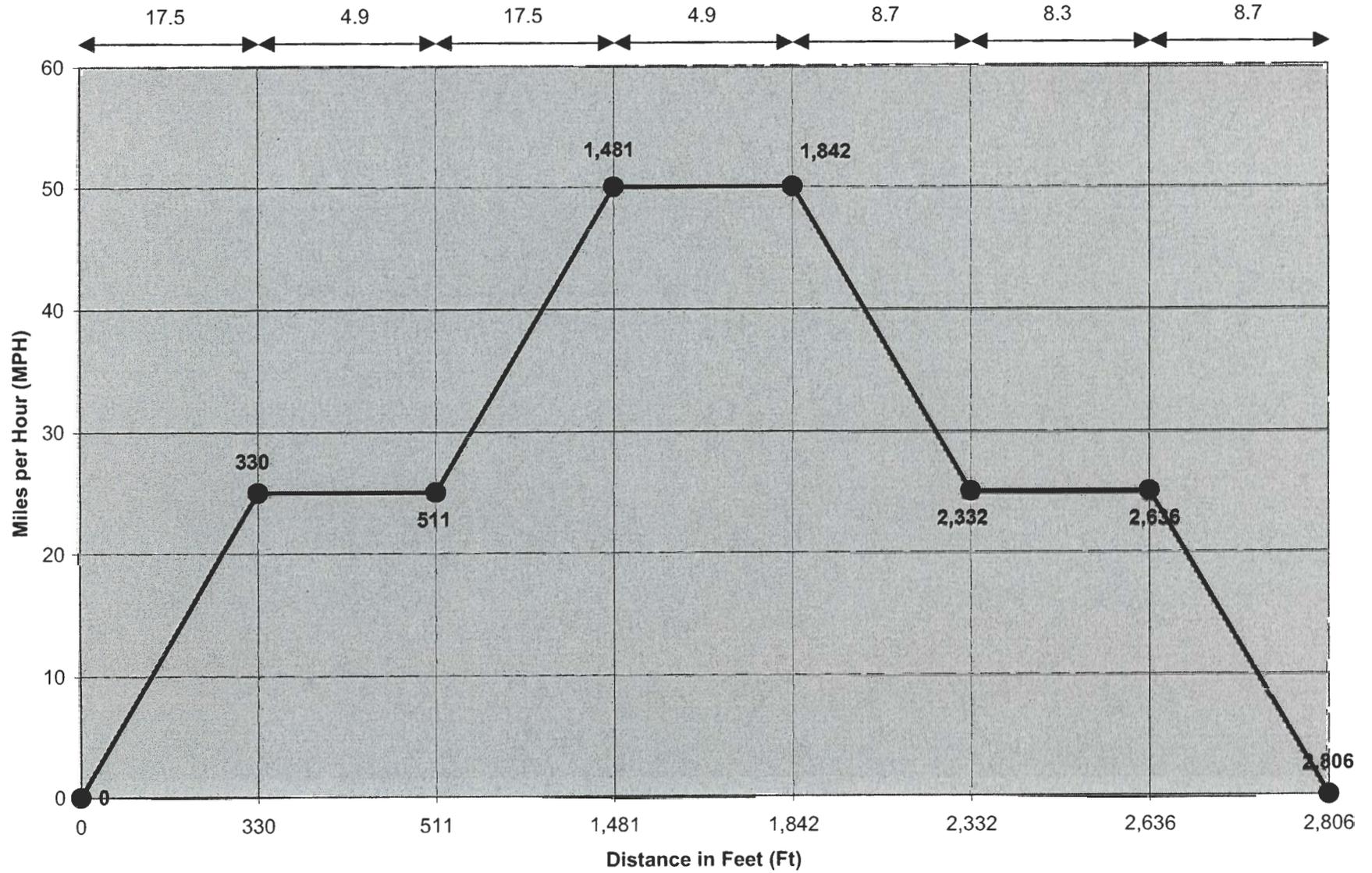
Striker 3000 Top Speed 60 MPH

ARFF Station #2 - Alternative #2 Runway 4L/22R - 2 min 11 sec



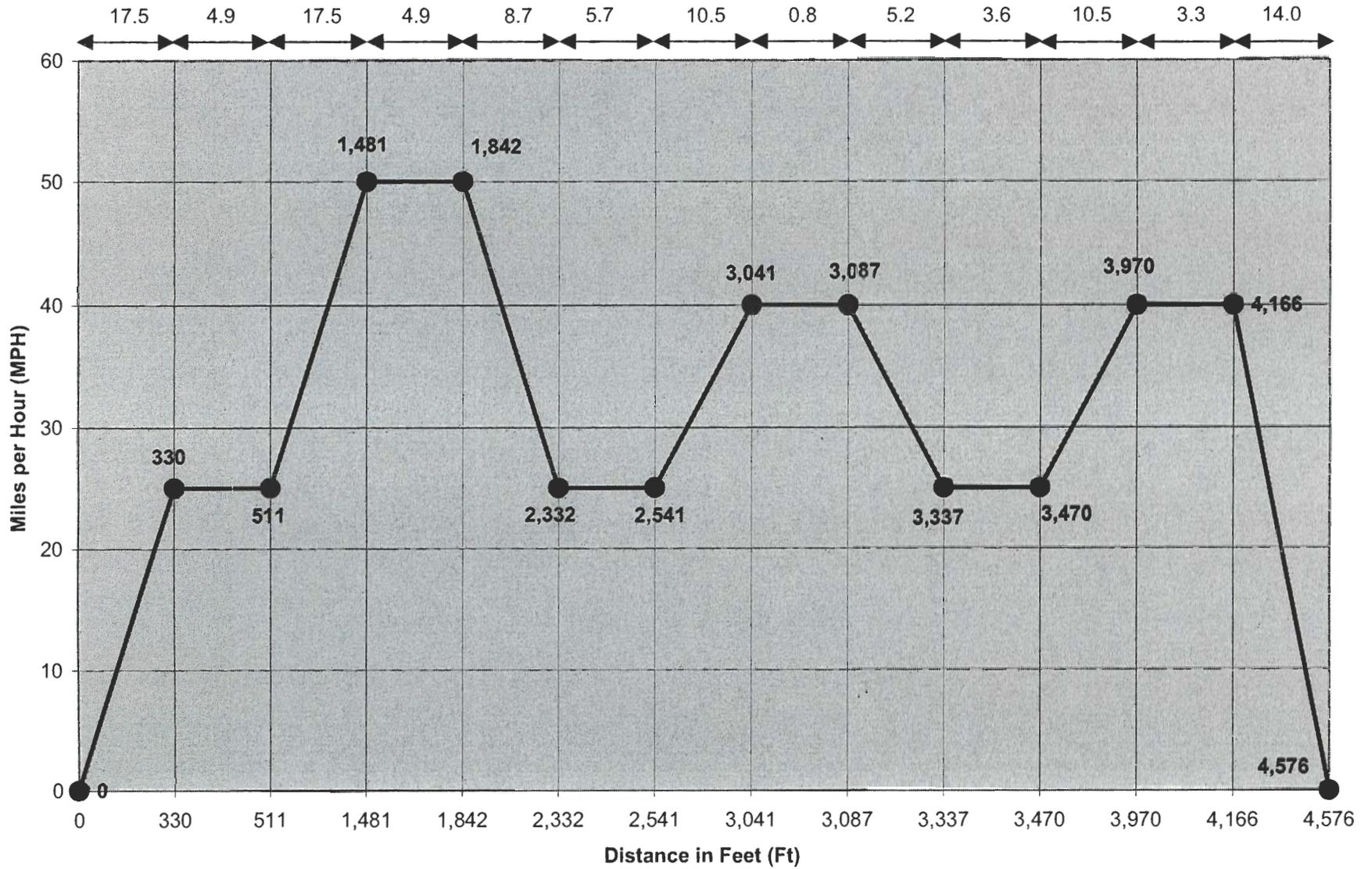
