

# REPORT

WITH SUPPLEMENTS

## LOCATION OF AIRPORT PHILADELPHIA, PA. DISTRICT

DECEMBER 7, 1928

*Ford, Bacon & Davis, Inc.*  
*Engineers*

PHILADELPHIA  
NEW ORLEANS

NEW YORK

CHICAGO  
SAN FRANCISCO



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**LETTER OF TRANSMITTAL**





# Ford, Bacon & Davis, Inc.

## Engineers

39 BROADWAY  
NEW YORK

New York, December 7, 1928.

JOINT COMMITTEE OF THE CHAMBER OF COMMERCE  
AND THE REGIONAL PLANNING FEDERATION ON  
AIR TERMINAL SURVEY, PHILADELPHIA, PA.

DEAR SIRs:

In accordance with our agreement with you of September 27, we have made a study of airport location and facilities for the Philadelphia District. We submit herewith our report of this study and summarize herein some of its principal features. The report covers:

1. A comprehensive study of the general and technical requirements of airport facilities for the district.
2. A comparative study of the various available locations for airports.
3. Conclusions as to the most advantageous location and development.

### PROSPECTIVE GROWTH OF AVIATION MAKES LARGE SCALE PLANNING NECESSARY

Air traffic has in the last few years increased at a very rapid rate as is shown by statistics of American and foreign operations. In particular the demonstration of the reliability of airplanes by the United States Post Office Department, by the foreign transport lines and by spectacular flights, has stimulated this growth. One of the greatest obstacles to the growth of air traffic is the lack of adequate airports. With the provision of airports generally throughout the country, the future growth of air traffic should be even more rapid. The great volume of air traffic that the future will provide makes it necessary to plan on a corresponding scale.

### PHILADELPHIA HAS PROMINENT PLACE IN AVIATION

Philadelphia, located in a thickly populated, wealthy, industrial section, is well situated to benefit by the development of air traffic. Conditions for flying are much more favorable at Philadelphia than at points further north and east, and nearer the Atlantic coast, on account of the greater freedom from fog, wind and snow. In particular, wind storms are of much less frequency and intensity. Important aviation interests are located in the Philadelphia District and the district should receive full benefit from the growth of air traffic, not only in the improved facilities for travel but also from the manufacture and operation of aircraft.

### SYSTEM OF AIRPORTS MUST BE PROVIDED

The large extent of the Philadelphia District makes it impossible for any location to be easily accessible to all sections. The volume and variety of the traffic to be accommodated will also require more than one airport. These requirements make it clear that we must

REPORT - LOCATION OF AIRPORT, PHILADELPHIA DISTRICT

look toward a system of airports or fields. Such a system should consist of a principal airport easily accessible from the central business district and be capable of furnishing facilities for all essential traffic that may be expected, particularly transport lines, together with supplementary airports located where local or special traffic may require.

RECOMMENDED SITE FOR PRINCIPAL AIRPORT

In going about the problem of determining upon the best location for the principal airport in the Philadelphia District we have examined the existing fields, as well as all other sites that have been suggested, and have made a careful study of the topography and building development generally, within ten miles of Philadelphia City Hall, in order to find that location which would answer the requirements in the highest degree. In view of the fact that a clear area not less than 3,000 feet across in all directions with additional adjoining areas for auxiliary facilities should be provided, there are comparatively few acceptable locations. Next to ample area, the most essential requirements are freedom from fog, freedom from present or prospective future obstructions to flight, and accessibility to the central business district.

Our study of the territory has resulted in finding a most favorable location near the town of Springfield, in Delaware County. This site is distant eight miles west-southwest from the City Hall. It is 32 minutes by automobile from the City Hall, and 12 minutes by automobile from 69th Street Station of the Market Street Elevated-Subway line. It lies generally at an elevation of 250 feet above sea-level which makes it comparatively free from fog and haze which often overlie the river and lowlands adjoining. The ground slopes away on all sides so that there is little danger of impairment of the field by the future building of high structures on the surrounding land. An area of 400 acres is readily available and the topography is such that runs of 3,000 feet in all directions and 3,600 feet in the directions of the prevailing winds can be provided.

The drainage and soil conditions are excellent. Considering its nearness to the center of the city, the probable cost of the land, together with the cost of grading, is moderate. This location is far superior to any other in the Philadelphia District that has been under consideration. It compares favorably with and in some particulars is superior to the airports of the larger European and of other American cities.

Our report includes a preliminary plan for the development of the field, and a workable layout for the buildings and auxiliary facilities. These structures and facilities, together with the preparation of the field, are estimated to cost approximately \$707,000. No definite prices on the land were obtained, but from data which you have submitted to us it would appear that the property should be purchased for about \$1,000,000, making a total estimated cost of approximately \$1,707,000.

GENERAL

Airports may be classified by their use and control as, Federal, Private and Municipal.

Federal airports are limited under the present policy of the Government to those used by the Army and Navy and are not available for civilian use.

## REPORT - LOCATION OF AIRPORT, PHILADELPHIA DISTRICT

Private airports are in general provided for the preferential use of one or more operators of aircraft and are not generally available to the public. They are usually remote from the business district and must be considered temporary in character, as they can be expected to continue only so long as no other use of the property is more profitable to the owner.

Municipal airports are provided to serve all classes of traffic which may be of value and advantage to the public and are intended to furnish such facilities reliably and permanently. A municipal airport should be so managed as not to injure the business of private airports but at the same time to be available to the public for all classes of service not inconsistent with the best use of the airport.

This investigation has been directed particularly to the airport requirements of the district for public purposes, the necessary facilities to be provided under municipal or community control.

### SUPPLEMENTARY AIRPORTS

Certain classes of traffic will probably require airport facilities specially accessible to the central business district, even though less advantageous in other respects. Private interests are promoting a terminal to be known as the "Central Airport" to be located in New Jersey just east of the city limits of Camden on Crescent Boulevard at its intersection with Kaighn's Avenue. This site is very desirable for an airport for this purpose and will, in addition, serve the local traffic of the Camden section. It is desirable that this site be preserved for use as an airport and its use by the public assured. To this end the air approaches should be protected from obstruction and if possible arrangements should be made for its permanent use.

Traffic will develop at different points in the district and require the construction of airports to conveniently serve the traffic.

It is probable that lighter-than-air ships and seaplanes will, in the future, be used in commercial service overseas, coastwise and along important waterways, but the extent of the traffic and method of operation are too uncertain to permit any provision for terminals at this time. The terminal requirements of land planes, seaplanes and airships are different and inconsistent. In the Philadelphia District it is not desirable at this time to provide terminals for combined use. The most desirable location for a port for seaplanes is near the junction of the Schuylkill and Delaware Rivers. Only a small area of land is needed, which should be easily accessible to the central business district and free of obstacles in the air approaches.

### CONTROL AND MANAGEMENT

Airports are of a public utility character, somewhat similar to marine ports and highways. Unlike highways, airports will receive a direct return in revenue for their use. Under sound management revenues may be large, though a full return on the investment should not be expected in the near future.

REPORT - LOCATION OF AIRPORT, PHILADELPHIA DISTRICT

A public authority should be established for the control and development of airports in order that all parts of the district shall be provided with facilities as required.

The operation of the principal airport and supplementary airports that may be established will constitute a business of importance and should be provided with a first-class, efficient management to assure satisfactory service and results.

Very truly yours,

FORD, BACON & DAVIS, INC.

# REPORT



# Report

## Location of Airport, Philadelphia, Pa., District

December 7, 1928

### General Considerations

This report covers:

1. A comprehensive study of the general and technical requirements of airport facilities for the Philadelphia District.
2. A comparative study of the various available locations for airports.
3. Conclusions as to the most advantageous location and development.

In the study of airport requirements it was recognized that airports may be classified by their use and control as

1. Federal (Governmental)
2. Private
3. Municipal

Federal airports, under the present policy of the government, are limited to the requirements of the Army and Navy and are not available for the use of civilian operators of aircraft.

Private airports are in general provided for the special or preferential use of an operator or group of operators of aircraft and are not available for the general use of the public. Their location is usually remote from the central section of the city and they must be considered as temporary as they can be expected to continue only so long as no other use of the property is more profitable to the owner.

Municipal airports are provided to furnish facilities to all classes of traffic which may be of sufficient value or advantage to the public and are intended to furnish such facilities reliably and permanently.

The purposes of airports of these classes are distinct and, while the private and municipal airport functions may overlap, in some particulars the operation of a municipal airport should result in benefit to all private interests in aviation not only in furnishing facilities needed by the operators but by stimulating the use of aircraft and interest in aviation. A municipal airport should be so managed as to encourage the provision of additional airport facilities and should not compete with private airports.

This investigation has been directed particularly to the airport requirements of the district for public purposes, the necessary airport facilities to be provided under municipal or community control.

Airport facilities are of a public utility character and partake somewhat of the nature of marine ports, but even more so of the nature of highways. Unlike highways the airports will receive a direct return in revenue from the use of the facilities. These revenues will result from:

1. Charges for the use of the airport by transport lines and other operators of aircraft and for the handling of passengers and cargo.
2. Rentals of space or buildings for offices, storage of equipment, studios, sales facilities, etc.
3. Repairs to aircraft, etc.
4. Sale of gasoline, lubricants, supplies, parts and equipment.
5. Service to the visiting public viewing the operations in pavilions, restaurant, field, etc.
6. Public automobile garage, parking, supplies, etc.
7. Rentals of land for factories, shops, hotels, residences, etc.

Under sound management the revenues will probably be large though they are not likely to be a full return on the investment, at least for some years.

In order that airport facilities will be provided for the district in an orderly manner as the requirements develop, that the airports will be managed to be of greatest advantage to the community and that the charges will be equitably fixed and revenues properly collected and administered, a capable management must be provided. This management should control all of the municipal airport facilities of the district and in the future may, in the interest of the public, have regulatory authority over the rates and service of private airports serving the public.

The results of this investigation are presented under the following principal headings:

Air Traffic  
Necessity for Public Airports  
Airways  
Philadelphia in Air Traffic  
Flying Fields in Philadelphia and Vicinity  
Need for Better Airport Facilities  
Airport Requirements of the Philadelphia District  
Authority to Control Airports  
Air Traffic to be Accommodated  
Uses of Airports  
Requirements of a Principal Airport  
Air Traffic Center  
Meteorology  
Investigation of Sites  
Most Desirable Site  
Proposed Plan for Airport  
Proposed Present Development  
Proposed Future Development  
Cost of Proposed Airport  
Supplementary Airport of Maximum Accessibility  
Conclusions  
Exhibits

### Air Traffic

After the war, with the experience and research of that period available, the economic value of the airplane in commerce and industry was promptly recognized and aircraft manufacturers began to develop types of airplanes for commercial purposes of much greater efficiency and usefulness. The use of aircraft for purposes other than military developed slowly from small beginnings until the operations of the Post Office Department demonstrated the commercial reliability of air travel.

During the last few years, the encouragement of the Federal Government in providing information, supervision, airways and important facilities, together with the record of European commercial air traffic and the spectacular demonstration of reliability in long flights, have resulted in a tremendous growth in the manufacture and use of aircraft.

This growth is indicated by statistics compiled by the U. S. Department of Commerce which show that there are now in regular operation about 15,000 miles of airways on more than 12,000 miles of which air mail is carried. The mileage flown daily with mail is in excess of 27,000 and the total distance flown daily on those airways is in excess of 40,000 miles.

The above statistics refer to the transport lines only. It is estimated that the air service operators are flying several times as much mileage as the transport operators.

The record of the air mail is to the same effect. During the first six months of 1928 nineteen air mail routes carried 1,054,729 pounds of air mail compared with 1,449,364 pounds carried by air by the Post Office Department and fifteen contractors during the entire year 1927. In 1928 for January the total poundage on these routes was 144,680; for June, the last month of the half year, 211,627. For August, the first month of reduced postage rates, the poundage increased to 419,047.

The production of planes shows a somewhat similar growth. The production for 1921 was 302 planes, for 1926 it was 1,186 planes and for 1927 it was 1,995 with a much greater growth indicated for 1928.

### Necessity for Public Airports

One of the greatest present obstacles to the growth of air traffic is the lack of suitable airports. Operating airplanes without satisfactory terminals, safe, convenient and of sufficient capacity may be compared to the use of automobiles without good roads. The growth of airplane traffic is controlled by the extent to which airports are available.

Air mail routes have been established to serve definite sections of the country, and terminals temporarily sufficient for this service have been provided in order to permit air mail operation. Passenger transport lines will doubtless be combined with or parallel the mail lines and may for a time

use the same facilities even though such facilities are inadequate. With the provision of adequate airports, passenger traffic should soon exceed the mail and mail will become incidental except on routes, the schedules of which are not attractive to passengers.

The selection of terminals for important through passenger and express transport lines without mail and the establishment and operation of less important lines (other requirements being satisfactory) will depend largely on the location of desirable airports. The provision of such facilities may well result in attracting business which will prove every profitable and desirable.

The airport requirements of the Army and Navy are provided at the regular government establishments. These are not generally in locations satisfactory for commercial purposes, and moreover such facilities cannot be made available for civilian use. For this reason no consideration should be given at this time to the needs of the Army and Navy nor to their facilities except as both civilian and military facilities may be used by either in emergencies.

On account of the large areas required for suitable terminals and the very great expense involved, it is not generally feasible for individual operators or small groups of operators to supply the terminals needed by them, near important centers. Such facilities must be supplied on some basis by governmental or community agencies or in special cases by larger groups of operators acting co-operatively or through a contractor.

### Airways

The first commercial airways in the United States have been established only recently. There are still very few airways except the mail routes.

The only commercial airway reaching the Philadelphia district at present is the New York-Atlanta mail route, which passes through the district, Philadelphia being one of the regular stops on the route. Very recently the service on this route has been increased to include a special air mail service between Philadelphia and Hadley Field to afford more direct connection of the transcontinental air mail with Philadelphia.

The New York-Atlanta mail schedule requires the operation of this section by night and this airway is lighted by the Department of Commerce, which has also established and maintains intermediate fields along the route. From New York to Baltimore this airway is located along the general alignment of the Pennsylvania Railroad. From Trenton to Wilmington it passes to the east of Philadelphia to more conveniently reach the present airport.

There is a general tendency throughout the country to establish passenger transport lines along the mail routes. The present airway is available both to the north and to the south for the operation of passenger lines. Other passenger lines have been projected from Philadelphia particularly to the western cities and are now under consideration.



This development will require the location of airways to the west from which direction a large part of Philadelphia's future air traffic must be expected. To the eastward, passenger lines to Atlantic City are under consideration and will probably be operated during the season in the near future.

### Philadelphia in Air Traffic

Philadelphia has developed or attracted to its vicinity very important aviation interests which are among the leaders in this country in aircraft manufacture, the use of airplanes in aerial surveying, photography, etc., the operation of air transport lines, air service for short passenger flights and cross-country flights, flying schools, the manufacture of materials and equipment for aircraft and airports, etc.

