EVALUATION OF AIRCRAFT NOISE AT DETROIT "METRO" AIRPORT AS A BASIS FOR FORMULATING A GENERALIZED LAND USE PLAN

Thesis for the Degree of M. U. P.

MICHIGAN STATE UNIVERSITY

Maurice William Roach JR.

1964

ABSTRACT

EVALUATION OF AIRCRAFT NOISE AT DETROIT "METRO" AIRPORT AS A BASIS FOR FORMULATING A GENERALIZED LAND USE PLAN

by Maurice William Roach, Jr.

The development of a land use plan in Romulus Township, Michigan, is required in order to eliminate the conflict between jet aircraft operations at Detroit "Metro" Airport and the surrounding urban land uses. Through the efforts of concerned individuals in Romulus Township and Wayne County, and through the facilities of the Detroit Metropolitan Area Regional Planning Commission, and with substantial funds provided by the Housing and Home Finance Agency in the form of a Demonstration Grant, a study was instituted with the objective of recommending a resolution to the aircraft noise problem. A set of principles and standards for development, along with a general land use plan for the future physical design of the Township and the airport environs was presented to the various officials and citizens concerned, as a result of

this investigation. This thesis attempts to present the development of Romulus Township and Detroit "Metro" Airport, and to trace the reactions of citizens and public officials to the proposed plan for the environs of the airport as set forth in the Demonstration Grant Project.

Much of the data utilized in this thesis was gathered from the numerous sources which were made available to the author during the preparation of the Airport Environs Study and Plan by the staff of the Detroit Metropolitan Area Regional Planning Commission, and through the observation of events which have occurred since the completion of this work. The thesis has been broken into three areas of presentation; 1) historical background of the Township and the Airport, 2) the development of the Plan, and 3) the use of Plan and Recommendations.

The result of this analysis pointed to a number of conclusions with regard to the problems associated with airport-community development, and the urban planning process.

1. Demonstration Grants are a most useful vehicle with which to explore unique planning problems, and to present workable solutions to them.

2. There is a basic concern on the part of township, county and federal officials with respect to future airport-community development.

3. The involvement of key officials through an Advisory Committee charged with guiding such a program is useful, meaningful and will aid in the long range implementation of the plans and recommendations set forth.

4. The Federal Government through legislation and appropriation of funds is accepting the responsibility for co-ordinated airport-community development.

5. Local officials tend to move in a less co-ordinated manner toward the implementation of such plans and recommendations.

6. The Demonstration Grant has forced all of the concerned agencies into a process of self-analysis which will likely continue into the future.

7. Romulus Township has the responsibility and the ability to implement the Plan and Recommendations of the Demonstration Grant. The FAA and the Detroit "Metro" Airport likewise have a similar responsibility and ability to regulated flights to aid the Township in achieving sound community development.

8. The Airport Environs Study as presented to the public should have included more quantitative data to support the defined "Affected Area."

9. The study likewise should have perhaps contained more substance with regard to the selected uses which this land can be used for.

EVALUATION OF AIRCRAFT NOISE AT DETROIT "METRO" AIRPORT AS A BASIS FOR FORMULATING A GENERALIZED LAND USE PLAN

by

MAURICE WILLIAM ROACH, JR.

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER IN URBAN PLANNING

School of Urban Planning and Landscape Architecture

1964

PREFACE

The author wishes to take this opportunity to express his deep gratitude to Professors Charles W. Barr, Sanford Farness and Stuart Marquis of Michigan State University, and to Mr. Paul M. Reid and Mr. James F. Miller of the Detroit Metropolitan Area Regional Planning Commission, for the comments and suggestions made during the preparation of the text. The author also wishes to express his sincere appreciation to the others who have labored so willingly in the preparation of this work.

TABLE OF CONTENTS

TABLE OF CONTENTS--Continued

LIST OF TABLES

LIST OF ILLUSTRATIONS

CHAPTER I

INTRODUCTION

Statement of the Problem

The development of a land use plan in Romulus Township, Michigan, is required in order to eliminate the conflict between jet aircraft operations at Detroit Metropolitan Wayne County Airport and the surrounding urban land uses. This problem has become intensified by the increase in flight operations at the airport, by the increasing concern expressed by dissatisfied home owners and residents in the area, as well as by increasing urban development in the airport environs.

Beginning in 1960 through the efforts of concerned individuals in the Township and the County, and through the facilities of the Detroit Metropolitan Area Regional Planning Commission, and with substantial funds provided by the Housing and Home Finance Agency in the form of a Demonstration Grant, a study was instituted with the objective of recommending a resolution to the aircraft noise problem. During the next three years, the issues

involved were discussed and analyzed by the Regional Planning Commission staff, its acoustical consultant, and an advisory committee made up of airport management, township officials, county officials; other concerned agencies such as the FHA and the FAA were consulted. In 1963, a set of principles and standards for development, along with a general plan for the future physical design of the Township and the airport environs, was presented to the various officials and citizens concerned, as a result of the investigation.

The solution to the problem of conflict between the airport and the community now became one of implementation of these principles and standards within the framework of the physical development plan, and within the framework of governmental structure.

Objective of the Thesis

The objective of this thesis is to present the development of Romulus Township and Detroit "Metro" Airport, and to trace the reactions of citizens and public officials to the proposed plan for the environs of the airport as set forth in the Demonstration Grant Project.

It is intended that the following questions will be answered by the research and observations made during the course of this study. What has been the basic value of the Demonstration Grant Project with respect to the Township and future development? What effect has the Demonstration Grant had on the policy of concerned governmental agencies? Have those residents most seriously affected by the problem accepted the answers given to them as a solution to the noise problem?

The author was attracted to the subject initially through involvement with the Demonstration Grant Study conducted by the Detroit Metropolitan Area Regional Planning Commission, beginning in August of 1960. It became apparent that the study began influencing the Township soon after the program was initially adopted and it has continued to do so through the preparation of this particular research. It has been possible for the author to monitor the events related to this urban planning function and to both record and explore the events which have taken place over the past several years.

Methodology

Much of the information utilized in this thesis was gathered and compiled from numerous sources which were made available to the author during the preparation of the Airport Environs Study and Plan by the staff of the Detroit Metropolitan Area Regional Planning Commission. Some of these are expressed in terms of insights gained at the many meetings held in conjunction with the study effort.

The Airport Environs Study and Plan is a Demonstration Grant, Project (Michigan D-3), which was financed by the Federal Housing and Home Finance Agency, the Regional Planning Commission, Wayne County, Romulus Township Board and the Romulus School District. The purpose of this study was to provide a suggested plan of compatible land uses for the areas determined to be seriously affected by the sound and vibration of aircraft operations at Detroit "Metro" Airport.

The study involved several principal parts: the land use and economic analysis conducted by the Regional Planning Commission, the acoustical determination of the land

affected by the aircraft operations which was conducted by Polysonics Inc. and the overall plan development by the staff of the Regional Planning Commission with the aid of the Airport Environs Advisory Committee.

Some of the data presented herein has been gathered through personal contacts with many of the officials of government connected with the study, the airport and the township.

Information has also been gathered from a review of the supporting studies which have been made dealing with the aircraft noise problem, and in the area of land utilization in the environs of airports.

Other supporting data have been used where applicable and will be so footnoted throughout the text.

Shortly after the completion of the Airport Environs Study and Plan new Federal requirements with respect to the spacing of parallel runways were established. Should these requirements be adopted at Detroit "Metro" Airport it will cause some alterations to the physical plan as presented.

These alterations should be made only after a careful acoustical analysis of the new runway configuration.

It is important to point out that during the development of the Airport Environs Study and Plan several basic assumptions were made with regard to future aircraft development. These assumptions have been adhered to in this effort.

The first assumption is that the present day aircraft such as the DC-8, the 707 and the Viscount airplanes will continue to form the basic core of the commercial aircraft fleet until at least 1980. This is based on the premise that the airlines undertook a vast expenditure to purchase these planes and as such will be required to use them to the maximum in order to make them profitable.

The second assumption is that because vertical takeoff and landing aircraft are still in the experimental and development stage that it will be a considerable time before these types of aircraft will become an integral part of the commercial operations. It was concluded that this will not take place prior to 1980.

It was also realized that some form of supersonic jet aircraft might be in operation before the 1980 date of the Plan. However, virtually no operational data existed at the time of the preparation of the study and as such this concept was not fully utilized in the preparation of the Plan.

The two latter assumptions have been made with the warning that when such data and knowledge are made available that they be analyzed and evaluated and that modifications to the plans be made where necessary.