T3000 Top Speed 55 MPH

ARFF Station #2 - Alternative #2 Runway 4L/22R - 2 min 11 sec



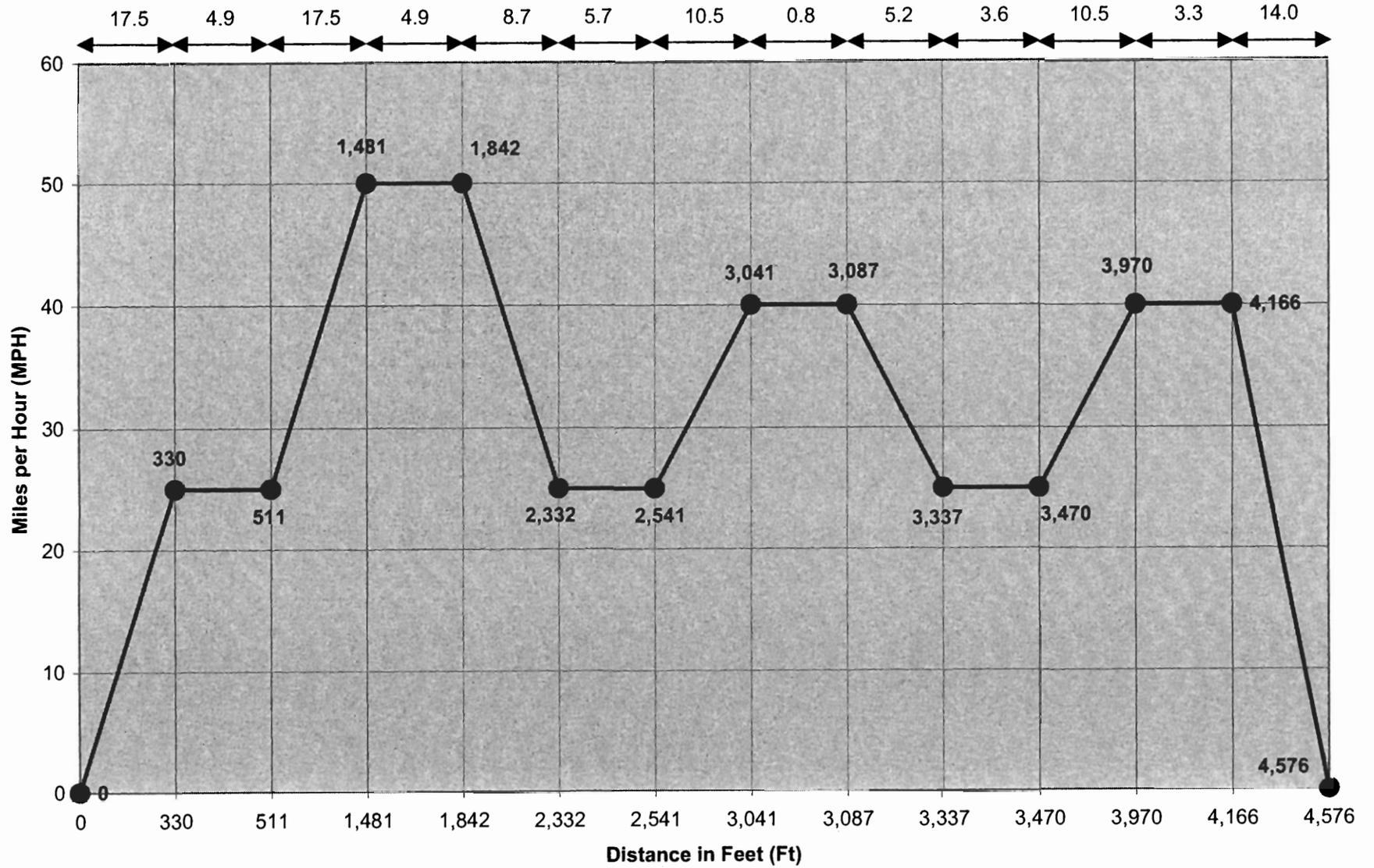
Striker 3000 Max Speed 60 MPH

ARFF Station #2 - Alternative #2 