One of the earliest passenger transport lines in this country operated from Philadelphia to Washington and Norfolk during the Sesqui-Centennial Exposition. This line was established in connection with the Exposition as a demonstration of the progress in aviation and with the hope that traffic would so develop as to permit permanent operation. After the close of the Exposition the line was discontinued of insufficient traffic. At present the only transport lines reaching Philadelphia are the New York-Atlanta mail line, on which Philadelphia is a regular stop, and a special Philadelphia-New York mail line, both operating on night schedules. The use of airplanes in and about Philadelphia in other commercial service is very extensive and is growing rapidly.

### Flying Fields in Philadelphia and Vicinity

Aircraft operations in the Philadelphia District have made necessary establishment of flying fields. In one instance the Mustin Field at the League Island Navy Yard was made available for the operation of a commercial transport line—the Philadelphia, Washington and Norfolk passenger service operated by the Mitten interests during the Sesqui-Centennial Exposition—but further civilian use of the military fields is not permissible.

Commercial fields have been established by aircraft manufacturers and air service operators where necessary for their business. The locations adopted have been controlled more by conditions peculiar to the interests involved than by the conditions affecting flying. The aircraft manufacturers have selected locations near their factories, which in turn were located for the convenience of their owners, promoters or managers, or on account of the supply of labor or other industrial conditions. The air service operators have in general, in the selection of flying fields, been influenced principally by the probability of attracting passengers for short sight-seeing flights and students for their instruction courses.

The fields established privately for factory and air service purposes have been located usually at points remote from the center of the city. These flying fields, particularly those nearer to the built-up districts, frequently have been of temporary char-

acter located on leased land and provided with buildings and equipment to a very limited extent.

As a result of the agitation for a more central, permanent and better equipped flying field and to provide facilities for the National Guard, the city authorities, with the co-operation of one of the important air service operators, established the present Philadelphia airport which began operations about two years ago. When the air mail between New York and Atlanta was inaugurated last spring, this field was selected for the Philadelphia stop of the air mail as it was the most desirable of the available fields.

The more important fields in regular operation in the district are:

1. The Philadelphia Airport, located on Island Road near Tinicum Avenue, near the southern city limits.
2. The Pitcairn Field, on the Doylestown Pike near Horsham, established for use in the air service operation of Pitcairn Aviation, Inc.
3. The Bryn Athyn Field, located at the factory of Pitcairn Aircraft, Inc., established in connection with the Company's operation.
4. The Patco Field, on the Ridge Pike near Norristown, established in connection with the air service and commercial operations of the Philadelphia Air Transport Company.
5. The Keystone Field, about two miles north of Bristol, established as an adjunct to the Keystone Aircraft Corporation's factory at Bristol.
6. The Crescent Airport, located on Crescent Boulevard near Kaighn's Avenue, in New Jersey, just east of the city limits of Camden, established for the air service operations of the Crescent Air Service, Inc.
7. The William Penn Airport, located on Roosevelt Boulevard at the intersection of Red Lion Road. It has been in use for a number of years and now serves the purposes of the Interstate Flying Service, Inc.
8. The Lincoln Airport, located on Roosevelt Boulevard near the Comly Road, used by Lincoln Air Service, Inc.

There are several fields in other localities in more or less general use.

### Need for Better Airport Facilities

The increased use of airplanes, the occasional troubles experienced in the operation of the mail planes at the Philadelphia airport and the more active public interest in aviation have resulted in much discussion of the need for more adequate airport facilities for the Philadelphia District. This need has probably been emphasized by the reports of projected passenger transport lines which may be influenced by adequate airport facilities to make Philadelphia a terminus. The necessity for such facilities is further confirmed by the construction of airports in practically all of the larger cities of the country.

An important reason for promptly acquiring suitable sites for airports is the rapid growth of the city

in the more sparsely occupied nearby areas which may in a very short time make it impossible to acquire or use sites which are now available. It is only by prompt acquisition that such sites can be protected from further encroachment and obstruction or development for other uses.

Notwithstanding the very rapid expansion of aviation in this country, the present traffic must be considered as only a beginning which has been greatly hindered by the lack of terminal facilities.

In providing airports, consideration must be given not to the present traffic but to that which will develop when terminal facilities are generally available in this country. The extent to which facilities will be needed is indicated by the operations of some of the airports in this country where air transport is comparatively new and the growth of air transport abroad where it has been more extensively developed.

Recent published statements are to the effect

that during the last three years the Cleveland Municipal Airport has cleared 6,600,000 pounds of freight and express and 4,900,000 pounds of mail exceeding both Templehofer Field, Berlin, and Croydon, Field, England. Nine private companies are located on this field and six mail lines cross it. During the month of June, 1,480 planes were cleared.

The statistics of the Oakland Municipal Airport, which evidently include air service operations, show that 51,152 plane landings were recorded during the first nine months of 1928 and that 32,357 passengers were carried and 6,476 student flights made during the same period.

The growth of foreign traffic is indicated by the statistics of the German Lufthansa, whose planes during the first six months of 1928 carried 46,231 passengers, an increase of about 17 per cent over the same period in 1927 and three times as many as were carried during the whole year 1926.

## Airport Requirements of the Philadelphia District

As the principal benefit to result from air traffic is the saving of time in transportation it is essential that terminal facilities be provided so located that there will be no serious loss of time between the terminals and the origin or final destination of passengers or cargo which would tend to offset the time saved by air travel.

In any large metropolitan center such as Philadelphia the extent of the business and residential areas is such that no single location can possibly be quickly accessible to all sections. With the growth of air traffic the necessity will develop for airports in different sections of the metropolitan district.

The immediate need of the Philadelphia District is a principal airport accessible from the "center of air traffic," capable of furnishing facilities for all essential traffic that may be expected, particularly the transport lines.

For convenience, the point in the city which can be considered as the center of the points of beginning and final destination of passengers and cargo traveling by air is referred to above and hereinafter as the "center of air traffic."

Supplementary airports will be established in other sections of the city as traffic develops locally. Such airports in addition to supplying local needs, will be available as landing fields for transport lines and other operators coming over such locations. It is probable that until the need for such supplementary airports is definitely determined a large part of the air traffic tributary to the outlying districts will be accommodated at the private fields maintained by manufacturers and operators of aircraft.

### Authority to Control Airports

In order that these airports shall be properly co-ordinated to serve the district and in order to assure permanence, the airport facilities of the metropolitan district should be under the control of some central authority which will provide for adequate facilities as the need develops.

The requirements of air traffic, to a greater extent even than highway, railroad or marine traffic, are independent of the political subdivisions of the metropolitan district. It is evident that the most desirable location for facilities to serve the district should not be rejected because the location happens to be in a particular municipality, borough, county or state. Similarly it should not be necessary to duplicate such facilities on account of the existence of such political subdivisions.

The country's highway systems have, to a large extent, been made more serviceable by commission control over entire state areas and by federal co-operation in co-ordinating the facilities of adjacent states. Also, the railways under private management have generally been free of interference by political subdivision but have failed to provide the most desirable terminal facilities because of competition between the railroads. The largest ports have been forced into co-operation by the needs of water-borne traffic, co-ordinating control through interstate authority.

In providing facilities for air traffic advantage should be taken of experience, and efficient supervision and control should be provided by community action.

### Air Traffic to be Accommodated

In the location and design of airports for present use, the uncertainty as to future developments makes any extensive provision for such developments inexpedient and undesirable. It is probable that in a few years important air service between the United States and foreign countries across the ocean and Gulf of Mexico and along the seacoast will be in commercial operation. It seems quite certain that ships lighter-than-air or seaplanes will be used for this service but the methods to be employed and the facilities required cannot at this time be predicted with sufficient accuracy to justify any special investment other than the tentative reservation of parcels of land which may seem desirable.

There are serious objections to the presence of water areas in the vicinity of fields used for land plane or dirigible operation. In the case of land planes the water area is an additional hazard in the event of forced landings. In the operation of dirigi-

bles the variation in atmospheric conditions over water and land areas seriously disturbs the equilibrium of the airship and greatly increases the danger of operation.

The combination of facilities for seaplanes with those for land planes or airships restricts the sites available to the low-lying areas adjacent to waterways, in which locations fog and mist are most frequent and persistent.

Lighter-than-air ships require large areas for their anchorages, which areas cannot be used by both ships and planes. The provision of such additional area in connection with an airport of the present day would seriously limit the sites available. For these reasons it is desirable, in providing at present an airport for land plane traffic, to give little consideration to the possible future needs of seaplanes and lighter-than-air ships. In the final development it will probably be desirable to provide facilities at separate locations for land planes, seaplanes and airships.

## Uses of Airports

The activities requiring air terminal facilities may be classified as follows:

I. Air Transport, consisting of regularly organized air lines operating on fixed airways and regular schedules including:

1. Mail lines
2. Passenger lines
3. Express lines

Any Transport line may combine two or all of these activities.

II. Air Service, consisting of the operations of concerns owning and operating aircraft for commercial purposes, including:

1. Passenger carrying in sight-seeing and cross-country flights.
2. Instruction of pilots, aircraft mechanics, etc.
3. Exhibition flying.

III. Commercial and industrial uses, consisting of the operations in commerce and industry requiring the incidental use of aircraft, including:

1. Photography for news, information and advertising.
2. Surveying by photography from the air.
3. Advertising by smoke-writing, planes with electric signs, and other means.
4. Special uses such as crop-dusting, etc.
5. Sales demonstrations.
6. Factory tests and trials.

IV. Private flying, including business traveling, commuting between residences and place of business, pleasure and other flying.

V. Governmental Service, consisting of the use of aircraft by the State or its subdivisions and the Civil Departments of Federal Government including:

1. National Guard, training and practice.
2. Aviation supervision, promotion and inspection.
3. Patrol for forest protection and law enforcement.

In an important center it is impossible to satisfactorily accommodate all of the traffic at one field, no matter how large. Some of the uses are inconsistent with others as, for instance, the use of the same field at the same time for air transport and student instruction unnecessarily increases the hazard to both. Already complaints are numerous regarding the delays experienced at some of the important airports due to the frequency of landings and take-offs and the danger of such operations among student fliers or inexperienced pilots. Some of the field activities can be more satisfactorily cared for at special fields which need not be near the traffic center; such fields are frequently of comparatively small cost and can well be provided and operated by the private interests which principally use them as are some existing fields.

It is not necessary or desirable for the public to furnish facilities for all of these uses, but only such as may be considered public in character. As long as public traffic is not interfered with there is no objection to the use of the public facilities for the more individual requirements, but the organization and management of the public airports should be such as to provide for strict limitation of private or individual uses when they may interfere with public use.

## Requirements of a Principal Airport

The Department of Commerce is by law required to examine and rate air navigation facilities and has prepared regulations for the rating of airports. These ratings are based on three groups of requirements. The first group covers the general facilities and equipment and is designated by a letter, "A" indicating the highest class. The second group covers the dimensions of the available landing area designated by a number, "1" being the highest class. The third group covers night lighting equipment, designated by a letter, "A" being the highest class.

The requirements for the highest rating, "A-1-A," are moderate and should be met in all respects by the principal airport of an important center and many of the requirements should be exceeded.

In the design and location of a principal airport there are certain essential features which may be summarized as follows:

1. Safety and reliability of air travel.
2. Capacity to meet air traffic demands.
3. Accessibility to air traffic center.
4. Accessibility to airways.
5. Permanence of favorable conditions.
6. Reasonable cost of acquisition and operation.

The success of the airport will depend on the extent to which these features are provided.

### 1. Safety and Reliability of Air Travel

It is not possible to restrict air traffic to locations where safety is at a maximum. The present commercial problem is to adapt air service to the needs of important centers already established under the conditions existing at these centers, but in such process no risks should be assumed which are not reasonably necessary.

Air traffic to be of maximum service must be reliable. With a highly efficient communication system it might be possible to operate with safety from a location subject to intermittent hazards such as fog and smoke by directing traffic to other and safer locations during the existence of the hazardous conditions; but such operation would not be satisfactory on account of the uncertainty of the schedule and destination. It is of great importance that the service be reliable on its regular route and schedule particularly for transport lines.

Safety and reliability will be promoted by the selection of a site which provides, as far as possible,

- Freedom from fog, smoke and unfavorable wind currents.
- Freedom from obstacles or other hazards in the air approaches.
- Large area for safe take-offs or other favorable landing areas under take-offs.
- Favorable surface with respect particularly to grade, drainage, surface material, snowdrifts and length and direction of runs.

### 2. Capacity to Meet Air Traffic Requirements

This will depend principally on the dimensions and design of the airport which should afford ample areas for airplane operation, for all necessary facilities for such operation and the maintenance of the field and such incidental facilities as may be needed for factories, studios, offices, residences, public recreation buildings and areas, parking spaces, etc.

The flying field should provide runs of not less than 2,500 feet length in all directions with additional length in the directions of the prevailing winds if possible. This area should be available throughout and not be obstructed by buildings or other structures between designated runways which limit operations to certain fixed directions. Such directions may not always be most advantageous. Such structures unnecessarily increase the hazard of operations.

The additional area for necessary and incidental facilities should be ample for all present purposes and for future expansion liberally estimated.

### 3. Accessibility to the Air Traffic Center

The airport should be so located that transportation between the airport and the air traffic center shall be rapid and convenient. Ordinarily, mail will be transported by motor truck between the post office and the airport in order to avoid additional transfers. Express is controlled by the same conditions and will ordinarily move to and from the field by motor truck. The extent of air passenger traffic will probably not justify the construction of railroad terminal facilities at the airport. Passengers for air traffic generally will be of a class which will prefer to travel by automobile or motor bus between the business center and the airport rather than use a railway or rapid transit line with probable walks or transfers at both ends to complete the journey. For these reasons it is of first importance that highway connections be ample and attractive. It is desirable that railway and rapid transit facilities be available for handling freight to and from the airport and for use by large numbers of people on special occasions but it is not likely that railways will be used in ordinary operation and they are secondary in importance to highways.

It does not seem probable that the use of the highways by passengers, mail and express traveling by air will be of large volume during the peak hours of highway and railway traffic. Travel by air between residence and place of business will probably occur later in the morning and earlier in the afternoon than other similar travel. Cross-country travel, both for long and short distances, will probably begin and end at off-peak hours. On this account, highway congestion is not as important as it would be otherwise.

In the future it is not improbable that planes will be developed to land on large buildings or platforms in central areas, such as railroad yards. Such planes may form the equipment of the transport lines or be used in auxiliary service between such landing places at the traffic center and the airport, but such development is too remote to seriously influence present plans.

#### **4. Accessibility to Airways**

It is desirable that the airport be located on or very near the established airway and in a position such that it will be convenient for airways to be established; but a moderate increase in the distance traveled by the planes is not of serious importance provided no obstacles or other hazards occur in the routes traversed.

It is important that the airport be so located that it can be easily identified from the air by means of prominent topographic features or large or peculiar structures.

#### **5. Permanence of Favorable Conditions**

In order that the airport shall continue satisfactory in the future it must anticipate development of aviation and to that end dimensions and designs should be ample and liberal. Objectionable development of adjoining property must be prevented by ownership or restriction. The development and use of neighboring property must be such as will not be unfavorably affected by the operation of the airport or such areas must be protected from annoyance by the ownership or control of sufficient intervening property. The airport itself must be in such owner-

ship or be so dedicated to its proper use as an airport that it cannot be diverted to other uses which may be more profitable.