EXPANDING URBAN AREA

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT

1960

1970

1980

SCALE MILES 0 1 2 3 6 7 8 9

1964

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 1

LOCATIONAL MAP

CHAPTER II

HISTORICAL BACKGROUND

Background of the Demonstration Grant Study Area

The following introduction to the thesis has been collected and presented from the material which the author prepared as part of the Demonstration Grant Study. It is intended for the purpose of presenting the history of the study area and the pointing out of the general problem of airport development in the township.

The Detroit Metropolitan Wayne County Airport is located in the central and eastern portion of Romulus Township on the Detroit Industrial Expressway (I-94). Downtown Detroit is 16 miles from the airport via this route. The township contains one urban center to the west of the airport, the unincorporated village of Romulus, and the fringe development of the city of Wayne to the north. The population can be called predominately urban in the north, east and central portions of the township with the south and west being essentially rural in

nature. Some of the latter portions however have felt the pressure of coming urban development.

The expansion of Detroit Metropolitan Wayne County Airport was completed in September of 1958 to accommodate commercial jet air service. The introduction and expansion of regularly scheduled jet service has created a situation of some difficulty when it is related to the urban growth which has become evident in the area surrounding the airport. This urban growth has in part been caused by a general expansion of the Detroit regional population and more specifically by the wartime industrial development which is located in close proximity to the township and the airport.

The airport is administered by the County Road Commission under the direction of the Wayne County Board of Supervisors, and has been since 1929. During the past ten years the facilities of the airport have been greatly expanded in an effort to build the plant into the leading commercial airport of the Detroit region. This expansion included facilities for the advent of jet aircraft as part of commercial carrier operations.

The development of Romulus Township has not been as rapid as other townships of similar background in the region, either in terms of economic development or population growth. In the period of 1940 to 1950, when the airport was largely in wartime usage, the population grew from 6,880 to 12,311.[1] It was during this period that a greater portion of the poorly built homes was constructed.

The majority of new homes constructed in the township since 1950 fall within the lower price ranges as compared to the other new homes built in the Detroit region during the same period. In many cases, residential land values and minimum development standards have attracted the marginal type of builders, and have resulted in minimum types of home building. This prior development has resulted in the attraction of many families of lower income, unable to maintain these homes properly and to pay for the necessary urban services and facilities which are now required by the population. The highly scattered

---

[1] Decennial Census for 1920, 1930, 1940, 1950 and 1960, U.S. Department of Commerce.

development and poor building controls have caused the FHA authorities to render adverse decisions in a number of cases for the guarantee of loans. This situation has been improved with stricter local enforcement of the zoning ordinance and building codes.

Wayne County adopted an airport zoning ordinance in 1951, thus regulating the height of structures within specified areas around the airport. The ordinance did not however, take into consideration the various requirements that jet plane operations would involve, with longer runways, longer approach patterns, jet engine noise, and increasingly heavy air traffic. All of these factors restrict the type of growth and economic development which are likely to or should take place in Romulus Township and its environs.

The situation in Romulus Township is not all negative. The township has certain assets and potentials which should play an important part in the future development of the area. The Detroit Willow Run Industrial Expressway offers an excellent established link to the remainder of the region. Both the Wabash Railroad and the Chesapeake and

Ohio Railroads service the township and intersect in the unincorporated village of Romulus. Water and sewer lines from the Detroit area now service the northern half of the township, or are well along in development. Additional expressway development is proposed in the township area to further extend regional auto and truck communication. Finally, the airport itself should foster certain forms of economic development.

Township officials became interested and started to raise certain questions about future development after the first jet runway was placed in operation. The county board of supervisors, through its airport committee, realized that they had certain responsibilities to the township regarding the development of the airport. It was through the interest of these groups that the concept of a study for future development around the airport was initiated. Because of the metropolitan nature of the airport facility, the Regional Planning Commission was asked to look into the problem and it was here that the study in its present form was conceived.

Here in summation, is a largely rural, but potentially suburban township with an established metropolitan facility in the form of an inter-continental airport occupying its center, inhibiting normal suburban growth, and requiring special planning treatment. This situation not only affects the environing township but also bears on the attractiveness of the metropolitan airport as a point of entry into the Detroit region.

History of the Study Area Land Use Pattern

Development of the present day land pattern began with the establishment of Wayne County in 1796. At that time, the county consisted of a large portion of what is today the present State of Michigan. By 1850, the size of Wayne County had been reduced to its present day area, and the townships which make up the county had been established. These townships were 36 square miles in size and were divided into little squares by a system of section lines. Each of the square mile areas was called a section and contained approximately 640 acres. The sections were further subdivided into quarter section areas. The section lines also served as road rights of way.

Agricultural development first took place in the county with settlement beginning in the early 1800's. These early farmsteads were composed mainly of various combinations of quarter sections. Small villages began to appear in the county about 1820, the most significant being New Boston, Romulus (Pullen's Corners), Dearborn and Wayne. These villages served as agricultural trading centers and as rest points for travelers in the area, especially along the Chicago Road (now Michigan Avenue). The introduction of the railroad in the late 1830's added still other villages along the right of way, the most notable being Inkster and Belleville.[2]

The area remained primarily agricultural in nature until the 1920's when the automobile manufacturing industry became the dominant economic factor in the area. This resulted in some land being converted to industrial and commercial use, but more important it brought subdivision

---

[2]H. Belden and Company, Illustrated Historical Atlas of Wayne County, Detroit, 1876; Clarence M. Burton and M. Agnes Burton, History of Wayne County and the City of Detroit, Vol. 1, Detroit, 1930; Mason L. Brown, Wayne County, published by Silas Farmer and Company, 1894; W. S. McAlpine Map Company, Wayne County Farm Atlas, Burton Abstract and Title Company, 1936 and 1942.

activity into the area. This has been especially significant in the past ten to twenty years. This growth has been reflected in the original villages many of which have now become cities or large villages. Several of the townships, notably Taylor, Dearborn and Nankin, have become almost totally urbanized.

The present day land use still reflects the early land survey method, in that many of the present subdivisions are entire quarter sections, or portions thereof, and that many of these subdivisions have maintained and extended the gridiron road system. Other quarter sections now remain vacant, the land being held for speculative purposes. At present, only the western portion of the study area has any appreciable agricultural use.

Romulus Township Land Use Picture

The following attempts to give a description of the land use picture in Romulus Township. The information was collected while making the land use survey of the area during the early part of 1961 (see Fig. 2).