Future Runway 9C/27C - 2 min 48 sec



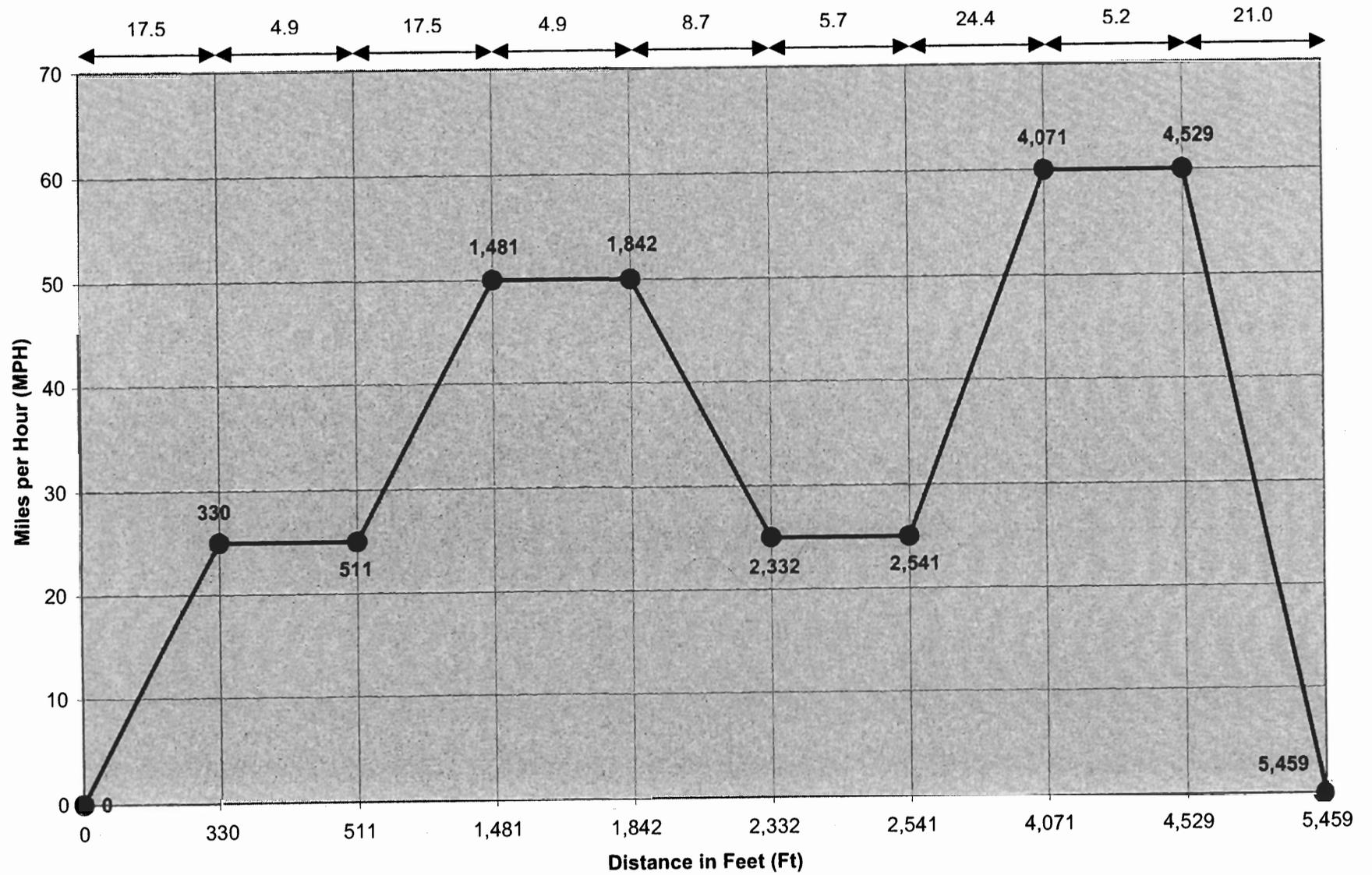
T3000 Max Speed 55 MPH

ARFF Station #2 - Alternative #2 Future Runway 9C/27C - 2 min 48 sec



Striker 3000 Max Speed 60 MPH

ARFF Station #2 - Alternative #2 Future Runway 9R/27L - 2 min 50 sec



T3000 Max Speed 55 MPH

ARFF Station #2 - Alternative #2 Future Runway 9R/27L - 2 min 51 sec