#### **6. Reasonable Cost of Acquisition and Operation**

The reasonableness of the cost will depend on the advantages and desirability of the airport and the actual cost involved.

#### **Interpretation of Conditions**

These conditions have been interpreted as requiring that:

1. The airport be located at a distance from large areas of water or wet lands, at an elevation above sea-level sufficient to minimize fog and mist, in such position that the prevailing winds will not blow smoke over the site and with satisfactory surroundings.
2. That the site be of such dimensions as to provide ample area for the necessary and incidental facilities and for protection from neighborhood interference—comprising a fairly regular shaped tract about 4,000 feet in diameter or a smaller tract with the surrounding territory under restrictions or control.
3. That the time required for transportation by highway between the airport and the air traffic center be not more than about 30 minutes under normal driving conditions under present or early future highway and traffic conditions, or with equivalent rapid transit facilities.
4. That there be no serious obstacles or hazards in the air routes between the site and present and future airways.

## Air Traffic Center

Based on investigations made by the Bureau of City Transit the center of population of the City of Philadelphia in 1910 was about one and one-half miles north of Market Street and about one-quarter mile west of Broad Street. Since that time the trend of population has been generally northerly and to a less extent westerly, the center having moved about one-quarter mile northerly and a few hundred feet westerly.

The center of population of the Philadelphia Metropolitan District, considered as the area within a radius of sixteen miles from the City Hall, would be substantially the same, the difference in population amounting to about one-quarter of the city's population, being well distributed around the city boundaries.

For the future the trend of population will probably continue as in the recent past. Important developments in recent years to the east, particularly the construction of the Delaware River Bridge, and construction now in progress to the west, particularly the establishment of the new railroad terminals at West Philadelphia, will probably maintain the balance of the population of the area about the north and south axis.

The development incidental to the Sesqui-Centennial Exposition and the projected improvements in the southern district will stimulate growth in that direction but the area available and character of the development, which will be largely industrial, will not attract a large population.

The attractiveness of the northern section for residences, together with improved transportation facilities, will result in its continued rapid growth and it is probable that the trend of population will continue for some time in a general northerly direction.

The projected rapid transit developments follow rather than direct the growth of population and will have the effect of intensifying the trend resulting from other causes.

The theatre, hotel and apartment, office building and financial districts can all be considered as having their centers in the neighborhood of the City Hall. The center of the main shopping district is probably somewhat easterly from the City Hall.

The present trend of all of these activities is definitely westward. This tendency will probably be stimulated by the proposed construction program of the Pennsylvania Railroad along Market Street west of Broad Street and in the neighborhood of West Philadelphia, as well as by other construction in those locations.

Air traffic depends for its popularity on increased speed of transportation. The resultant saving of time is of most importance in business. Air mail will originate and be delivered in greatest quantity

in the office building, hotel, theatre and shopping districts.

Mail collection now centered at the main Post Office at Ninth and Market Streets will, to a large extent, probably be diverted to the Railroad Branch at West Philadelphia, transferring westerly the origin of the air mail which will always form a large part of air transport traffic.

Air travel will be most attractive to passengers as a means of spending part of the day in Philadelphia and reaching other points more expeditiously by traveling the remainder of the day by air, a portion of the trip being made on a railroad in many instances. Trips which begin in the evening or end in the morning will probably be made via railroad. In other words, the majority of air passengers will go directly between the terminal and places of business rather than residence so that passenger air traffic as well as mail will probably concentrate in the city at the business and hotel center.

Air express will consist largely of shipments by department stores, supply houses, etc., and an important item will probably be moving picture films in course of distribution to the theatres.

It seems that the center of air traffic in the city can now be taken as near the City Hall with a westward trend which may be stimulated by the developments of the next few years.

### Meteorology

The outline of weather conditions for Philadelphia as compiled by the United States Department of Commerce for aeronautical purposes is as follows:

Prevailing winds—summer, southwest; winter, northwest; annual, northwest.

Strongest winds—usually from northwest.

Winds of 40 miles per hour or over average one day per month during January and February and infrequently during the remainder of the year. Highest recorded velocity 75 miles per hour.

Dense fog occurs one day per month, September to March, inclusive, and infrequently April to August, inclusive. Light fog averages two days per month in summer; five in autumn, six in winter and three in spring. Fog is most prevalent during the period 4 A. M. to 11 A. M.

Precipitation as heavy as one inch in 24 hours is recorded about one day in six weeks, with greatest frequency during July, August and September. Average monthly snowfall December to March, inclusive, about six inches.

These conditions are much more favorable for flying than those at other neighboring cities, particularly New York, as represented by Hasbrouck Heights airport where the winds, fog, rain and snow are much more frequent and persistent. In particular, high winds are very much more frequent and violent at New York.

## REPORT—LOCATION OF AIRPORT, PHILADELPHIA DISTRICT

The observation and recording of weather data, except at the regular offices of the United States Weather Bureau, is infrequent and not according to any uniform or standard method. Even in the different offices of the Weather Bureau some of the data, for instance those concerning fogs, are not sufficiently uniform to be compared. Records of the United States Weather Bureau show the weather conditions at Philadelphia based on observations made at the Bureau office in the Post Office. These observations do not cover the conditions at other points in the district.

In the Philadelphia district there are records of intermittent and special observations at several locations other than the Weather Bureau Office but none on a basis which will permit comparison with the Weather Bureau records. Recently a meteorologist has been located at the League Island Navy Yard whose records will be of great value in the future but the period covered (a few months only) is not sufficient to be of much value at this time in estimating average conditions.

In connection with the operation of fog signal stations, the Department of Commerce, through the Lighthouse Service, records the occurrence of fog at the several stations. These data, over a period of years, are of much value but the observations are on a basis different from the Weather Bureau data and cannot be directly compared.

In connection with the operation of the air mail and other transport lines, the weather reports transmitted to the pilots approaching Philadelphia will form a very serviceable record of weather conditions but such records at this time cover too short a period to be at all conclusive as to average conditions.

Comparisons of the weather conditions in different localities in the Philadelphia district must be

based on these incomplete records, the data obtained from the United States Weather Bureau offices in neighboring cities and the opinions of persons familiar with the conditions in the several localities.

From an aeronautical standpoint the most important variations in atmospheric conditions in different parts of the Philadelphia district are in the frequency, variation and intensity of fogs and the occurrence of smoke. Fogs, as reported by the Philadelphia Weather Bureau from observations made during certain hours of the day on top of the Post Office, are of general distribution, ordinarily covering the entire Philadelphia district and frequently this entire section of the Atlantic slope.

Ground mist of considerable density occurs frequently in the low wet areas, particularly during the morning hours, but is not of a character to be reported as fog by the Weather Bureau. This mist is usually dissipated a few hours after the sun rises, which period is frequently associated with an increase in the wind movement.

Smoke is produced principally in the heavy industrial district along the banks of the Delaware River for several miles north and south of Market Street; along the Schuylkill for several miles south of Market Street; in the northeastern section of the city; in the railroad switching yards and in the heating and power plants of the larger buildings in the central district. In general, the smoke is produced principally in and about the central district and in the northeast industrial district. Smoke in the Philadelphia district of less density originates along the Delaware River south of Philadelphia, including Chester and Wilmington, and is carried to the Philadelphia district by southwesterly winds. On days of high humidity with much ground mist, its combination with smoke greatly decreases the visibility.

## Investigation of Sites

### Nature of Investigation

An investigation has been made of the lands available for the site of the principal airport within the area considered reasonably accessible, taken approximately as within 30 minutes' travel under normal conditions or a distance of about ten miles from the City Hall.

Consideration was first given to existing flying fields and sites which had been suggested in so far as this information could be secured from correspondence, newspaper records and interested persons. Additional suggestions were sought from pilots familiar with the territory. These locations were investigated to determine their present adequacy and the possibility of extending them to meet the requirements.

A study was made of the Geological Survey's topographic sheets to disclose locations suitable for the airport, which locations were investigated for availability by a study of city maps, aerial photographs and field inspection.

Within the area indicated, sites of sufficient size, not already dedicated to permanent use, are not numerous. The configuration of the land renders most of them undesirable and railways, important roads and streets and other city development interfere with the consolidation of adjoining tracts.

In the northerly section of the city in the direction of the most intensive growth no suitable sites of sufficient size were available reasonably accessible to the air traffic center.

To the south no suitable sites were available on high ground. In the vicinity of the junction of the Schuylkill and Delaware Rivers there are large areas of low, flat lands in which development has been comparatively slow on account of the necessity for extensive filling.

The section lying between the rivers which is nearest the City Hall is obviously attractive on account of its accessibility to the center of air traffic. However, the presence of railroads and essential highways and the character of the city development so restrict these areas that sites sufficiently large for the principal airport are not there available. The prevalence of fog and smoke and the presence in the neighborhood of large industries with obstacles in the air approaches make this location less desirable.

Further south and westerly across the Schuylkill River the land is of the same character but there are a few areas of larger size without intersecting railroads or important highways. The requirements of the city sewage disposal plant make unavailable the large areas nearest the city.

The most available site of suitable size in this vicinity is the northerly portion of the Hog Island

tract where a sufficient area is available, a large part of which has been filled to a safe elevation. It is probable that this property could be acquired from the Federal Government on suitable terms and serious consideration was given to this site. The prevalence of fog and some smoke and less satisfactory accessibility by land render it less desirable. In addition it was considered undesirable to dedicate to the uses of an airport so large an extent of water frontage that will ultimately be required for marine use.

Adjoining the Hog Island tract is the present Philadelphia Airport. The present area of this site is inadequate. It might be possible to enlarge the site by the acquisition of adjoining areas and the moving of a railroad. The site is subject to the same fog and smoke conditions as the Hog Island tract and would require a large amount of difficult and expensive filling on account of the great distance from the river, the best source of filling material.

To the east across the Delaware River in New Jersey the land is low in elevation rising gradually from the river to heights of 100 feet at distances of about eight miles from the City Hall. This section is intersected by several water-courses with marshy banks and by many important highways which together with the development of the district leave few large areas available. The prevailing westerly winds blow the smoke from Philadelphia and the Camden waterfront over this area and fog and mist occur more frequently and are more persistent than at higher elevations.

To the west across the Schuylkill River the land is higher reaching an elevation of 300 feet within eight miles of the City Hall. The surface is rough with few flat areas. Development has been active particularly on the more level areas, but some such lands are available beyond the city limits.

### Most Desirable Site

In this section to the west of the city is the site which, of the many investigated, most nearly meets all requirements.

### Location:

The site is on the Springfield Road about one mile east of the village of Springfield in Delaware County and about eight miles from the Philadelphia City Hall.

The tract consists of about 400 acres held in four parcels, forming an approximate rectangle about 4,000 by 4,400 feet. It consists of the flat top of a hill reaching the elevation of 260 feet above sea-level, surrounded by slopes running down a minimum of about 15 feet to the Springfield Road on the south, to a maximum of about 100 feet to Darby Creek on the north.



### Safety and Reliability of Air Travel

On account of its elevation and remoteness from large water or wet land areas, the prevalence of fog and ground mist is reduced to the minimum for the district. Its elevation above all surrounding property renders it least liable to irregular wind currents. Its position to the west of Philadelphia and northerly from Chester protects it from smoke from Philadelphia or from Chester except with southerly to easterly winds, which are infrequent, the prevailing winds being westerly. It is surrounded by farming and residential districts at lower elevations, leaving it free from obstacles and other hazards in the air approaches.

The large area of the field makes emergency landing spaces in the neighborhood of less importance than usual. The surrounding country is being developed rapidly with small residences but for a time there will be open spaces available for use in emergencies. For the future, the long runs available must be relied on for safety in forced landings due to mechanical trouble in take-offs.

The natural surface of the field is reasonably level and a field with 2,500 feet runs in all directions can be brought well within the limits of the Department of Commerce Class "A" Rating for a moderate expense and at a greater expense can be enlarged to make available a 3,000-foot all-way field with runs of 3,600 feet in length in the directions of the prevailing winds for summer and winter. The surface material is sandy loam which, in connection with the existing grades, provides excellent drainage and should, with little expense, grow a tough turf. The high, even surface should avoid the accumulation of snow drifts at any point in the field.

### Capacity to Meet Air Traffic Requirements

The ample dimensions of the field will furnish capacity to handle all traffic which can properly require service for many years with a reasonable margin to take care of possible developments in aircraft.

There is ample space accessible to the field for all necessary buildings and facilities and for all incidental purposes, including large areas available for factories and residences, hotel, club, etc., public recreation and observation, parking, etc.

### Accessibility to Air Traffic Center

The edge of the field is at a distance of about eight miles airline from the City Hall. The most direct highway route is via Market Street from the City Hall to 69th Street, thence via Garrett Road to the village of Addingham and over the village streets to and across Darby Creek to the east side of the property, a distance of about eight and one-half miles. This distance via this route can be easily traversed under ordinary traffic conditions in considerably less than thirty minutes. Garrett Road is a wide, well-paved concrete highway running through an attractive residential section without serious

traffic congestion as it has no through outlet. It reaches to within a few hundred feet of the end of Bishop Road, which traverses one side of the site and is now being paved with a bituminous impregnated macadam. This short connection with a bridge across Darby Creek can probably be easily provided at small cost. For the present a short detour through the streets of Addingham connects Garrett Road with Bishop Road. During this investigation Bishop Road was out of service between Springfield Road and Sycamore Avenue on account of repaving. It is estimated that the south front of the property on Springfield Road can be easily reached, via this route, under ordinary traffic conditions, in less than thirty-two minutes.

The south front of the site can be conveniently reached from the City Hall via Market Street to West Philadelphia, thence over the Baltimore Pike to Clifton Heights and on the Springfield Road to the site, a total distance of nearly nine miles, all on well-paved roads but more subject to traffic congestion—the Baltimore Pike being U. S. Highway No. 1. Under ordinary traffic conditions this distance can be traversed easily in less than thirty-two minutes.

The west front of the property can also be conveniently reached from the City Hall via Market Street to 69th Street, thence along the West Chester Turnpike to State Road, along State Road to Rolling Road, thence to North Springfield on the west side of the site, a total distance of about nine and one-half miles from the City Hall.

While some portions of the highways and streets mentioned are subject to traffic congestion, it is not likely that an important volume of air traffic will use the highways during the peak hours of road traffic.

The site can also be reached by rapid transit lines from the City Hall via the Subway-Elevated to 69th Street Terminal, thence via the Philadelphia and West Chester Traction Company Media Line to North Springfield on the west side of the property, the present combined running time being thirty-two minutes.

The westerly trend of the Air Traffic Center, if continued as expected, will improve the accessibility of this site and contemplated improvement in street facilities between the central district and West Philadelphia will improve traffic conditions, at least relatively.

If the development of air traffic should make rapid transit service more essential, it might be possible to establish through service from the central district to North Springfield, improving both the schedule and service.

### Accessibility to Airways

Its position to the west of the city removes the site from the existing airway which was apparently located with reference to the present Philadelphia airport.