LAND USE

EXISTING

RESIDENTIAL
- HIGH DENSITY
- MEDIUM DENSITY
- LOW DENSITY
- SUBURBAN

COMMERCIAL
- GENERAL BUSINESS
- EXTENSIVE BUSINESS

INDUSTRIAL
- INDUSTRIAL & UTILITIES
- EXTRACTIVE

PUBLIC & SEMI-PUBLIC
- PUBLIC RECREATIONAL
- SEMI-PUBLIC OPEN SPACES
- EDUCATIONAL
- OTHER
- AGRICULTURAL & VACANT

SCALE MILES

1961 Survey

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

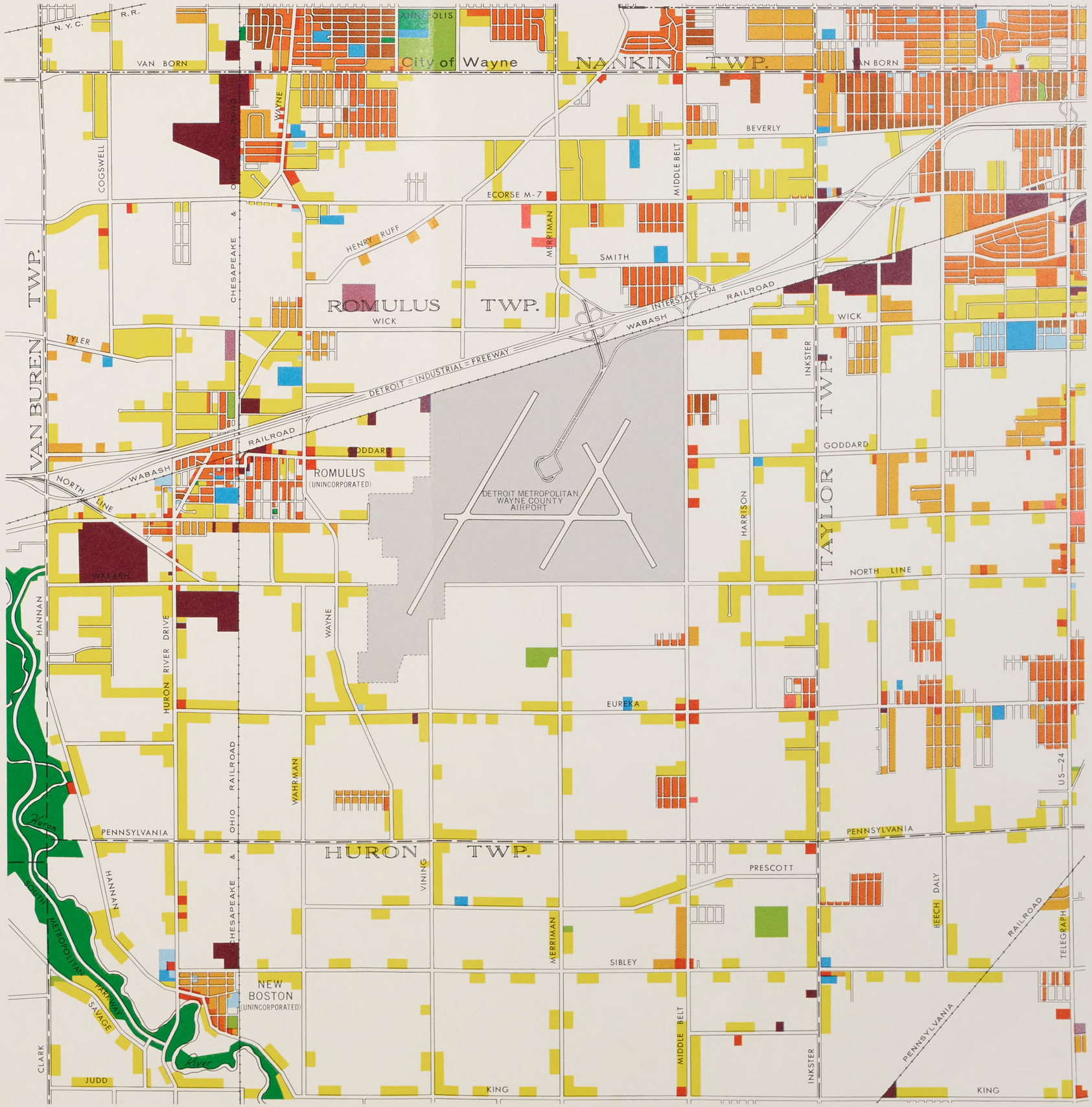


FIGURE 2

EXISTING LAND USE MAP

Residential land use in Romulus Township encompasses several significant types of development. First is the urban or village type of concentration and development centered on the unincorporated village of Romulus and the urban fringe of the city of Wayne, which has a definite influence in northern Romulus Township. The second form of development is the urban non-farm subdividing which is located along the mile and half-mile roads and is a result of Detroit's urban sprawl. This type is found in an area extending north from the expressway to the township line. The third form of residential land use is the rural farm home. The latter type of development is located predominantly in the southern portion of the township. The village type of development is predominantly older in date and type of construction, with the majority of this housing being built in the 1920's. The homes are of wood frame construction and appear to have been well built originally.

The second type of construction which also reflects the regional urban push of Detroit, appears to have taken place during the late 1930's through to the present. The greater part of these homes was constructed during

World War II and the post-war period. These homes are small wood frame buildings without basements, and not of sound original construction. They are characterized by sagging roofs, doors and windows. Many of these homes have had numerous additions placed on them, which in many cases appear to be of better construction quality than the original buildings. Others have been repaired with aluminum siding but still reflect poor basic construction. The general characteristic of the areas in which these homes are found must be rated as poor in relation to the entire Detroit region.

The farm type of housing is the oldest type of development in the township, and ranges in age from 50 to 70 years old. These homes are large in relation to the urban homes and are characterized by two-story, well constructed wood frame and brick development.

The maintenance of homes varies considerably throughout the township. The unincorporated village of Romulus contains both poor war-time housing and well built and maintained urban and farm type of development. The agricultural belt to the south is perhaps among the best

maintained in the township while the remaining farm homes tend to reflect the standards of the area in which they are located.

The war-time housing is only fair to poor as far as maintenance and upkeep are concerned. This may be in part attributed to the poor original construction and the lower income families which were attracted to and now live in the area. A great majority of these homes reflect varying stages of dilapidation and blight; this is especially true in the northern portion of the township.

Commercial development in the area is predominantly "strip commercial" in nature, except for the concentration in the unincorporated village of Romulus. The "strip" development is mainly confined to the intersections of mile and half-mile roads. The business activity of these areas is generally in the form of neighborhood services such as gas stations, grocery stores, drug stores, cleaners and small restaurants. The maintenance of these developments varies with the neighborhood location, the poorest development being located north of the Expressway.

The commercial activity in Romulus village area is well maintained.

Industrial development is of a varying nature but mainly associated with the auto industry, and ranges in age from new to twenty-five years of age. Most of the industry is of a small scale type of operation, both in physical size and employment.

There are presently nine public school plants being operated by the Romulus Township School District. One plant is devoted to high school activities, one to junior high school, and the remaining seven are being used for elementary education.

The high school was recently opened, and is located on Wayne Road north of the Expressway and northeast of the unincorporated village of Romulus. It appears that this school is in no direct conflict with the airport flight operations at present. The junior high school is located in the unincorporated village of Romulus. The building is approximately 30 years old, and formerly served as the high school. The junior high school is

located under the east-west runway operations of the airport approximately two miles from the end of the runway.

The elementary schools are spotted throughout the remainder of the School District, and are located for the most part in the more densely built-up residential areas. Two of these present a problem with reference to aircraft operations in the area.

The most serious problem of schools in relation to aircraft is that of the Gordonier School. This school is located approximately one mile off the end of the northeast-southwestern runway system to the north of the airport. This runway is the most heavily used as far as jet aircraft is concerned. The school is new, having been opened in 1954. This school was built with the aid of Federal School Funds at the same time that Federal Aid was helping construct the runway.

The other improperly located elementary school is in the unincorporated village of Romulus, and is exposed to the same conditions that prevail at the junior high school.

This elementary school is approximately two miles from the end of the east-west runway.

There is one parochial school, St. Aloysius, which is located in the village area settlement, and is in close proximity to the junior high and Romulus elementary school. This school plant is being greatly expanded during a current construction program.

It is important to note that the presence of these schools under the east-west flight path present no more of a problem than that posed by the village area as a whole.

Recreation areas in Romulus Township are confined mainly to the facilities provided by the school playgrounds. These contain such items as baseball diamonds, football fields and areas for other apparatus. A small portion of the Lower Huron Metropolitan Park is located in the southwest corner of the township and is maintained by the Huron-Clinton Metropolitan Authority.

Romulus Township is served by two rail lines, the Wabash Railroad and the C. & O. Railroad. The C. & O.

runs from north to south in the western sections of the township and the Wabash in an east-west direction paralleling the Detroit Industrial Expressway. The tracks of these two railroads cross in the northwest corner of the village area.

Highway facilities consist of three distinct systems in the township. First is the Detroit Industrial Expressway, or Interstate 94, which is a limited access road paralleling the Wabash Railroad. This highway provides interchanges at Middlebelt, Merriman, Wayne and Northline Roads within the township.

The second system of roads is the mile and half-mile network which forms a grid system pattern over practically all the township. At present nearly all the mile roads are paved, as are some of the more important half-mile roads. This system provides the major thoroughfare network for the township. The development of strip commercial land use along these roads has in some places hampered the flow of traffic on this road system, primarily due to poor parking facility design.

The third type of road in the township is the local street which is a result of subdivision activity in the area. The streets follow the grid pattern established by the mile roads and in most cases do not exceed one-half mile in length. Most of these streets are unpaved at the present.

Housing Analysis

Rating housing in terms of condition and maintenance was done to differentiate the various ranges of housing quality found in the study area. This information will have many varied applications throughout the scope of this study.

The terms good-fair-poor were used to rate both the original construction of the home and its maintenance. Those that were rated fair are believed to be an average indicator for the Detroit regional area, with the good and poor representing the extremes at each end of this regional scale. Time did not permit, nor the study purposes warrant, a precise house by house rating as would be used in qualifying areas for urban renewal.

However, the items used as indices for renewal purposes were used here as a general guide (see Fig. 3).

For the purposes of checking original construction, the following indicators were used: the plumb of the structure - checking walls, roofline, window sash, doors, etc.; the type and quality of the foundation - checking for cracks, loose blocks, sagging, etc.; the siding material and its application. Additions to the buildings were also noted as to how they compared with the original construction.