A direct line from Trenton to Wilmington passes very near the site and avoids the obstacles to the east of Philadelphia, the smoke blown easterly by the prevailing winds, and the more frequent fogs along the river and over the lowlands. Its position is most favorable for airways to the west, several of which will probably be established in the near future. Being west of the southern portion of the city only a slight detour is required from the direct line between the site and Atlantic City in order to avoid passing over the city.

The site can be readily found from the air by its relation to the city and the islands in the Delaware River due south of the site; by its position between a large gas holder near the 69th Street Terminal and the Maple Hill reservoir, a cylindrical water tank; by the peculiar layout of the village of Springfield immediately alongside and by the proximity of the Aronimink Golf Club.

#### Permanence of Favorable Conditions

The dimensions of the site are ample for present requirements with a reasonable margin to care for changes in the operation of planes which may result from developments in aircraft.

The neighboring property is being developed for residential purposes and is all at lower elevations than the flying field site. There is little probability of the construction of any buildings which might

prove obstacles. In order to assure this result, proper zoning regulations should be established to which there can be no valid objection as the property is, from the circumstances, naturally destined for residential use with small buildings.

The operation of the airport will not result in annoyance to occupants of the neighboring property as the slopes surrounding the field will protect them from noises or view of the field operations which result can be more thoroughly assured by the planting of shrubbery and low-growing trees on such slopes. The property on the other side of Springfield Road facing the airport administration building and center of activity will probably develop under reasonable building height restrictions in harmony with the recreational use of the airport.

The location of the airport buildings between the highway (Springfield Road) and the flying field with ample parking space intervening will obstruct the view of the field from the road and avoid the obstruction of the highway by the slowing and stopping of vehicles to permit their occupants to view the operations on the field.

The dedication of the site to airport purposes must be provided for in the method adopted for its acquisition and ownership and the control of operations must be so organized as to preserve the use of the airport to the traffic properly entitled to such use.

## Proposed Plan for the Airport

A plan has been prepared showing in a preliminary way a desirable method of developing this property for use as Philadelphia's principal airport.

It will be noted that this plan proposes an all-way flying field with runs of 2,500 feet in all directions and with extensions for longer runs in the directions of the prevailing winds, providing runs of 3,600 feet length in the northwest-southeast and southwest-northeast directions. Further provision is made to increase the size of the all-way field in the future so that runs of 3,000 feet will be available in all directions, leaving the long runs in the directions of prevailing winds at their present proposed lengths.

The plan also indicates a preliminary layout of the buildings and other improvements proposed for present development with a suggested layout for future development as may be needed.

#### Proposed Present Development

It will be noted that the proposed present development includes:

1. The preparation of the field:

- (a) Grading of the field to make available runs of 2,500 feet in all directions with runs of 3,600 feet in the northwest-southeast and the southwest-northeast directions.

- (b) The preparation of the soil and planting and cultivation of a tough, durable sod.
2. The construction of buildings consisting of:  
Administration Building (60 feet x 60 feet).  
Two Hangars (100 feet x 150 feet each).  
Two Hangars (100 feet x 150 feet each) with lean-tos 100 feet x 37.5 feet each for repair shops.  
Two Garages (60 feet x 100 feet each) one for the use of the public and the second to care for the motor equipment of the airport.  
A pavilion with roof garden and adjacent enclosure for the use of the public in viewing the operations—for restaurant, concessions, etc.
3. The preparation of a parking space for automobiles at the airport entrance.
4. The fencing of the airport property.
5. Paving aprons, taxiways, automobile roads, etc., about the airport.
6. Tile drainage system around the buildings and center of operations. The natural drainage is considered sufficient for the remainder of field.
7. Connecting the airport with local distributing systems for water, electricity and telephones.
8. Equipment of the repair shops for overhauling airplanes, engines and for general repairs.

9. General Equipment has been included consisting of ambulance, Foamite fire engine, service tank truck, trucks for hauling, apparatus for maintaining the field and removing snow, two light passenger cars, etc.
10. Provision has been made to comply in all respects with all other requirements of the Department of Commerce regulations for "A" rating on general equipment and facilities covering particularly field marking, servicing facilities, weather instruments, wind direction indicators and other features.
11. The lighting equipment has been provided for in accordance with the regulations of the Department of Commerce for "A" rating, including airport beacon, illuminated tee, boundary and obstruction lights, building flood-lights, ceiling projector and field flood lights.
12. Radio Equipment - Provision has been made for the installation of such radio equipment as will probably be desirable. The details of this installation cannot be determined at this time on account of the frequent changes in methods; but the cost of marker mast, communication masts, receiving masts, antennae, remote control struc-

tures, connections and general equipment has been included. Radio apparatus will probably be leased from the manufacturers at least during the period of development. It is probable that the cost of radio equipment and its installation may be assumed by the Department of Commerce.

#### **Proposed Future Development**

The plan indicates the possibility of providing additional hangars as may be needed either for the use of private interests or for the general use of the airport and an enlargement of the administration building to care for the increased activities.

A location and general layout is suggested for the National Guard organization with hangars, garage and headquarters building.

An area is indicated for the location of factories, shops, studios, offices, etc., incidental to aviation activities.

An area is indicated on the property but outside of the airport enclosure, for a hotel, pilots' club, residences for officials or employes, etc.

## Costs

### Land

It has not seemed desirable to secure offers of sale for the property included in the site and no definite prices on the several parcels forming the site are available. From data which you have submitted to us it appears that the 400 acres comprising the site should be purchased for a total price of \$1,000,000.

It may be desirable to purchase at the same time the strip of land between the airport site and Darby Creek which is included in a park project under consideration. Portions of the property indicated as the airport site might also be dedicated to park purposes under suitable restrictions as to use, particularly as to the height of structures or trees.

The area shown as airport property includes a margin around the area of operations which in general forms the slopes of the hill. It is desirable to own this margin as a protection to the airport site from encroachment on necessary clearances and to protect neighboring property from annoyance due to the operation of the airport.

There are at present in the property thirty-five small residences with incidental outbuildings. It may be desirable to move some of these buildings to permanent locations for use in connection with the airport. Others of the buildings which do not interfere with the present development may be utilized in their present location until the space is required for future development. No consideration has been given to the disposal of these buildings as their salvage value should at least provide for their removal.

### Development Cost

An approximate preliminary estimate has been prepared of the cost of the proposed present development of the airport near Springfield as outlined above.

This estimate may be summarized as follows:

#### Approximate Preliminary Estimate of Cost of Proposed Present Development of the Airport near Springfield

##### Preparing Site

Grading . . . . .	\$120,000	
Fertilizing and Seeding . . . . .	15,000	
Removal of Large Trees, etc. . . . .	<u>2,000</u>	
Total . . . . .		\$137,000

### Construction

Administration Building . . . . .	\$13,000	
Hangars—4 . . . . .	242,000	
Garages—2 . . . . .	36,000	
Pavilion . . . . .	56,000	
Fence . . . . .	29,000	
Paving, concrete . . . . .	84,000	
Storm-water Drains . . . . .	8,000	
Sewers . . . . .	3,000	
Water Lines . . . . .	2,000	
Boundary Markers, etc. . . . .	<u>1,000</u>	
Total . . . . .		\$474,000

### Equipment

Shop Equipment . . . . .	\$25,000	
Motor and Airport Maintenance Equipment . . . . .	25,000	
Servicing Equipment . . . . .	7,000	
Meteorological Instruments and Wind Indicators . . . . .	2,000	
Lighting Installation . . . . .	19,000	
Radio Installation . . . . .	<u>18,000</u>	
Total . . . . .		\$96,000
Total Construction and Equipment . . . . .		\$570,000

### Total Cost

The total cost of the acquisition of the site and its development as outlined is estimated as:

Assumed Cost of Land . . . . .	\$1,000,000	
Approximate Estimated Cost of Development . . . . .	<u>707,000</u>	
Total Estimated Cost . . . . .		\$1,707,000

The immediate cost of development may be reduced by arranging with contractors under leases, concessions or contracts for such contractors to provide at their own expense the buildings and equipment needed by them. This applies particularly to the pavilion and field enclosure and the public garage which would probably be operated under concessions. Organizations operating large numbers of airplanes may lease special hangars, shops and equipment. The gasoline and oil servicing equipment might be leased under concessions to the dealers and producers. In such leases, concessions and contracts it should be provided that at their termination the property would revert to the airport under the conditions agreed upon.

No estimate has been prepared of the cost of future development as it is expected that the work will be spread over a period of time depending on the development of traffic.

## Supplementary Airport of Maximum Accessibility

For certain traffic for which the utmost dispatch is essential, it may be desirable that operating facilities be provided in a location more quickly accessible to the business district even though these facilities be otherwise inadequate for a principal airport.

### South Philadelphia Section

The most accessible location available for such supplementary airport is in the southern portion of the city in the vicinity of the Sesqui-Centennial grounds and League Island. There are several sites in this vicinity in which areas of sufficient dimensions could be consolidated.

These sites can be reached from the City Hall by automobile under normal traffic conditions in about twelve minutes, over well-paved and well-regulated city streets and the streets traversed are not ordinarily subject to serious obstruction from peak load traffic. At present the route is temporarily obstructed by subway construction which can be avoided by a detour but involves delay in any case.

This district is located on low ground subject to overflow and is partially surrounded by the Delaware and Schuylkill Rivers resulting in fogs and mist of greater frequency and density than in other portions of the city. The banks of the river are partially occupied by active industries and it is probable that other industries will be similarly located. Important railroad lines traverse the vicinity with many industrial switch tracks requiring much switching. Smoke from the industries and railroads is present in sufficient quantity to be serious particularly when associated with fog or mist. There are already a number of obstacles to air traffic in the surrounding area which, while well below the gliding angle, are hazardous under unfavorable conditions.

While it is feasible to obtain areas between essential streets of dimensions sufficient to serve as landing fields, there would not be sufficient area to permit encroachment by the construction of interfering buildings or other structures on the neighboring property. It does not seem feasible to control or restrict a sufficient area of surrounding property to prevent such interference.

The entire area is much below city grade and will require a large amount of filling, making the filled land too expensive to maintain for restricted uses. It is probable that this surrounding property will develop for industrial use or for small apartments or tenements closely built. Either class of structures will encroach on the necessary clearances. In addition, industries may establish obstacles in the air approaches. The operation of an airport in close proximity to apartments will probably result in annoyance to the occupants.

A typical site in this section, known as the Philadelphia Air Terminal, is being promoted as an airport for private operation. The site under consideration is included between Packer Avenue,

Swanson Street, Pattison Avenue and Fifth Street. The exact limits of the site, plans for development and estimated cost are not at present available.

### Camden Section

A site slightly less accessible from the center of air traffic than the South Philadelphia sites, but more desirable in other respects, is located in New Jersey just east of the city limits of Camden.

### Location

This site, known as the Central Airport, is located in Crescent Boulevard at the traffic circle intersection with Kaighn's Avenue and Entrance Boulevard about two miles from the Camden Bridge Plaza.

This site has recently been consolidated by private interests promoting the "Central Airport, Inc." for private operation. The following statement is based on inspections of the site and information obtained from the promoters.

The site includes the existing Crescent Airport and all other property in the area included between Kaighn's Avenue, Browning Road and Cooper River, except the small triangle at the intersection of Kaighn's Avenue and Browning Road, cut off by a small creek.

The site is divided by Crescent Boulevard into an area of about 150 acres on the east of the boulevard to be used as a flying field with necessary buildings and an area of about 50 acres to the west of the boulevard to be used for parking space, restaurant and other concessions for the accommodation of the public desiring to view the flying operations and for other incidental activities. It has been suggested that an underground crossing be constructed in the future to connect the two areas.

Portions of both areas adjoining the Cooper River are marshy. A public park project contemplates using a portion of the property along the Cooper River for park purposes. It is understood that the property so used can be limited to that required for a road with suitable margins which will be so restricted as to prevent structures or growths higher than fifteen feet. A projected road through the flying field area from the traffic circle to Browning Road has been abandoned.

### Safety and Reliability of Air Travel

The low elevation of this section, the limited distance (about 2.5 miles) from the Delaware River and the presence of marshy areas contribute to the occurrence of fog and mist. The location to the east of Philadelphia and the Camden industrial district will result in the blowing of smoke by the prevailing northwesterly and southwesterly winds over the airport site. Its greater distance from the river and smaller area of low land in the vicinity will make it less subject to fog than the South Philadelphia sites.

There are no serious obstacles in the approaches. The poles, wires and trees at the site will be removed in connection with the development of the airport.

There are at present near the Central Airport some fields for landing in emergencies but the neighborhood is developing and in the future such places will not be available. The flying field of the airport is of such dimensions as will provide landing strips of sufficient length to make emergency landing spaces of minimum importance provided the approaches are unobstructed.

The land, in general, is level, with elevations varying up to about twenty-five feet above sea-level. Only a small amount of grading is required to bring all portions of the flying field to a surface to meet requirements of the Department of Commerce Regulations for "A" rating.

The soil is a sandy loam. Portions of the area have been under cultivation recently. That portion used by the Crescent Airport is very sandy. The loose character of the soil and the available slopes will facilitate drainage, the field requiring very little pipe drainage. There may be a moderate expense required to produce a suitable turf, as fertilizers and some additional soil may be necessary.

The dimensions of the Central Airport site are ample to provide four landing strips to comply with the requirements of the Department of Commerce Regulation for No. 1 rating on size.

The level, even surface of the field makes the accumulation of snow at any point improbable.

#### Capacity to Meet Air Traffic Requirements

The dimensions of this site, while inadequate for a principal airport, will provide ample areas for flying operations. The site will easily accommodate within its area all traffic for which the utmost dispatch is essential.

#### Accessibility to Air Traffic Center

Entrance Boulevard is a wide, well-paved, well-planned highway with few intersecting roads, designed to accommodate and distribute to the highway system in New Jersey the traffic over the Delaware River Bridge. The airline distance from the Philadelphia City Hall to the site is about four and five-tenths miles. Under ordinary traffic conditions it requires about fifteen minutes to reach the site from the City Hall by automobile. There are other less direct roads between the Bridge Plaza and the airport site.

The Philadelphia streets forming the approaches to the Bridge Plaza are badly congested with traffic during peak hours. This condition may be improved in the future and it is probable that air traffic will not be heavy during the bridge traffic peak hours.

Motor buses operate at short intervals via Crescent Boulevard in front of the Central Airport enroute between Philadelphia and points east in New Jersey.

There are no railroads or rapid transit lines within convenient reach of the site.

#### Accessibility to Airways

The site is on the existing New York to Atlanta airway and is conveniently situated for airways to reach points to the eastward on the Atlantic coast. For airways to the westward an unimportant detour of a few miles will be necessary to avoid flying over the central district of Philadelphia.

The site can be easily found from the air by its relation to the Delaware River Bridge, its location approximately at the center of an arc in the Delaware River along the waterfront of Camden, its proximity to the large traffic circle with intersecting highways, and by the nearby cemetery.

#### Permanence of Favorable Conditions

Encroachment on the approach clearances to the west is controlled by ownership of the property on the west side of Crescent Boulevard. Partial protection is provided on the south by the park project and the Cooper River. On the north and east the approaches are already obstructed by pole lines and wires the removal of which can be arranged for. To the north across Kaighn's Avenue, to the east across Browning Road and on the small triangle adjoining the field to the northeast, the obstruction of the approaches is unrestricted.

In order to protect the available landing area it will be necessary to restrict the height of structures and trees on the south, east, north and northeast, to remove the poles and wires from Kaighn's Avenue and Browning Road and to prohibit the erection of poles and wires, on all streets adjacent to or in the vicinity of the field, which might encroach on the air approaches. Zoning ordinances establishing setback lines and restricting the height of structures should meet little opposition as the natural use of the property is residential, requiring buildings of only moderate height.

The section in which the Central Airport site is located is low with rolling surface and some marshy areas along the watercourses. The neighborhood is developing for residential use and does not seem likely to develop any large obstacles in the approaches. This condition should be assured by suitable zoning ordinances or regulations prohibiting the construction of tall towers, smokestacks, etc., in the surrounding area even though they are below the gliding angle.

The Central Airport is being promoted by private interests for private operation. The operation of an airport under private ownership can only be expected to continue as long as such use is more profitable than other uses of the property. Airports partake of the character of public utilities and their permanence as long as required for public use is essential. To secure permanence, public ownership or a dedication to public use must be accomplished.

REPORT - LOCATION OF AIRPORT, PHILADELPHIA DISTRICT

The jurisprudence of aviation is in its infancy and the jurisprudence of airports is just beginning. It is probable that the private operation of airports will in the near future be under public supervision and regulation as to service and rates, and a public license, franchise or permit will be required. Private ownership and operation of an airport may be very desirable to the public and the public may be fully protected in permanent use and fair rates by some form of contract providing for acquisition by the public under stated conditions. Compensation for such option might be provided by a waiver of taxes. Apparently legislation will be required to provide satisfactory terms for private ownership and operation of airports.

The dimensions of the field and the surrounding conditions provide a reasonable margin over present airport requirements to care for possible changes in the method of operation which may result from aircraft development.

The operation of an airport in this location immediately across Kaighn's Avenue and Browning Road from property under other ownership may in the future result in annoyance to the occupants of such property. Such a condition might result in limiting the use of the airport or in damages to the property owners.

The operation of an airport immediately alongside important highways such as Crescent Boulevard and even Kaighn's Avenue and Browning Road may in periods of moderate or heavy traffic result in the

slowing or stopping of vehicles, in order that their occupants may view the field operations, to such an extent that highway traffic will be delayed or obstructed. Such highway interference might involve expense or limitation of the use of the field.

**Plans and Cost**

The plans and estimates for the development of the Central Airport are not yet available. From information furnished by the promoters, the approximate cost of the project is:

Land . . . . .	\$1,450,000
Development:	
For Grading and Preparation of the Field . . . . .	\$10,000
For 1 Hangar 80 feet x 120 feet, with Shop alongside . . . . .	35,000
For First Section of Administration Building . . . . .	25,000
For Lighting System . . . . .	12,500
For Fencing and Miscellaneous Work . . . . .	17,500
Total Development . . . . .	<u>100,000</u>
Total Estimated Cost . . . . .	\$1,550,000

The cost of the land estimated above is said to represent actual cost to the promoters and is stated by competent real estate men to be fair present value.

The development provided for in this estimate is evidently meager and of only a preliminary character.

## Conclusions

1. The development of aircraft together with the provision of adequate airports generally throughout the country will result in a very rapid growth in air traffic which will probably far exceed all present conceptions. The airport facilities for the Philadelphia District should be planned with this in view.

2. For the traffic to be expected the Philadelphia District cannot be adequately served by a single airport but must be provided with a system of airports affording facilities convenient to all parts of the district.

3. The system of airports should consist of a principal airport easily accessible to the center of air traffic, capable of furnishing facilities for all essential traffic that may be expected, together with supplementary airports located where local or special traffic may require special facilities. With the growth of traffic each of the important sections of the district will require an airport.

4. The present needs of the district will be best served by the early construction of the principal airport for which the most desirable location is the site near Springfield, the cost of which as estimated is reasonable. This airport will serve all of the public requirements of the district until traffic develops to such an extent as to require facilities at other locations in the district.

5. Special facilities may be required in the near future to care for the traffic for which maximum accessibility is essential. The site known as the Central Airport located in New Jersey just east of

the city limits of Camden is the most desirable for a supplementary airport for this purpose and will also efficiently serve the local needs of the Camden section. It is desirable that steps be taken to preserve this site for use as an airport and to assure its use by the public for all traffic for which it is essential to have maximum accessibility to the business center and for the local use of the Camden section. To this end the surrounding territory should be restricted by zoning regulations to prevent the erection of obstacles in the air approaches. If possible, arrangements should be made to assure the permanence of an airport in this location.

6. In order that airport facilities may be furnished to all parts of the district as the needs develop, a public authority should be established for the development and control of airports, which authority may, in the future, in the interest of the public, have jurisdiction over the operation of private airports serving the public.

7. The operation of the principal airport and supplementary public airports that may be established will constitute a business of magnitude. A first-class, efficient management must be provided to assure satisfactory results.

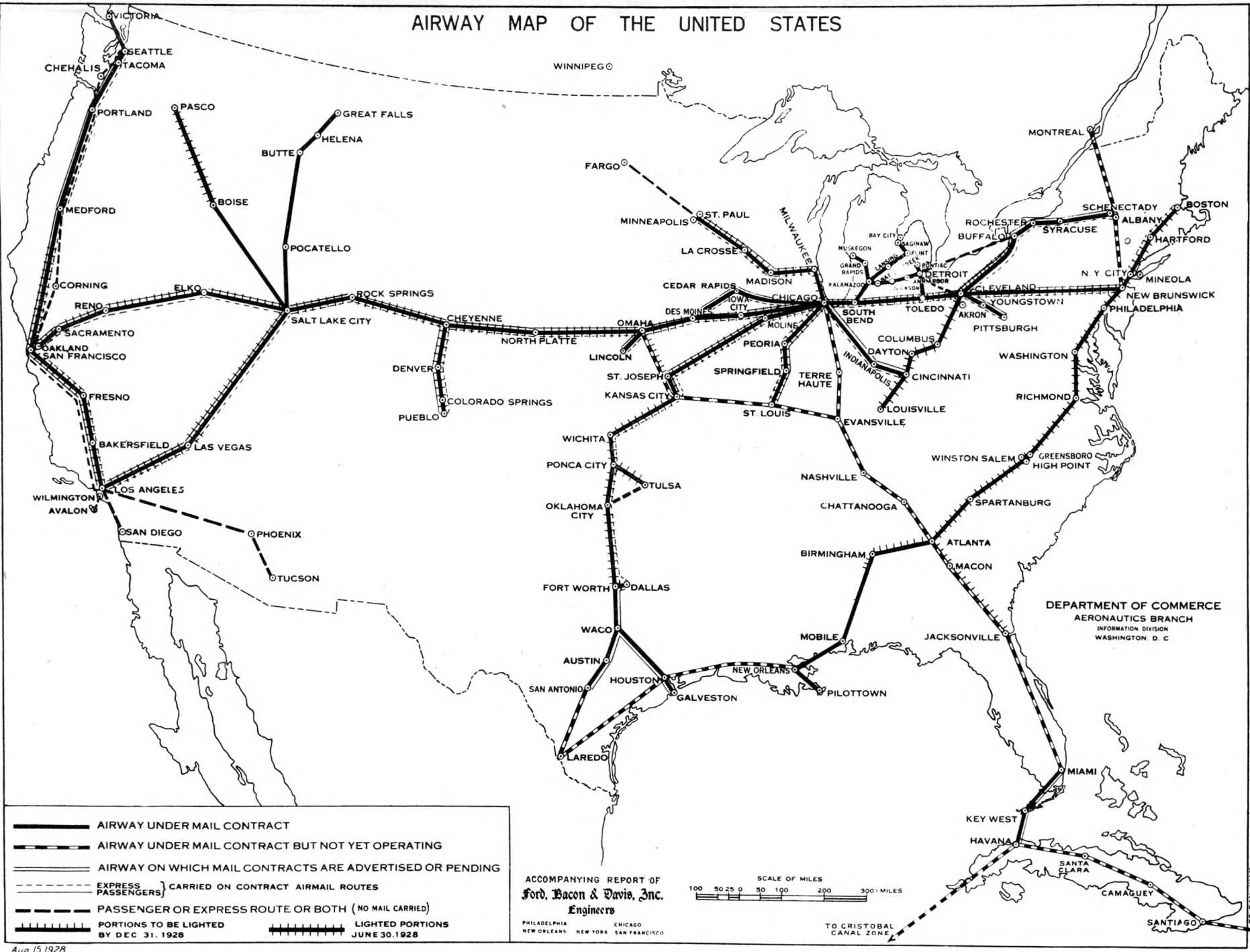
8. The prompt provision of adequate airport facilities will assure to the Philadelphia District the consideration to which it is entitled in the organization and development of the nation's air transport and will permit the use of sites which may not be available at a later date.



# EXHIBITS



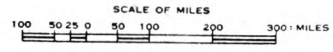
# AIRWAY MAP OF THE UNITED STATES



- AIRWAY UNDER MAIL CONTRACT
- AIRWAY UNDER MAIL CONTRACT BUT NOT YET OPERATING
- ..... AIRWAY ON WHICH MAIL CONTRACTS ARE ADVERTISED OR PENDING
- X-X-X- EXPRESS PASSENGERS } CARRIED ON CONTRACT AIRMAIL ROUTES
- P-P-P- PASSENGER OR EXPRESS ROUTE OR BOTH (NO MAIL CARRIED)
- ||||| PORTIONS TO BE LIGHTED BY DEC 31, 1928
- ||||| LIGHTED PORTIONS JUNE 30, 1928

ACCOMPANYING REPORT OF  
**Ford, Bacon & Davis, Inc.**  
 Engineers

PHILADELPHIA CHICAGO  
 NEW ORLEANS NEW YORK SAN FRANCISCO



TO CRISTOBAL CANAL ZONE

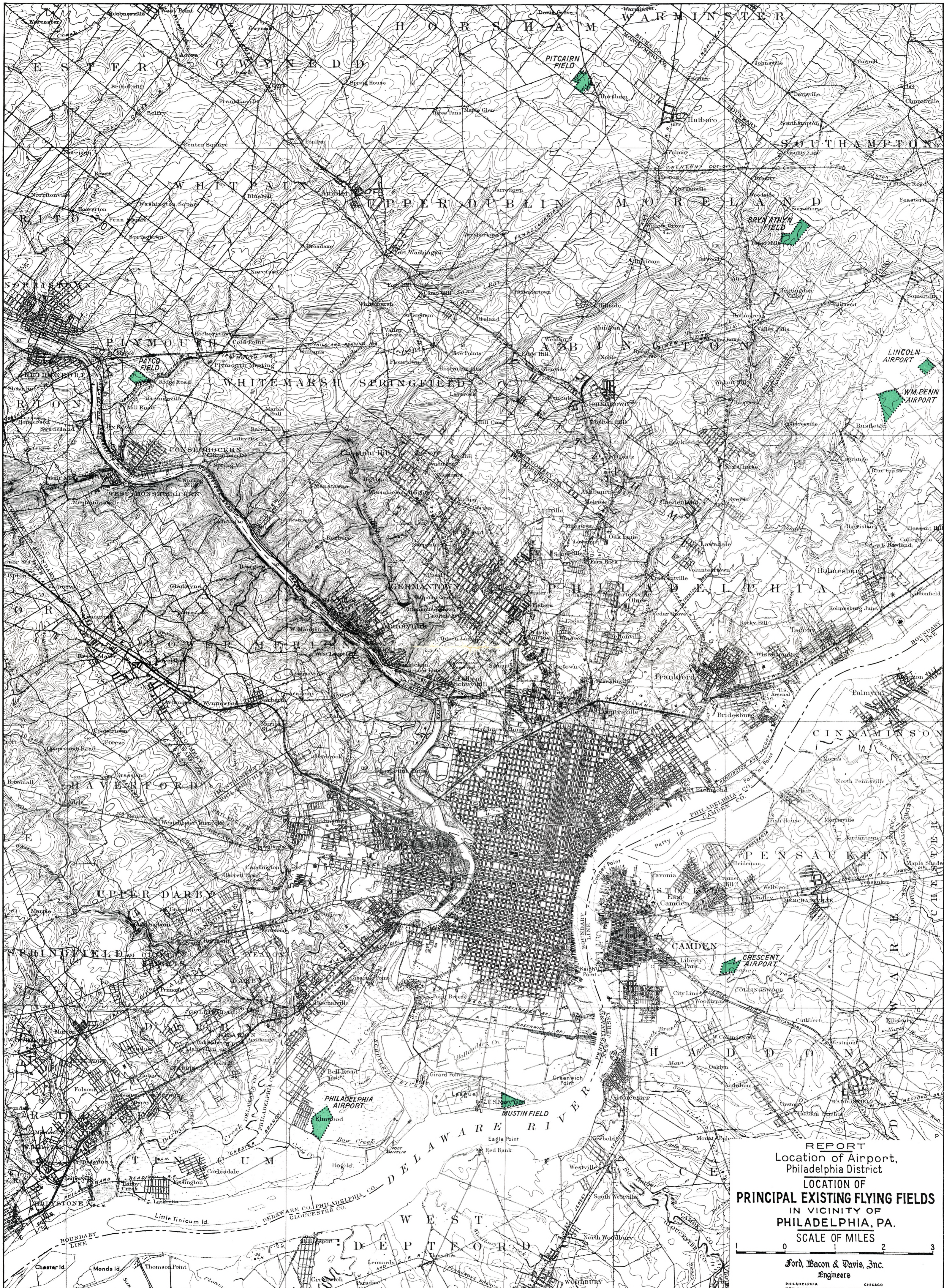
{ 33 }

EXHIBIT 1

DEPARTMENT OF COMMERCE  
 AERONAUTICS BRANCH  
 INFORMATION DIVISION  
 WASHINGTON, D. C.