Maintenance of the residence was noted by checking the condition of painted areas, the condition of roofing material, the condition of glass areas, and the condition of accessory buildings such as garages. Yard areas were also observed in terms of the general upkeep of lawn areas, parking areas, and for the presence of trash and other items such as junk automobiles. The maintenance of landscaping features was also considered.

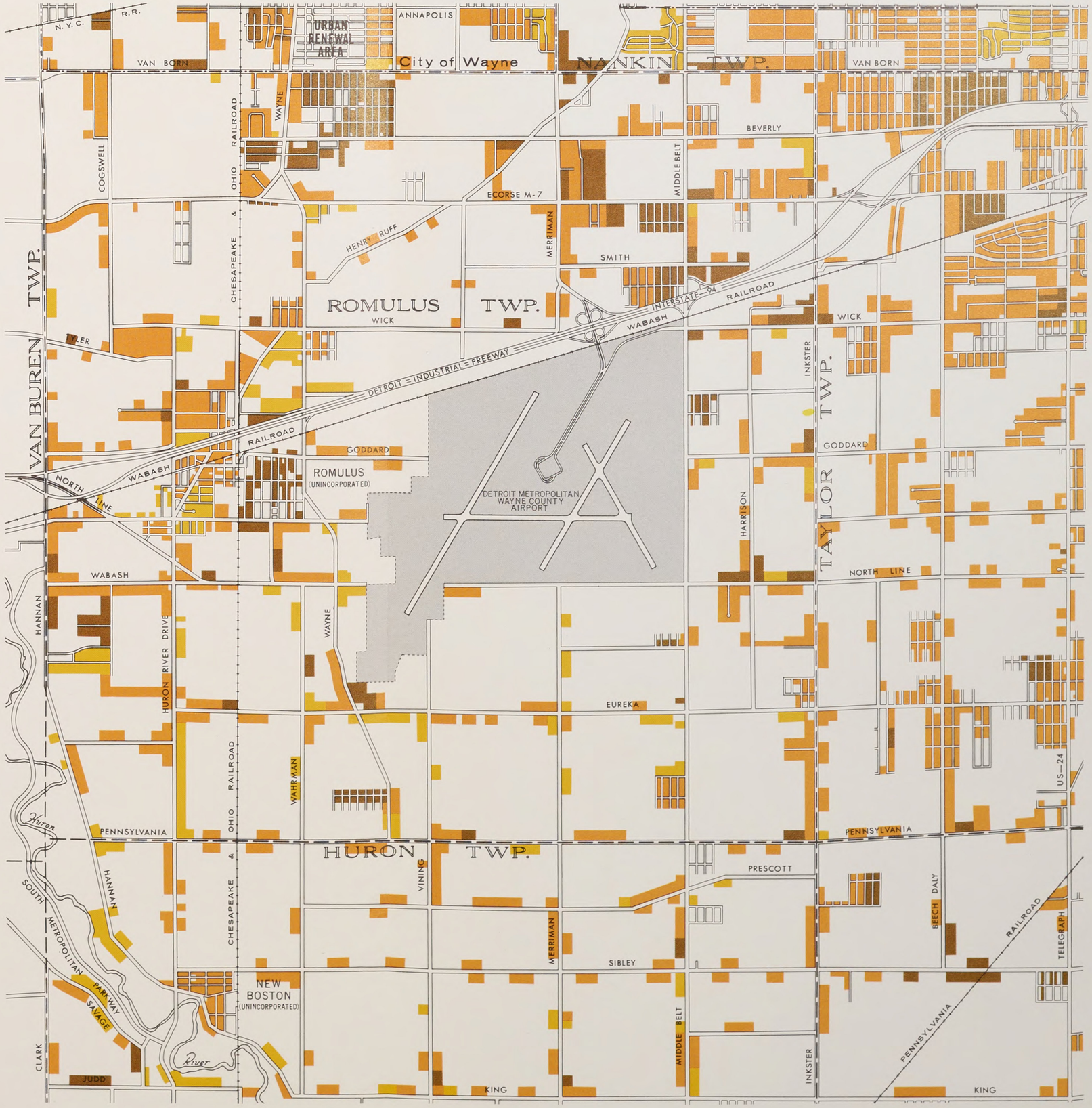
Each structure was rated in both classifications by a spot check during the actual land use survey of the area.

HOUSING CONDITION

EXISTING

CONDITION RATING

- ABOVE AVERAGE
- AVERAGE
- BELOW AVERAGE



SCALE MILES

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 3

EXISTING HOUSING CONDITION

New structures which were nearly completed in terms of building, and new structures which appeared to have been recently occupied were not rated in terms of maintenance.

The Population and Housing Growth

Within the immediate vicinity of Detroit "Metro" Airport lie fifteen regional units. These areas along with the remaining regional areas have experienced a general upward growth during the past years.

The population in Romulus Township and the adjacent cities, villages and townships has shown an increase of 217,243 persons during the period of 1950 to 1960, bringing the total to 485,580 persons.[3] It is anticipated that this area will be expanded by an additional 183,000 by 1970. The greatest portion of this growth is expected in Romulus, Van Buren, Nankin, Taylor and Brownstown Townships and the cities of Wayne, Dearborn and Inkster.

---

[3] Airport Environs Study and Plan for the Detroit Metropolitan Wayne County Airport, Detroit Metropolitan Area Regional Planning Commission, May, 1964.

It is significant to point out that only the city of Ecorse has shown a loss in population in this area. This has probably been caused by the general aging and deterioration of this city. Other very slight drops in area population did occur between 1900 and 1910 as a result of the beginning of the influx to the new industrial cities then being formed in the area.

The population figures have been presented to substantiate the fact that the area around the airport is under a definite pressure of future urban development. This growth hence will only intensify the problems around the airport in terms of compatibility of land uses with the airport operations.

The figure presented here for Romulus Township may appear to be rather high for anticipated future development by 1970 considering the facts that the airport could be expanded even more, and safety clearance zones could be expanded as a result of different operational patterns required by the jet. Perhaps development of future industrial and commercial types of land uses in the area

TABLE 1

POPULATION TRENDS FOR THE POLITICAL UNITS ADJACENT TO ROMULUS TOWNSHIP[4]

	1940	1950	1960	1970
Townships				
Romulus	6,880	12,311	15,233	44,000
Huron	3,668	5,558	6,884	11,000
Sumpter	2,228	3,363	5,972	8,400
Van Buren	3,239	5,705	9,509	19,000
Canton	2,111	3,761	5,313	12,000
Nankin	15,838	28,577	57,706	96,000
Dearborn	8,052	20,235	61,118	78,000
Taylor	8,862	18,848	49,658	80,000
Brownstown	3,434	5,907	8,272	26,000
Cities and Villages				
Garden City	4,096	9,012	38,017	42,000
Inkster	7,044	16,728	39,097	44,000
Wayne	4,223	11,239	19,071	26,000

TABLE 1--Continued

	1940	1950	1960	1970
Belleville	1,286	1,722	1,921	3,000
Dearborn	63,584	94,994	112,007	122,000
Allen Park	3,487	12,329	37,052	42,000
Ecorse	13,209	17,948	17,328	16,000
Total	151,241	268,237	484,159	669,400

may also tend to cut down the amount of available land for subdivision activity. These factors may then tend to retard the anticipated growth of population.

The growth of population and increase in housing have been major factors in the development of Romulus Township. This expansion became appreciable about 1920, ten years prior to the establishment of the airport. Figures from the U.S. Census present the following record of the population and housing.

---

[4] Decennial Census for 1960, U.S. Department of Commerce, pp. 24-22.

TABLE 2

YEAR HOME STRUCTURES BUILT[5]

1950-1960	1,163
1940-1949	1,393
1939-Earlier	1,606
	4,162

TABLE 3

YEAR FAMILIES MOVED INTO OCCUPIED DWELLING UNITS[6]

1958-1960	1,063
1954-1957	924
1940-1953	1,445
1939-Earlier	460
Not Listed	270
	4,162

The Romulus area is an integral part of the rapidly expanding metropolitan area lying squarely in the path of the westerly spread of population and industry from Detroit and has been greatly affected by the forces of urban development. Population grew by 70 per cent during the period 1950-1960, increasing from 90,184 to 153,233 compared to the 25 per cent increase of the three-county

---

[5] 1960 Census of Population, U.S. Department of Commerce, pp. 24-22.

[6] Ibid.

area. Census data also shows a comparable increase in housing stock which grew by over 17,000 units to 39,921.

Significantly, Inkster Village and the Townships of Dearborn, Nankin and Taylor more than doubled their population since 1950. The Cities of Dearborn and Wayne increased by nearly 50 per cent.

The gross densities of these communities, except for Taylor Township, run well over 3,000 persons per square mile. Taylor's lower density and the low densities of Huron and Romulus Townships reflect their rural character. However, Taylor and Romulus are areas of transition and are capable of being built up in ten or fifteen years. The outward push will certainly be felt stronger and stronger. Both communities have ample room for large-scale home building. Water and sewer facilities are becoming more readily available. These factors, coupled with the momentum of home building developed over the last ten years, should accelerate subdivision activity over the next ten years.

Income

Data published in the 1960 Census shows that the median family income of the communities which make up the Romulus area were generally higher than the county as a whole. Excluding Romulus Township ($5,800) and Huron Township ($6,000), the incomes were at least $300 over the $6,400 county figure, ranging from $6,700 to $8,800.[7]

The distribution of family incomes in the Romulus area more or less parallels family incomes of the county and metropolitan area. As Table 4 indicates, major differences occur in the high and low ranges with fewer families in the Romulus area either over or under the $5,000 - $10,000 groups. A more detailed comparison of incomes reveals that Romulus Township is a low income area. Romulus Township has 6 per cent fewer families in the over-$10,000 group, and 13 per cent more families in the under-$5,000 group than in the Romulus area. This same relationship holds true when comparing Romulus Township with either the county or the metropolitan area.

---

[7] Decennial Census for 1960, op. cit.

TABLE 4

1959 MEDIAN FAMILY INCOME - METROPOLITAN AREA WAYNE COUNTY, ROMULUS AREA AND ROMULUS TOWNSHIP[8]

Income Ranges	Metro. Area Families	Per cent	Wayne County Families	Per cent	Romulus Area Families	Per cent	Romulus Township Families	Per cent
Under $3,000	127,581	13.5	102,239	15.3	3,535	10.0	624	17.9
$3,000-$4,999	134,531	14.2	101,846	15.2	4,859	13.7	665	19.1
$5,000-$6,999	229,245	24.2	162,347	24.2	10,631	30.0	998	28.6
$7,000-$9,999	245,303	26.1	166,965	24.9	9,796	27.7	762	21.9
$10,000-$14,999	148,792	15.8	99,672	14.9	5,214	14.7	364	10.5
$15,000 and Over	58,134	6.2	37,022	5.5	1,364	3.9	70	2.0
	943,586	100.0	670,091	100.0	35,399	100.0	3,483	100.0

[8]Decennial Census for 1960, U.S. Department of Commerce, pp. 24-332.

Employment

The number of persons in the Romulus area listed as employed totalled 47,269 (Table 5). Of this number, about 17 per cent were either self-employed or worked for a governmental agency. The remaining 83 per cent was split almost evenly between manufacturing and non-manufacturing operations.

Comparing Romulus Township to the Romulus area reveals a different employment profile. While employment was more evenly divided in the Romulus area, Romulus Township is preponderately non-manufacturing oriented with about 64 per cent earning their livelihood in this sector of the economy. About 9 per cent were reported as self or government employed.

Historical Development of the Airport

Development of the airport began in 1929 when the Board of Wayne County Road Commissioners acquired a square mile of land and started construction on the airport with funds made available through a $2,000,000 bond issue. The parcel of land was located in the northeast quarter of the present airport. Initial

TABLE 5

TYPE OF EMPLOYMENT ROMULUS AREA AND ROMULUS TOWNSHIP 1960[9]

Type of Employment Category	Romulus Area Number	Romulus Area Per cent	Romulus Township Number	Romulus Township Per cent
Self Employed	2,202	4.7	213	4.5
Manufacturing	19,799	41.8	1,282	27.0
Non-Manufacturing	19,566	41.4	3,033	63.9
Government	5,702	12.1	219	4.6
	47,269	100.0	4,747	100.0

construction included the North Hangar Building and the Military Hangar, plus concrete runways, taxiways and aprons.

The period from 1930 to 1939 saw the airport used by the National Guard and for general aviation and non-scheduled passenger operations. During the 1939-1940 period, an administration building was constructed and scheduled passenger service was initiated by American Airlines.

[9] Ibid., pp. 24-335.

The U.S. Army Air Corps took over the operation of the airport in 1941, converting it into Romulus Air Corps Base. The Air Corps constructed a hangar with supporting buildings, widened and extended the existing runways, and added concrete apron space.

The airport was returned to the Wayne County Road Commission in 1947 and was redesignated as the Detroit Wayne Major Airport. During 1946 and 1947, an additional three square miles was purchased by the Road Commission for an expansion program. This expansion was made available under the Federal Airport Act of 1946. From 1947 to 1952, additional runways, taxiways and aprons were constructed. During this period the airport was used by the Air National Guard, general aviation users, non-scheduled passenger carriers and freight cargo carriers.

A new control tower and administration building were constructed in 1952. Regularly scheduled passenger service by Pan American World Airways and British Overseas Airways Corporation was instituted in the same year. In October of 1958, the present terminal building was

The U.S. Army Air Corps took over the operation of the airport in 1941, converting it into Romulus Air Corps Base. The Air Corps constructed a hangar with supporting buildings, widened and extended the existing runways, and added concrete apron space.

The airport was returned to the Wayne County Road Commission in 1947 and was redesignated as the Detroit Wayne Major Airport. During 1946 and 1947, an additional three square miles was purchased by the Road Commission for an expansion program. This expansion was made available under the Federal Airport Act of 1946. From 1947 to 1952, additional runways, taxiways and aprons were constructed. During this period the airport was used by the Air National Guard, general aviation users, non-scheduled passenger carriers and freight cargo carriers.

A new control tower and administration building were constructed in 1952. Regularly scheduled passenger service by Pan American World Airways and British Overseas Airways Corporation was instituted in the same year. In October of 1958, the present terminal building was

completed and the American Airlines returned as a regularly scheduled passenger carrier. Since that time, Alleghany Airlines, Northwest Airlines, and Delta Airlines have established regular service from the airport. Today the facility is officially named Detroit Metropolitan Wayne County Airport.

Additional land was purchased in the southwest corner to accommodate jet service introduced by the above carriers. The airport now covers a little over four square miles of land. Negotiations have recently been completed with the remaining air carriers at Willow Run Airport which will move then to the Detroit "Metro" Airport. Facilities are now being expanded to accommodate this added traffic by 1964.[10]

The Creation of a Metropolitan Airport

The introduction of jets to the airport and the resulting noise completed the cycle which has created the aforementioned problem during 1958. Jet service, airport

---

[10]Board of Wayne County Road Commission historical file.

expansion and the shift of air carrier operations from Willow Run Airport at Ypsilanti have resulted in the creation of a major metropolitan air terminal for the Detroit region, as well as for much of southeastern Michigan. It is anticipated that this growth of airport facilities will continue in the immediate as well as in the long-range future.

CHAPTER III

DEVELOPMENT OF THE PLAN

This section of the study will attempt to undertake and analyze the process of development of the principles, standards and land use designs as they were formulated in the Demonstration Grant Study.

Origin of the Demonstration Grant Study

The origin of the Demonstration Grant Study had its beginning in the mid 1950's when the airport began to expand for its present day function, and during a time when the community of Romulus began to expand urban services such as schools, water and sewer facilities. As stated before, these two forms of expansion could not be considered compatible and shortly thereafter officials of the various agencies and governments concerned began to raise certain basic questions with regard to area development.

The situation continued to be the concern of these officials until 1958 when the Regional Planning Commission

was asked by the Airport Committee of the Wayne County Board of Supervisors to look into the possibility of undertaking a study program of some type to recommend a solution to the problem. This was done and resulted in the Demonstration Grant Project (Michigan D-3) being awarded to the Regional Planning Commission in June of 1960.

The Housing and Home Finance Agency had expressed a great deal of interest in this study since the formulation in concept of this type of program in the latter part of 1959. The interest is basic with the philosophy of the Agency because of the problem associated with FHA's insuring existing housing in the area of airports and insuring new housing which may be built in areas surrounding the airport, regardless of the size of the facility or in which part of the country the airport exists. The interest of the Housing and Home Finance Agency had been expressed by officials at both the national and the local levels throughout the country. The potential creation of vast areas of blighted homes in the vicinity of the airport has likewise been of paramount concern with the Housing and Home Finance Agency.

Much of the initial concern was brought forth by the "Doolittle Report" which was conducted under the administration of President Truman and published in May of 1952. This report was for the purpose of analyzing a series of crashes which occurred in the vicinity of Elizabeth, New Jersey in the early 1950's and other crashes which subsequently occurred at other points across the country. The presentation of this problem and its magnification through the years undoubtedly aided in the willingness of the Federal government to finance portions of the Demonstration Grant.