PORTO RICO

Aug 15, 1928

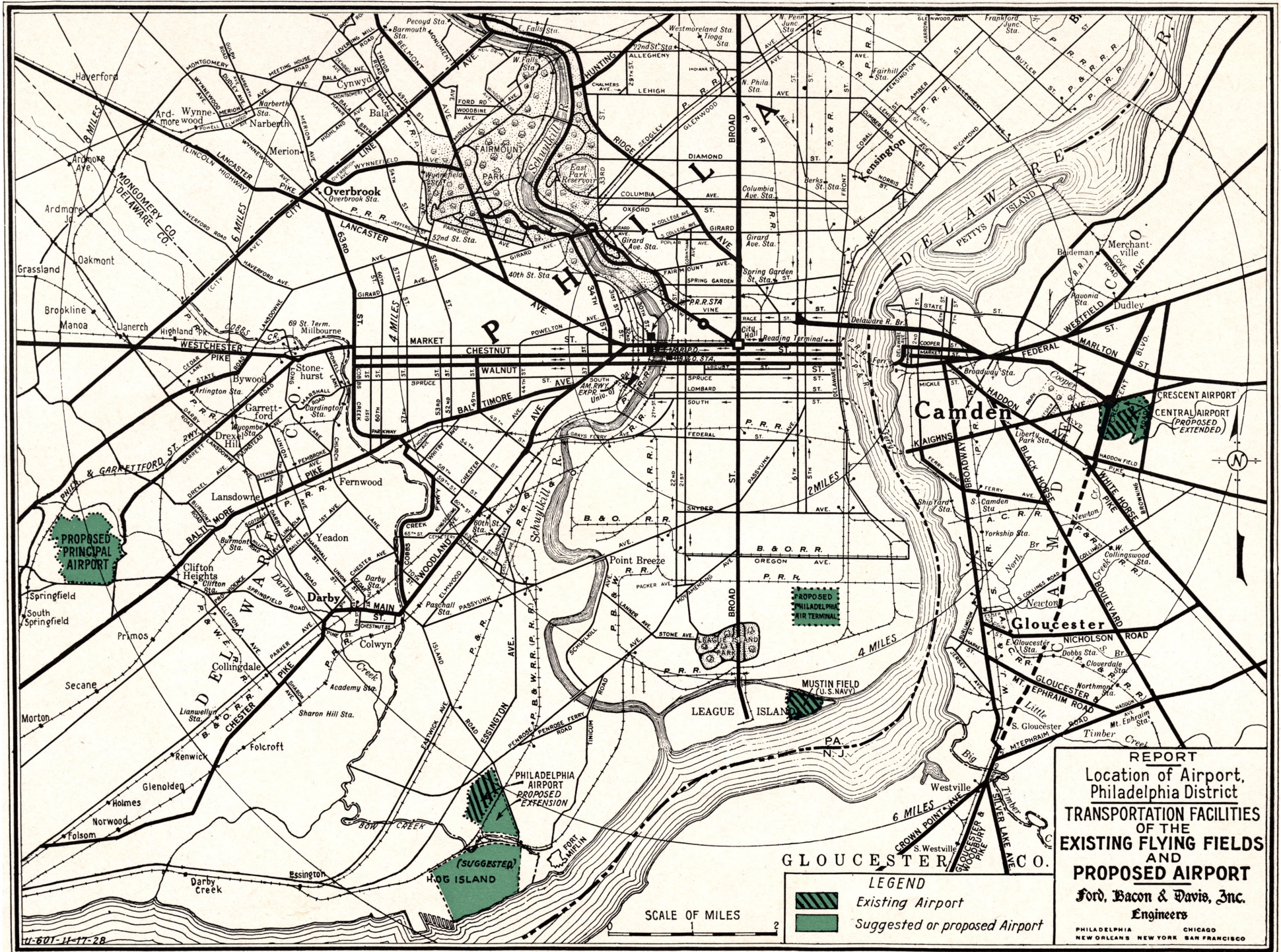


**REPORT**  
 Location of Airport,  
 Philadelphia District  
**LOCATION OF**  
**PRINCIPAL EXISTING FLYING FIELDS**  
 IN VICINITY OF  
**PHILADELPHIA, PA.**  
 SCALE OF MILES  
 0 1 2 3  
 Ford, Bacon & Davis, Inc.  
 Engineers  
 PHILADELPHIA CHICAGO  
 NEW ORLEANS NEW YORK SAN FRANCISCO



**REPORT**  
 Location of Airport,  
 Philadelphia District  
**LOCATION OF**  
**PRINCIPAL EXISTING FLYING FIELDS**  
 IN VICINITY OF  
**PHILADELPHIA, PA.**  
 SCALE OF MILES

0 1 2 3  
 Ford, Bacon & Davis, Inc.  
 Engineers  
 PHILADELPHIA NEW ORLEANS NEW YORK SAN FRANCISCO



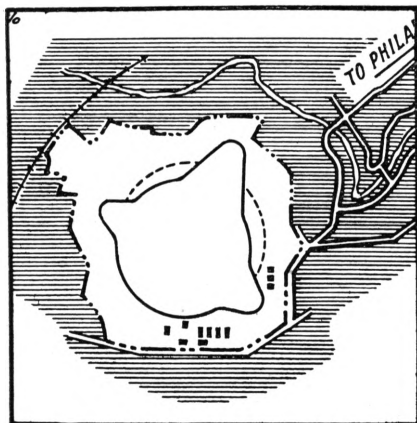
**REPORT**  
 Location of Airport,  
 Philadelphia District  
**TRANSPORTATION FACILITIES**  
 OF THE  
**EXISTING FLYING FIELDS**  
 AND  
**PROPOSED AIRPORT**  
 Ford, Bacon & Davis, Inc.  
 Engineers

PHILADELPHIA CHICAGO  
 NEW ORLEANS NEW YORK SAN FRANCISCO

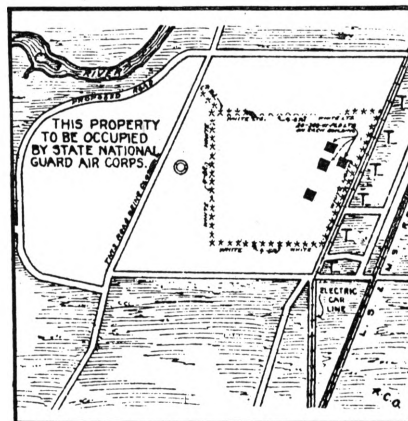
**GLOUCESTER**  
**LEGEND**  
 Existing Airport  
 Suggested or proposed Airport

U-601-11-17-28

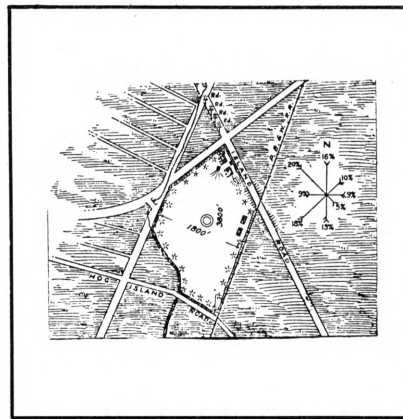
# COMPARISON OF IMPORTANT AIRPORTS SHOWN AT UNIFORM SCALE



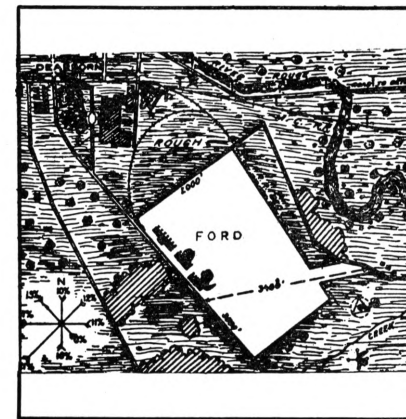
PROPOSED AIRPORT - PHILADELPHIA, PA.



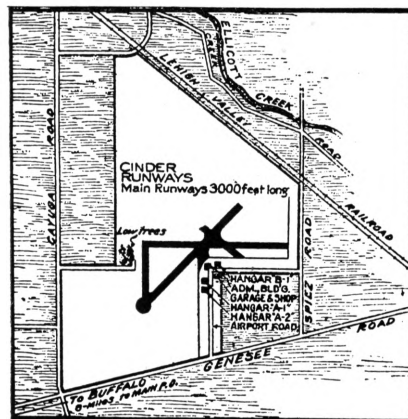
CLEVELAND AIRPORT - CLEVELAND, O.



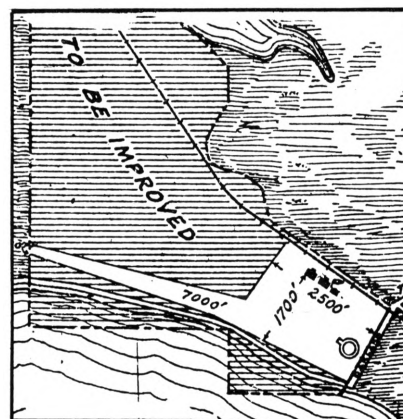
PHILADELPHIA AIRPORT - PHILADELPHIA, PA.



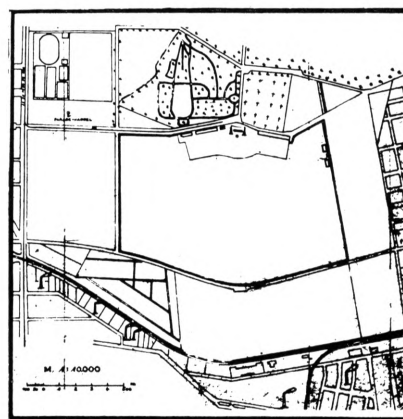
FORD AIRPORT - DETROIT, MICH.



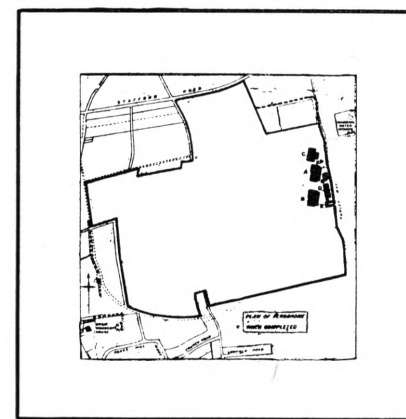
BUFFALO AIRPORT - BUFFALO, N.Y.



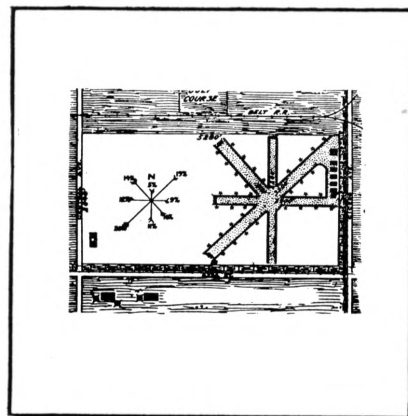
OAKLAND AIRPORT - OAKLAND, CALIF.



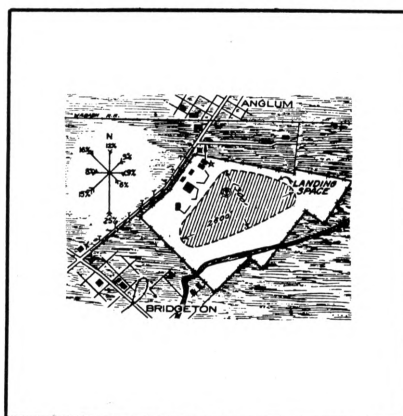
TEMPELHOF AIRPORT - BERLIN, GERMANY



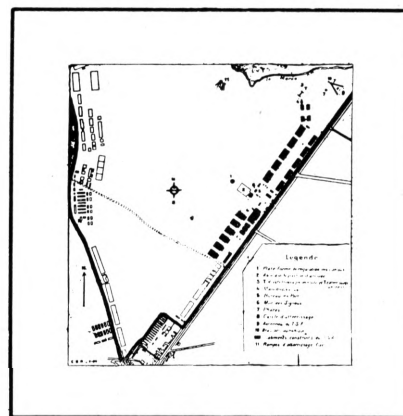
CROYDON AIRPORT - LONDON, ENGLAND



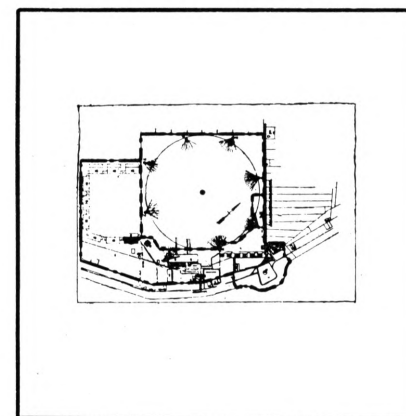
CHICAGO AIRPORT - CHICAGO, ILL.



LAMBERT-ST. LOUIS FIELD - ST. LOUIS, MO.