The land use situation also resulted in expressed concern on the part of housing officials in the resale of existing homes in airport areas. This concern influenced the owner, the potential buyer and the lending or insuring institution backing the mortgage.

The local office of FHA also became interested because of concern and complaints expressed along similar lines in the environs of Selfridge Air Force Base in Mt. Clemens, Michigan and the experience gathered at this type of air facility. Also, recent talk

of the possibility of adding a second major jet airport for the region in the vicinity of Pontiac, Michigan has had a bearing on the local situation.

Fear of blight was the major concern of the Urban Renewal Administration and was specifically the reason for the Demonstration Grant Section of this Agency approving the Grant of Project for the Airport Environs Study, as it later came to be called. The reasoning behind this was the concern expressed by many individuals in the field of housing that homes located in close proximity to large scale airport operations would, in time become adversely affected from such operations and would become blighted. At the time the study was formulated there was no evidence to support such beliefs, either pro or con, and one of the major objectives of the study was to determine what blighting influences, if any, had occurred in the vicinity of the Detroit "Metro" Airport.

Urban growth around other airport areas has also become a point of vital concern in many areas. Many of the major airports of the nation during the past twenty-five years experienced a fantastic growth of surrounding

urban type land uses. This converted the open countryside into cities of dense development. The growth was not hampered too seriously by the noise of piston driven aircraft used prior to 1958. Noise, however, has become an area of great concern with the introduction of jet commercial air traffic. Of recent years many complaints have arisen, centered on the noise aircraft were creating on the ground, and by airline pilots to the hazards of flying over the encroaching urban areas.

Federal Aviation Agency interest in the study became evident because of its interest in the national air traffic picture and the good image which commercial air carriers must show to the public. This Agency helped to design and give points of direction in the study and also in convincing the government officials of the merit of appropriating funds for this type of study program. The law suits which threaten not only the airport operator but also the FAA as a promotor of air traffic have also made these agencies keenly aware of the problem associated with the land surrounding airports.

The safety of humans on land and in air is a major responsibility of the FAA. This emphasis was made quite clear in the "Doolittle Report." To clarify the "Doolittle Report," here is a brief summary of the first eight recommendations which the report set forth. All are either directly or indirectly related to the urban planning process.

1. Support required airport development.
2. Expand Federal-Aid Airport Program.
3. Integrate municipal and airport planning.
4. Incorporate cleared runway extension areas into airports.
5. Establish effective zoning laws.
6. Improve existing airports.
7. Clarify laws and regulations governing use of airspace.
8. Define navigable airspace in approach zones.[11]

The "Doolittle Report" resulted in the establishment and enlargement of runways and clear zones at many airports

---

[11] The Airport and Its Neighbors, The Report of the President's Airport Commission, May 1952.

throughout the country. This report also pointed up the need for designating land areas which should not be developed from a crash hazard standpoint. The report failed however to take into consideration the effects which commercial jet transportation would have on the surrounding environs of the airport, both in terms of the space in which it would need to navigate and in the noise which would be created by such operations. These considerations became of vital concern eight years later.

Pilot prerogative is another element in this complicated spectrum. This can be described as the exercise of judgment the pilot may use in the name of safety with regard to both passengers and people on the ground. In essence, it gives the pilot the final power in operating the aircraft as he sees fit in time of need without regard for the standard rules or procedure. This is a right which the pilot will probably always have and justifiably should have, since he is responsible for the ultimate safety of all persons. As a result, the Air Line Pilots Association has adopted the following policy,

> The association maintains the position that aircraft noise should be reduced by engineering and design and not by marginally safe flying techniques: Therefore be it RESOLVED, that the A.L.P.A. refuses to endorse or accept noise abatement procedures which require . . .[12]

The statement goes on to spell out eight flying techniques which it will not use, or participate in for the purposes of eliminating noise on the ground. However, the pilots do practice noise abatement procedures at a number of airports whenever possible. The effects of these procedures have reduced complaints in some areas.

In the latter months of 1958, the Romulus Township Supervisor raised the question of airport development and the accompanying jet noise with the Airport Committee of the Wayne County Board of Supervisors. This committee in turn initiated discussions with airport management, the Detroit Metropolitan Area Regional Planning Commission, and national officials of the Federal Aviation Agency, with the aim of determining some form of solution to this problem.

---

[12] Aircraft Noise Problems, Subcommittee Hearings of the Committee on Interstate and Foreign Commerce, House of Representatives, 86th and 87th Congress, Washington, D.C., 1963, pp. 442-443.

Consideration was given at this point to the possibility of designing specific land use in the airport environs, compatible with the noise created by the increasing jet operations at Detroit "Metro" Airport.

The Regional Planning Commission made inquiries to the Chicago regional office of the Housing and Home Finance Agency in regard to obtaining federal planning assistance. This resulted in the Demonstration Grant Division of the HHFA at the Washington D.C. level accepting the idea of the study. Provisions were made to arrange for local matching funds in anticipation of federal assistance.

The provision of matching local funds was made by the Romulus Township Board, the Romulus School District, the County of Wayne, and the Regional Planning Commission, and a project application was filed in the latter part of 1959. Final conferences with the officials of the HHFA, the FAA, the County and the Township resulted in the final definition of the project, and the grant was approved in July of 1960.

The Romulus situation presented the opportunity for scientific evaluation of the airport problem in its growth stages. This is possible because of 1) the current growth and expansion of the airport, 2) the undeveloped nature of Romulus Township, and 3) the urban expansion potential.

It was the underlying hope of those concerned that this program would present answers to the situation before the environs were totally developed for urban residential uses as had been the case of the airports in New York, Washington, Chicago and Los Angeles.

Method of Solving the Problem

The methodology of solving the problem was set forth as follows. The staff of the Regional Planning Commission was to analyze the economic and land use potentials in the environs of the airport, with a view towards future development. An acoustical consultant was to make the scientific determinations related to the jet aircraft operations at Detroit "Metro" Airport. The work of both groups was to be carried out under the direction of the Airport Environs Advisory Committee.

Staff work of the Regional Planning Commission was broken into several specific phases. The first was to assess the existing conditions and growth potentials, with regard to the total economic setting, the growth pattern, transportation, land use and housing. Also reviewed was the history of land development in the area to get a more complete picture of land utilization. The staff also traced the development of the Detroit "Metro" Airport.

The Regional Planning Commission was also designated to develop a set of principles and standards with regard to the use of land in the environs of a major jet airport, and with the task of developing the overall report as designated by the Demonstration Grant contract.

The final phase in the work of the staff of the Regional Planning Commission was the designing of a generalized land use plan for the Township of Romulus. All of this work was to be coordinated with the work of the acoustical consultant, the Romulus Township planning consultant, and the Airport Environs Advisory Committee.

The Airport Environs Advisory Committee was set up with the designation of the project by the Federal government. This was in keeping with the policy of the Regional Planning Commission to work with a policy-guiding body made up of officials concerned with the project or study in question.

The Advisory Committee serves as a medium for keeping the various interested agencies, departments, committees, and governmental units informed of the work and the progress of the study. It is also to aid and help the staff in gaining the necessary information needed in conducting the study and to review and judge the work which has been done.

The Airport Environs Advisory Committee was composed of the following representatives:

Chairman, Commission member of the Regional Planning Commission. This member was not from Wayne County.

Supervisor, Romulus Township.

Superintendent, Romulus Township School District.

Director-Manager, Wayne County Road Commission and Manager, Detroit "Metro" Airport.

Planning Engineer, Wayne County Road Commission.

Wayne County Airport Committee member, who is also member of the Wayne County Board of Supervisors.

During the course of this study several of the members were replaced for various reasons. The Superintendent of Schools accepted another position in a distant community, and the Supervisor of Romulus Township did not seek re-election.

This committee served as an excellent vehicle in the planning process throughout the course of the study.

Determination of the affected area was accomplished through the hiring of an acoustical consultant with a specialization in aircraft noise problems. The consulting firm of Polysonics Inc. was selected after reviewing bids from ten organizations of similar background. The consultants job was outlined as follows:

A prospectus for acoustical engineering firms interested in taking part in the following study:

Demonstration Project: Study and plan for environs of Detroit Metropolitan, - Wayne County Airport. Project No. Michigan D-3.

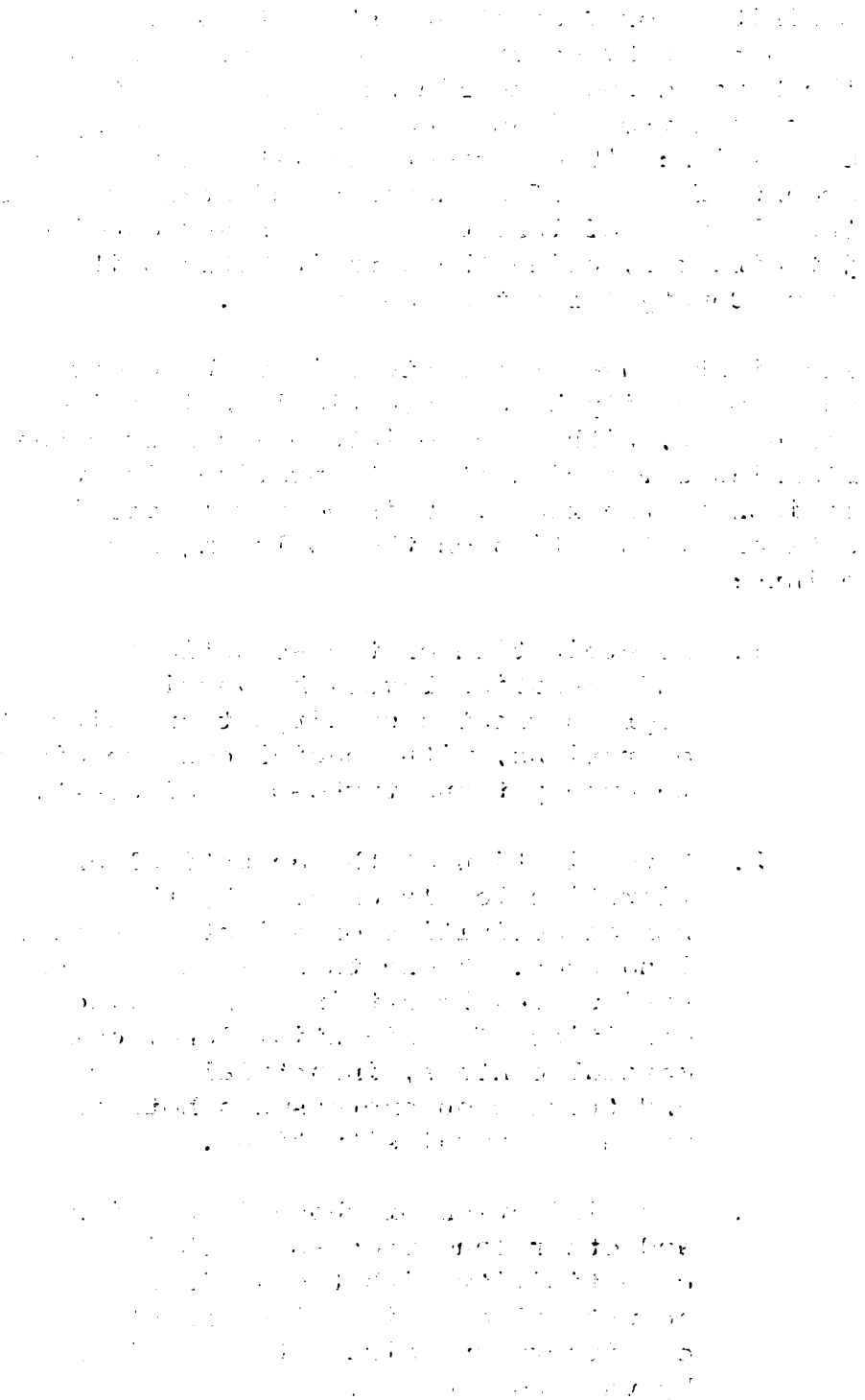
Definition of Project and steps to be followed, as approved by contract on July 19, 1960, between the Housing and Home Finance Agency and the Detroit Metropolitan Area Regional Planning Commission: "The Project consists of the development of a set of principles and standards for the planning of land use of areas surrounding jet airports, using the Detroit Metropolitan-Wayne County Airport as an example.

The first phase of the study is to be undertaken primarily by an acoustical engineering consultant, with an associate planner from the Planning Commission staff to provide direct liaison in the field. This work will provide data and information on the following four points:

1. Determination of the acoustical and vibration levels by varying degrees created by airport and aircraft operations, with special concern given to pure jet and turbo-prop aircraft.

2. Determination of the acoustical and vibration levels created by the normal activities of selected typical land uses. Among these would be the various levels attained in varying densities of residential land, commercial centers, industrial areas and traffic on expressways both in urban and rural situations.

3. Classification of those industries and other land uses as to their compatibility with the various acoustical and vibration effects of airport and aircraft operations by varying degrees.



4. Determination of the extent of area surrounding the airport which is adversely affected by the acoustical and vibration effects of airport and aircraft operations by varying degrees.

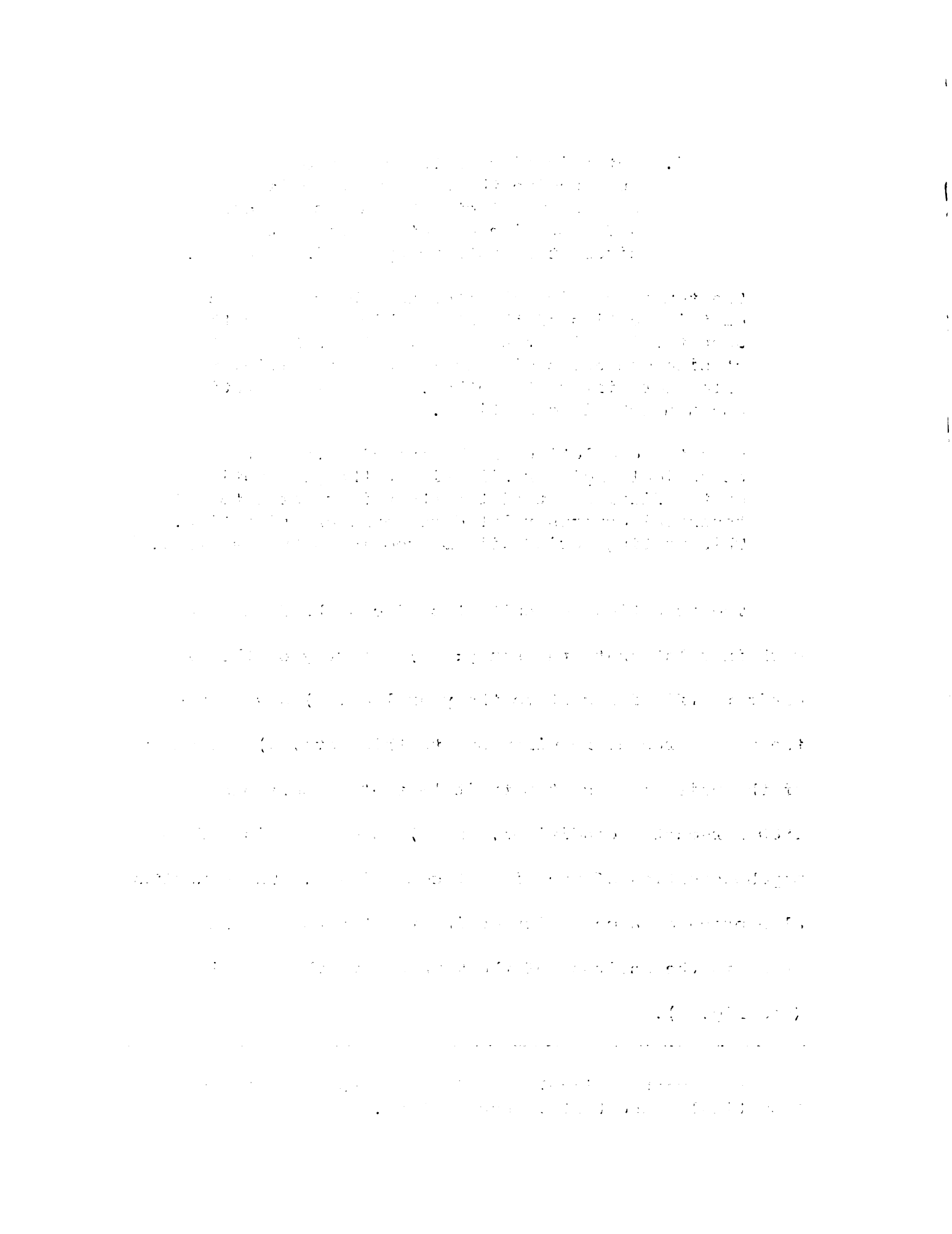
The tentative time allotted for the completion of this portion of the study which involves the acoustical engineering consultant has been set at nine months, beginning in November, 1960, to allow for different weather, seasonal vegetation and atmospheric conditions.