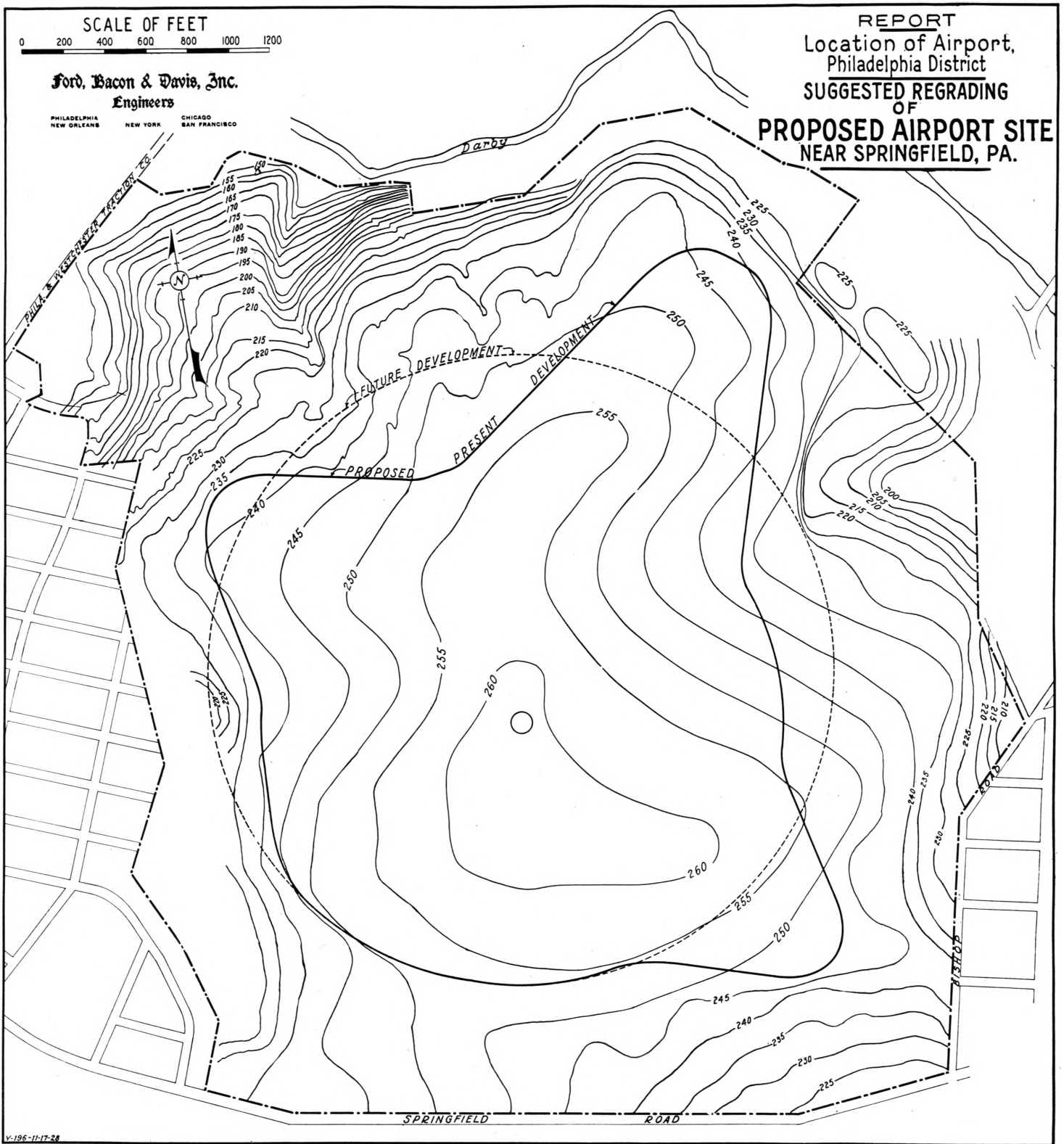


LE BOURGET AIRPORT - PARIS, FRANCE



SCHIPHOL AIRPORT - AMSTERDAM, HOLLAND

EXHIBIT 6







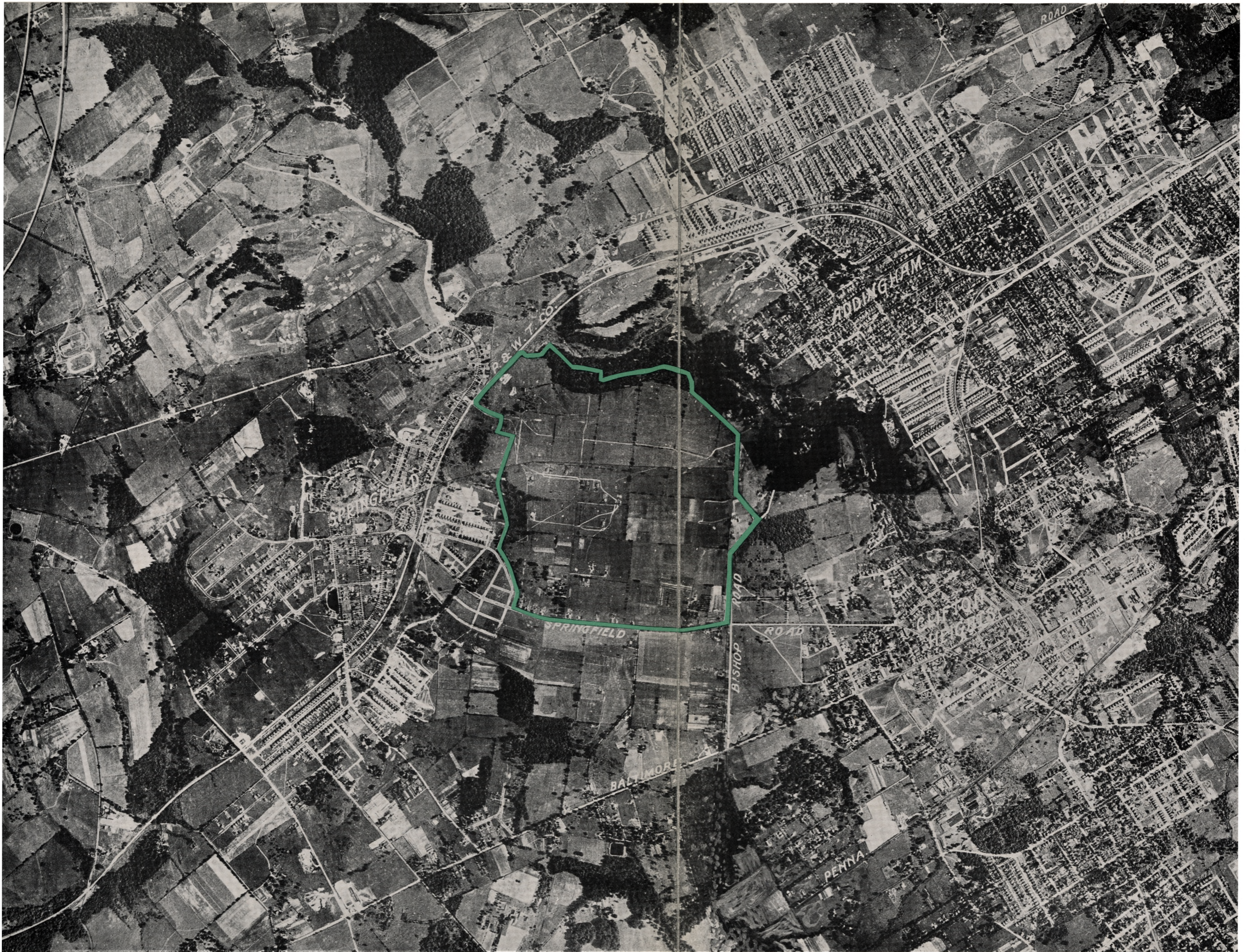
REPORT  
 Location of Airport  
 Philadelphia District  
 Philadelphia, PA.  
**SUGGESTED DEVELOPMENT  
 OF PROPOSED AIRPORT  
 NEAR SPRINGFIELD, PA.**

Scale of Feet  
 0 200 400 600 800 1000

John Jacobson & Smith, Inc.  
 Engineers

EXHIBIT 7

EXHIBIT 7



SITE OF PROPOSED PRINCIPAL AIRPORT, NEAR SPRINGFIELD, PA.  
AERIAL VIEW—VERTICAL



SITE OF PROPOSED PRINCIPAL AIRPORT, NEAR SPRINGFIELD, PA.  
AERIAL VIEW—LOOKING EAST



SITE OF PROPOSED PRINCIPAL AIRPORT, NEAR SPRINGFIELD, PA.  
AERIAL VIEW—LOOKING NORTHWEST



SITE OF PROPOSED PRINCIPAL AIRPORT, NEAR SPRINGFIELD, PA.  
AERIAL VIEW—LOOKING SOUTHEAST



SITE OF PROPOSED "CENTRAL AIRPORT," NEAR CAMDEN, N. J.  
AERIAL VIEW—VERTICAL

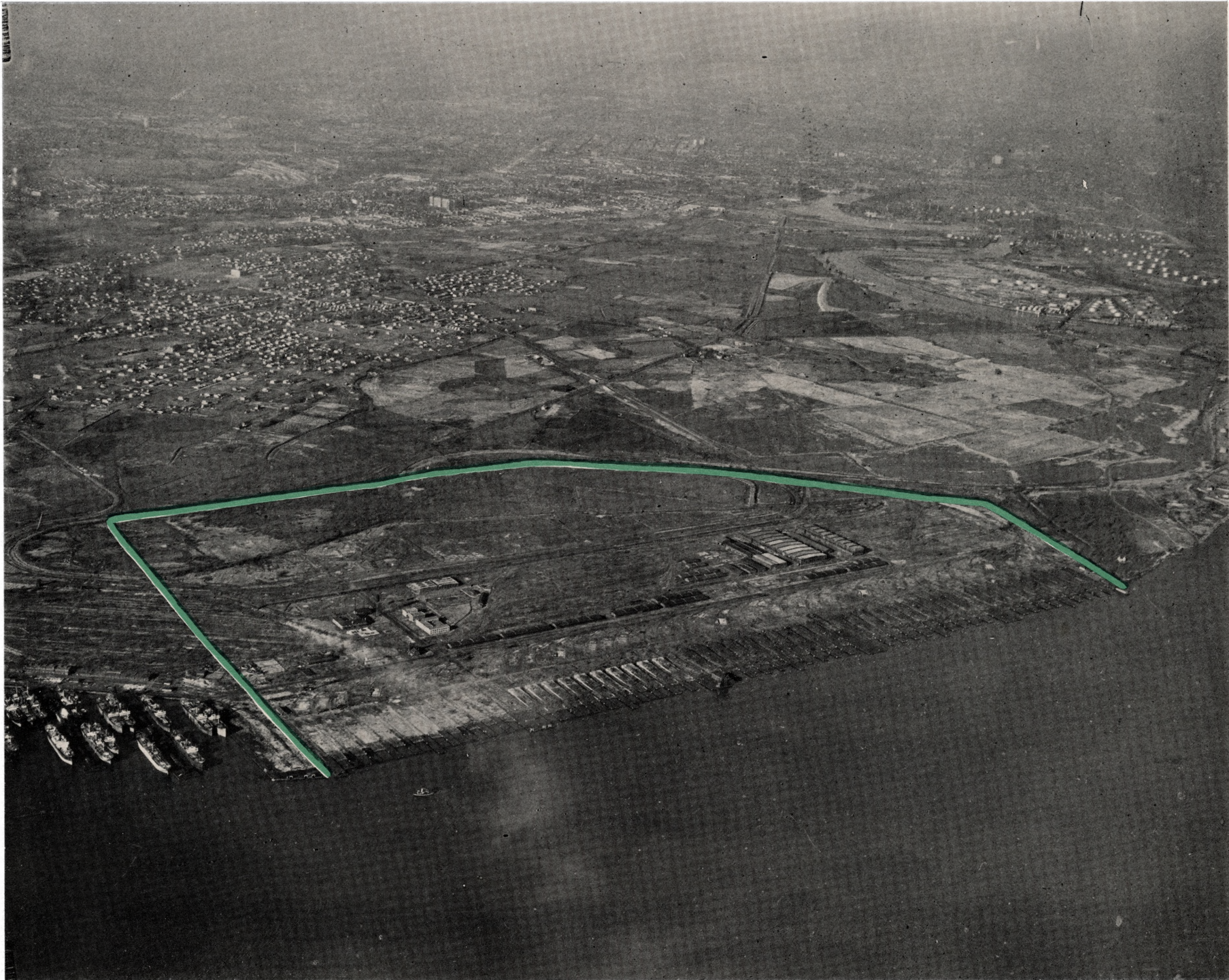


SITE OF PROPOSED "CENTRAL AIRPORT," NEAR CAMDEN, N. J.  
AERIAL VIEW—LOOKING NORTHEAST



EASTERLY PORTION HOG ISLAND TRACT  
AERIAL VIEW—VERTICAL





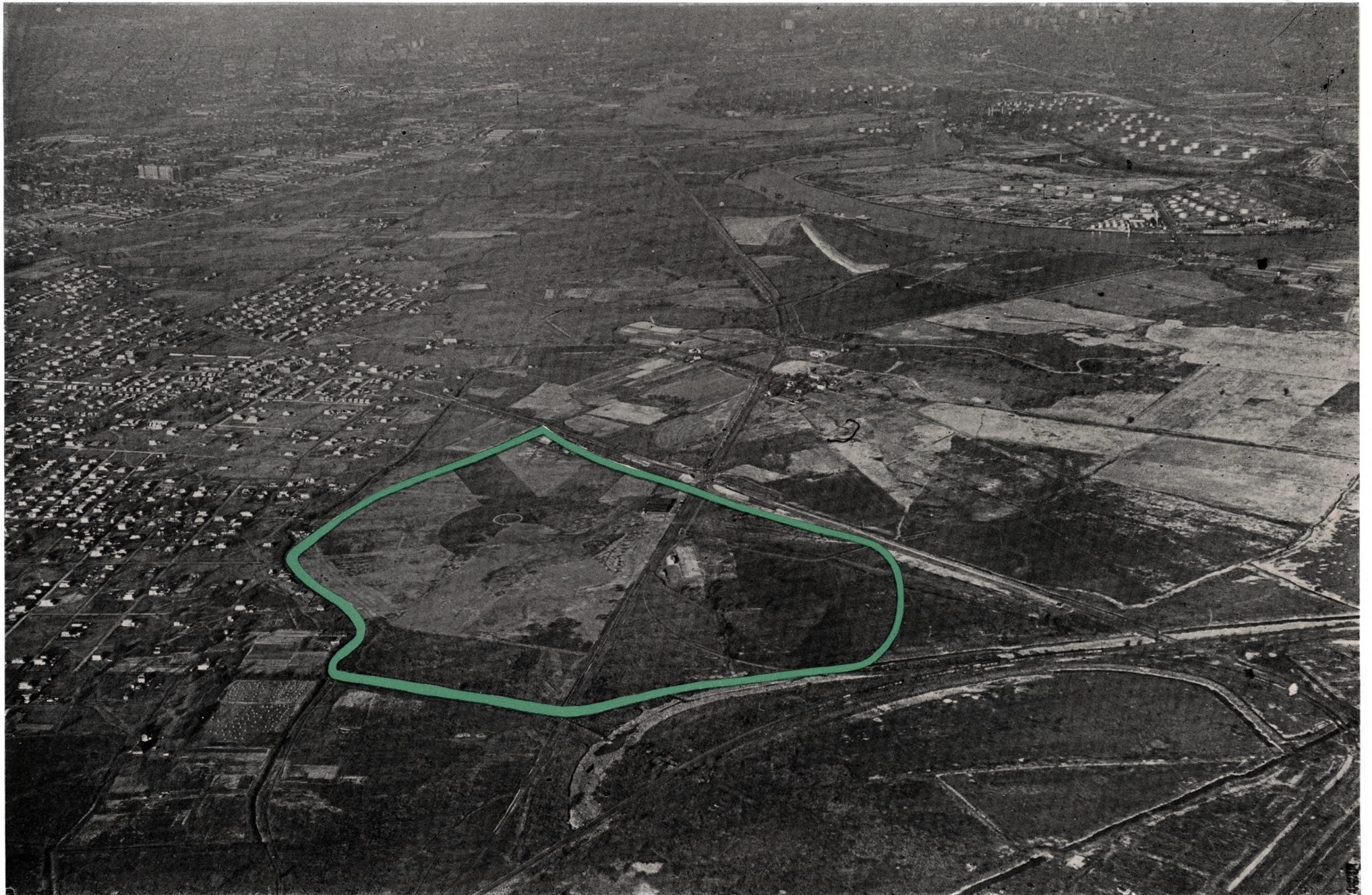
{ 46 }

EXHIBIT 19

EASTERLY PORTION OF HOG ISLAND TRACT  
AERIAL VIEW—LOOKING NORTH



“PHILADELPHIA AIRPORT” WITH PROPOSED EXTENSION  
AERIAL VIEW—VERTICAL



"PHILADELPHIA AIRPORT" WITH PROPOSED EXTENSION  
AERIAL VIEW—LOOKING NORTHEAST

EXHIBIT 23



SITE OF PROPOSED "PHILADELPHIA AIR TERMINAL"  
AERIAL VIEW—VERTICAL



SITE OF PROPOSED "PHILADELPHIA AIR TERMINAL"  
AERIAL VIEW—LOOKING NORTHWEST

SUPPLEMENT TO  
REPORT  
LOCATION OF AIRPORT  
PHILADELPHIA, PA.  
DISTRICT

DATED DECEMBER 7, 1928

DECEMBER 20, 1928



# LETTER OF TRANSMITTAL





**Ford, Bacon & Davis, Inc.**  
**Engineers**  
39 BROADWAY  
NEW YORK

New York, December 20, 1928.

JOINT COMMITTEE OF THE CHAMBER OF COMMERCE  
AND THE REGIONAL PLANNING FEDERATION ON  
AIR TERMINAL SURVEY, PHILADELPHIA, PA.

DEAR SIRs:

In accordance with your request we have prepared and submit herewith a supplement to our report on Location of Airport, Philadelphia District, restating in more detailed form the study of the area within the limits of the City of Philadelphia.

You will note that within the city limits we found no sites of adequate size and otherwise complying with the requirements for the principal airport, all of the sites examined within such limits being much inferior to the site near Springfield recommended in our report.

Very truly yours,

FORD, BACON & DAVIS, INC.



# REPORT



# Supplement to Report

## Location of Airport, Philadelphia, Pa., District

Dated December 7, 1928

---

December 20, 1928

In the report submitted to you on Location of Airport for Philadelphia District, at page 16, the existence of a number of political subdivisions within the district was referred to and it was stated that these subdivisions should not be permitted to interfere with the selection of the most desirable locations for airports to best serve the district.

The instructions under which the study was undertaken were to the same effect and seemed to be proper. For these reasons no extended comment was made separately on the sites available in the several subdivisions. Since the delivery of that report it has seemed desirable to discuss specifically such conditions within the limits of the City of Philadelphia.

In planning airport facilities for the Philadelphia District consideration must be given to the very great volume of air traffic that will reach the central section of this great center of commerce, industry and population. Facilities must be planned on a scale commensurate with the expected traffic. Safety and capacity are of first importance and are largely controlled by the size of the flying field and atmospheric conditions. In the report, at pages 18 to 19, the requirements of the principal airport are set

forth, discussed and summarized. The various proposed sites have been considered with respect to these requirements. In the study of available sites consideration was given to all existing flying fields, suggested sites and all locations which it seemed might permit development under reasonable conditions. The area within the city limits was first carefully studied, after which the surrounding area was investigated.

Within the city limits two districts seemed to offer possibilities for airport sites:

1. The south and southwest Philadelphia section, where there are large areas of lowlands subject to overflows, and
2. The northeast Philadelphia section beyond Pennypack Park, where on account of its remoteness from the central district, development has not advanced so far.

In all other sections of the city the permanent dedication of property to other uses, the topography and the presence of streets, railroads and other city development leave available no suitable areas of sufficient size to serve the purposes of the principal airport.

## South Philadelphia

In the vicinity of the junction of the Schuylkill and Delaware Rivers there are large areas of lowlands subject to overflow in which development has been slow on account of the necessity for extensive filling. North and east of the Schuylkill these lands are near and readily accessible to the central district. In this neighborhood near League Island Park several sites have been proposed or suggested which have the same general characteristics.

### The Philadelphia Air Terminal

The Philadelphia Air Terminal is shown in aerial photographs attached to the report. The location is within about a mile of the Delaware River, which lies to the east and southeast. There are large areas of wet land in the vicinity which may in the future be drained or filled. The elevation of the land is at or a little below sea-level. The low elevation and presence of large water areas and wet lands make fog and mist more frequent and persistent than usual. The industrial plants along the Schuylkill River and the railroads serving the industrial district, as well as industries farther down the Delaware River, produce smoke which, with the prevailing winds, will be blown over the site. The low elevation of the land requires a very large amount of filling to reach city grade and will make necessary a system of pipe drainage for the field and provision of proper top soil to grow turf, or the preparation of runways for flying operations. The filling and preparation of the field will require much time and may result in accidents or interruptions to service on account of settlement and washouts. The area of the field is limited by essential streets which cannot be closed or abandoned. The dimensions of the field are inadequate for the purposes of the principal airport and there is not sufficient area additional to the flying field for airport purposes.

The surrounding property separated from the flying field by public streets will require a large amount of filling and when filled will be too expensive for restricted uses. The land seems destined to industrial or small apartment use. Either use will result in reducing the available area of the flying field. The industrial use would result in the erection of obstacles in the air approaches. Apartment use

will further result in annoyance to the residents from the operation of the field.

The location is slightly more than three miles in an air line from the City Hall and about four miles via road, and is readily accessible from the central district. It can be reached easily by automobile under normal driving conditions in less than fourteen minutes from the City Hall over excellent roads, except a short distance at the site.

The air approaches are in general good but there are some high structures in the area surrounding the site which may be hazardous under bad weather conditions. The development of industries may increase the number and importance of such obstacles. The site is well located for ease of finding from the air and can be readily located by its position with reference to the rivers and neighboring conspicuous structures.

The site is inadequate for the principal airport on account of the insufficient size, and is much inferior to the site near Springfield in respect to the prevalence of fog, mist and smoke, the unsatisfactory surroundings and the large amount of filling required.

### Other Sites

The site bounded by Pattison and Packer Avenues, Fifth and Tenth Streets, has about the same characteristics as the Philadelphia Air Terminal. Its closer proximity to Broad Street makes the land more valuable but the physical conditions are about the same.

The site bounded by Pattison and Packer Avenues, Broad and Twentieth Streets, is of the same general characteristics but even more expensive on account of its Broad Street frontage.

The site included within the area bounded by Pattison Avenue, Pennsylvania Railroad, Twentieth Street and Penrose Avenue, is of much the same character but is closer to some of the industrial plants with serious obstacles in the air approaches.

All of these sites were considered inadequate because of insufficient size, and much inferior to the site near Springfield in respect to the prevalence of fog, mist and smoke, the unsatisfactory surroundings and the large amount of filling required.

## Southwest Philadelphia

### Model Farm Field

Across the Schuylkill River in the sewage disposal tract a site known as the Model Farm Field, prepared for use during the Sesqui-Centennial, has been suggested but was found unavailable as all of the land in the tract easterly of Island Road is required for the sewage disposal plant as planned, and is dedicated to that purpose.

### Philadelphia Airport

The Philadelphia Airport adjoins this site lying westerly of Island Road at its intersection with Penrose Avenue (projected). It is located about one and a half miles from the Delaware River with some wet lands in the vicinity. The elevation is at or a little below sea-level. The proximity of large water areas and the low elevation make fog and mist more prevalent. The location is southerly and westerly of the principal industrial and railroad district, thereby avoiding the smoke blown by the prevailing winds from these points. Some smoke from plants further down the Delaware River and near Chester and Wilmington would be blown over the site by southwesterly winds prevailing in summer. The adjoining land on the west is apparently destined for residential use with small houses. On the east the land is owned by the City and is dedicated to use as a sewage disposal plant. On the south the land may be used for industrial purposes but there is no present indication of such use. The low elevation of the land makes extensive filling necessary to reach city grade and will require a system of tile drainage for the field and the provision of topsoil to produce turf or the preparation of runways for flying operations. The filling and preparation of the field will require much time for construction and may result in conditions which will cause accidents or interruptions to service on account of settlement and washouts.

The area of the site is limited by an important planned highway on the northwest, a partially opened public street on the northeast, the double track 69th Street Branch of the Pennsylvania Railroad on the southeast and by drainage channels on the southeast and west. A triangular area to the southeast cut off from the sewage disposal tract by Island Road is available for enlarging the site but requires the removal to a new location of the 69th Street Branch of the Pennsylvania Railroad. The

field extended as proposed is inadequate for the purpose of the principal airport and it is not feasible to further enlarge the field sufficiently to serve this purpose on account of other railroad lines and important highways. The field is protected from interference by neighborhood construction where it adjoins city property except for railroad structures, which may interfere but can be controlled by agreement. Construction on other neighboring property would have to be restricted by zoning regulations or other control which might not be difficult as there is no present indication of any industrial use. The operation of the flying field opposite residential property may in the future cause annoyance and trouble.

The Philadelphia Airport is about six miles in an air line from the City Hall and about seven miles via road. It is readily accessible from the central district by excellent roads to a point near League Island Park, beyond which the road is an ordinary paved highway obstructed by railroad grade crossings and a swing bridge over the Schuylkill River. The road is further obstructed by a traction line on the road. This portion of the road is covered by an improvement project which should be executed in the near future. This would provide good roads directly from the City Hall to the Airport. The Airport can be easily reached from the City Hall with ordinary driving under normal traffic conditions in about twenty-five minutes.

There are no obstacles in the air approaches except locally, which can be easily removed. The site can be readily found from the air on account of its location with respect to the rivers and other topographic features. The Philadelphia Airport is a stop on the present airmail route.

The site is inadequate for the principal airport on account of insufficient size and is much inferior to the site near Springfield in respect to the prevalence of fog, mist and some smoke, the topography, the surroundings and the large amount of filling required with its resultant delay in the use of the field.

### Other Sites

Other sites along the west bank of the Schuylkill River were suggested but in no case was sufficient size available.



## Northeast Philadelphia

In the section beyond Pennypack Park there are several flying fields in operation including, in particular, the William Penn Airport, Lincoln Airport and the Flying Dutchman Field. Of these fields, the largest, and that nearest to the business district, is the William Penn Airport.

### William Penn Airport

The site lies westerly of Roosevelt Boulevard, south of its intersection with Red Lion Road and extends westerly to Haldeman Avenue and southerly to a creek which crosses the property. The site is shown on the accompanying aerial photographs, including a vertical view and an oblique view from the south. Only a portion of the area described is available for flying operations on account of unsatisfactory grades and lack of development. The location is about three and one-half miles from the Delaware River with no large water areas or wet lands in the vicinity. The elevation is about 160 feet above sea-level, which, with its distance from large wet areas, makes fog and mist less prevalent. The location being northerly and to some extent westerly of the industrial district and other large smoke producers, protects the site from smoke blown by the prevailing winds. The surrounding lands are undeveloped and to some extent under cultivation. The area is apparently destined for high-class residential use which should not result in the restriction of the available area of the field. The field surface is sandy loam with a fair turf. That portion of the field in use has satisfactory grades but the surrounding slopes are too steep.

The area of the site is limited by important roads and the topography, so that it is not feasible to enlarge the area. The dimensions of the flying field are inadequate for the principal airport and other areas are insufficient for buildings and facilities. On the west, north and east, the site fronts on important roads. In the future the operation of a flying field will annoy occupants of this property and possibly limit the use of the field. Flying operations may also result in traffic interference on the highways, due to efforts of drivers to view the field.

The site is somewhat more than twelve miles in an air line from the City Hall and more than fourteen miles via road. The roads are wide and well paved and the site can be reached from the City Hall by automobile with ordinary driving under normal traffic conditions in about 45 minutes.

The air approaches are good but there is a tall

steel tower transmission line about one-half mile to the west which may be hazardous under bad weather conditions. There are some nearby obstacles which can be easily removed. The site can be easily found from the air by the proximity of the Roosevelt Boulevard and the peculiar road arrangement nearby.

This site is inadequate for the principal airport on account of insufficient size, and is inferior to the site near Springfield in respect to its distance from the center of air traffic, the topography and surroundings.

In the future the local needs of Northeast Philadelphia will require that an airport be established nearby. It is probable that this site, which has many advantages, would serve the local needs efficiently, as the field need not be so large as for the principal airport and accessibility to the central district is not essential.

### Other Existing Fields

The Lincoln Airport located on the westerly side of Roosevelt Boulevard, somewhat more than a mile beyond William Penn Airport, has somewhat the same characteristics as the latter. The Lincoln Airport is of smaller size and is limited as to expansion by the distance between the Boulevard and the Philadelphia & Reading Railway, which makes it impossible to obtain a field of sufficient size between them.

The Flying Dutchman Field adjoins the Lincoln Airport, is of smaller size and is subject to the same limitations as to area.

The Lincoln Airport and the Flying Dutchman Field are both at a greater distance and require a longer time to be reached from the central district than the William Penn Airport.

### Other Sites

All suggestions of sites for the airport in this district were carefully considered. Maps were studied for areas of sufficient size, the topography of which was investigated by a study of maps and by inspection. No sites were found which could be developed with a reasonable amount of grading. Excessive moving of earth was considered objectionable on account of expense, the time required for construction and restoring the turf, and the probability of settlements and wash-outs which might make the field unserviceable for several years.

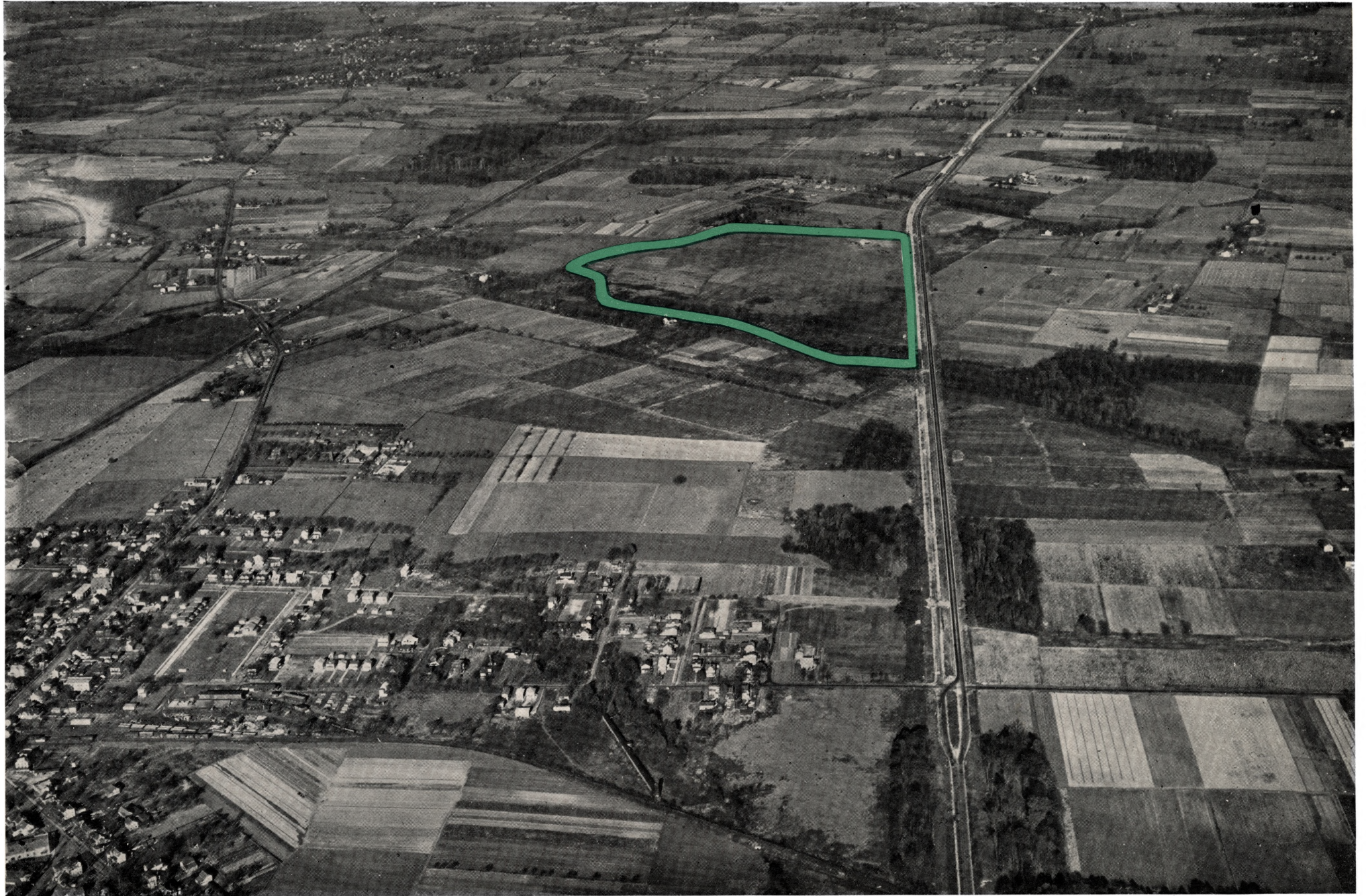
# EXHIBITS



EXHIBIT 1



WILLIAM PENN AIRPORT  
AERIAL VIEW—VERTICAL



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EXHIBIT 2

WILLIAM PENN AIRPORT  
AERIAL VIEW—LOOKING NORTH