Upon the completion of the overall study, the acoustical engineer will aid in the preparation of the final draft of the study in regards to all technical aspects related to sound and vibration. This writing period will be completed by May, 1962.[13]

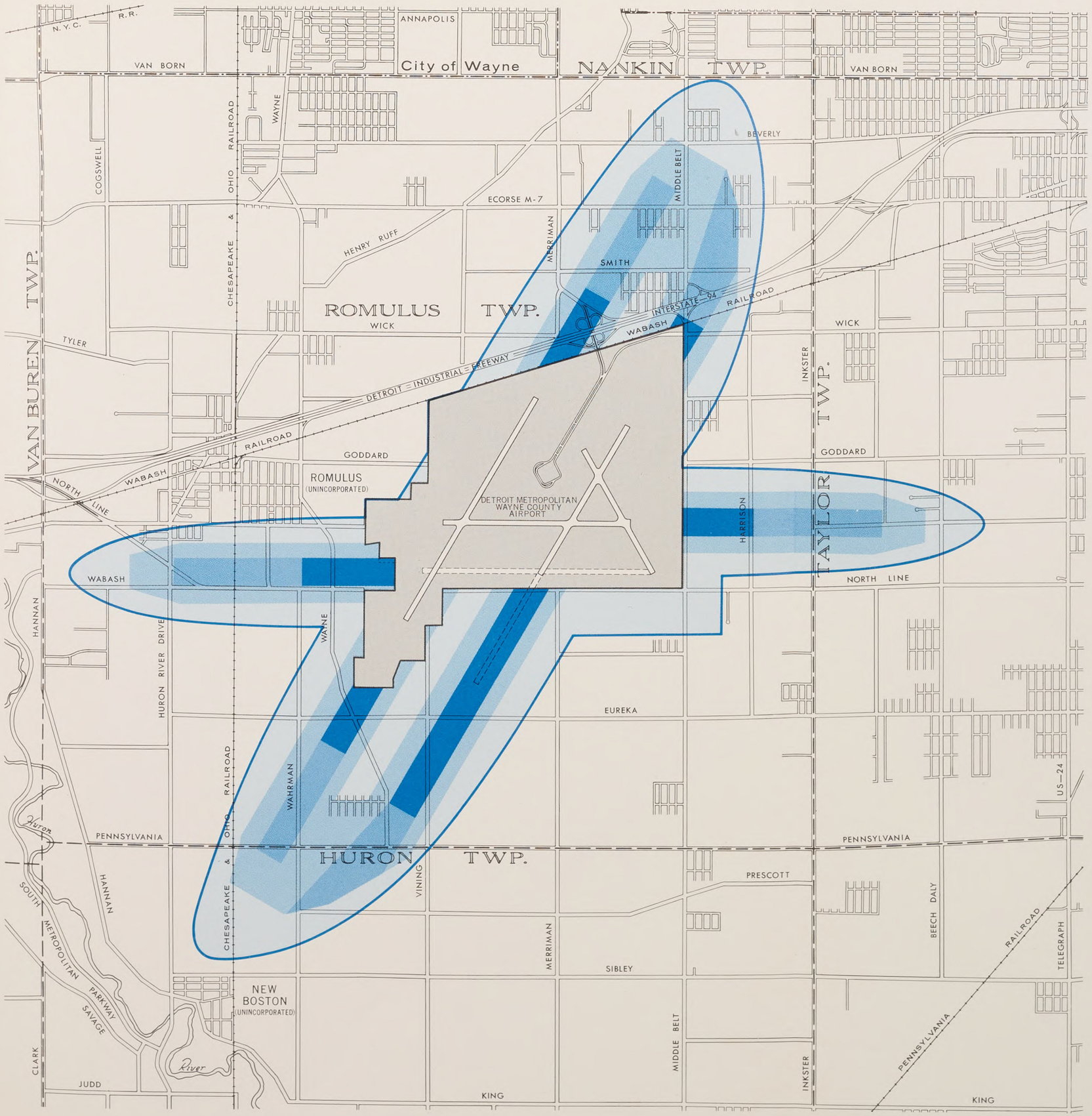
The acoustical consultant produced the following work in relation to the study: 1) a survey of the aircraft traffic forecast to the year 1980, 2) a survey of the needed runway requirements to this date, 3) a summary of the noise levels at Detroit "Metro" Airport based on 1980 forecasted conditions, and 4) an examination of the psychoacoustics of the airport communities. The consultant also prepared a map which delineated the noise affected areas in the environs of the Township to the year 1980 (see Fig. 4).

---

[13]Detroit Regional Planning Commission letter to Acoustical Consultants, August, 1960.



AFFECTED AREA



SOUND LEVELS

- CLASS
- CLASS
- CLASS
- CLASS
- CLASS

SCALE MILES

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 4

AFFECTED AREA MAP

FIGURE 5

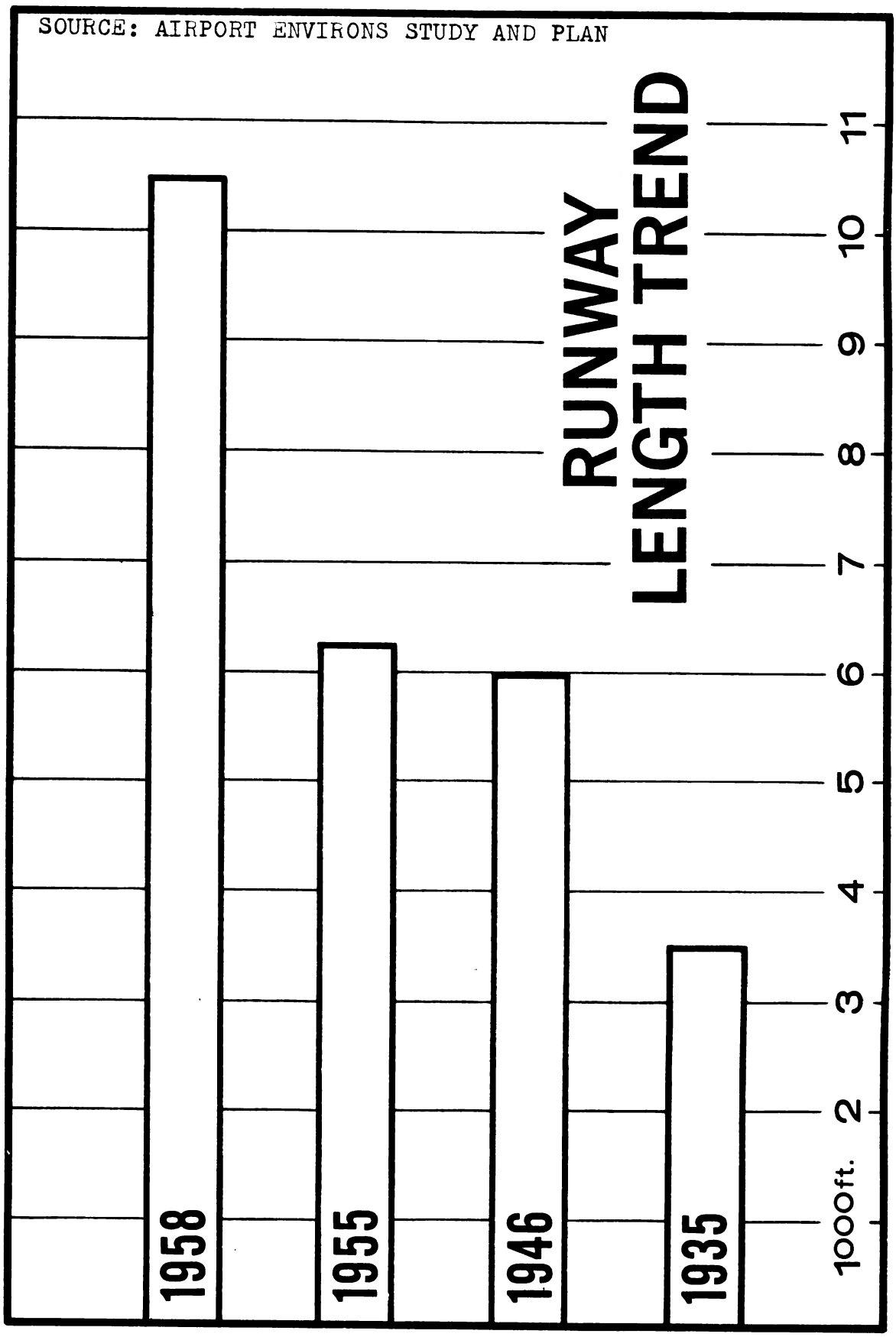
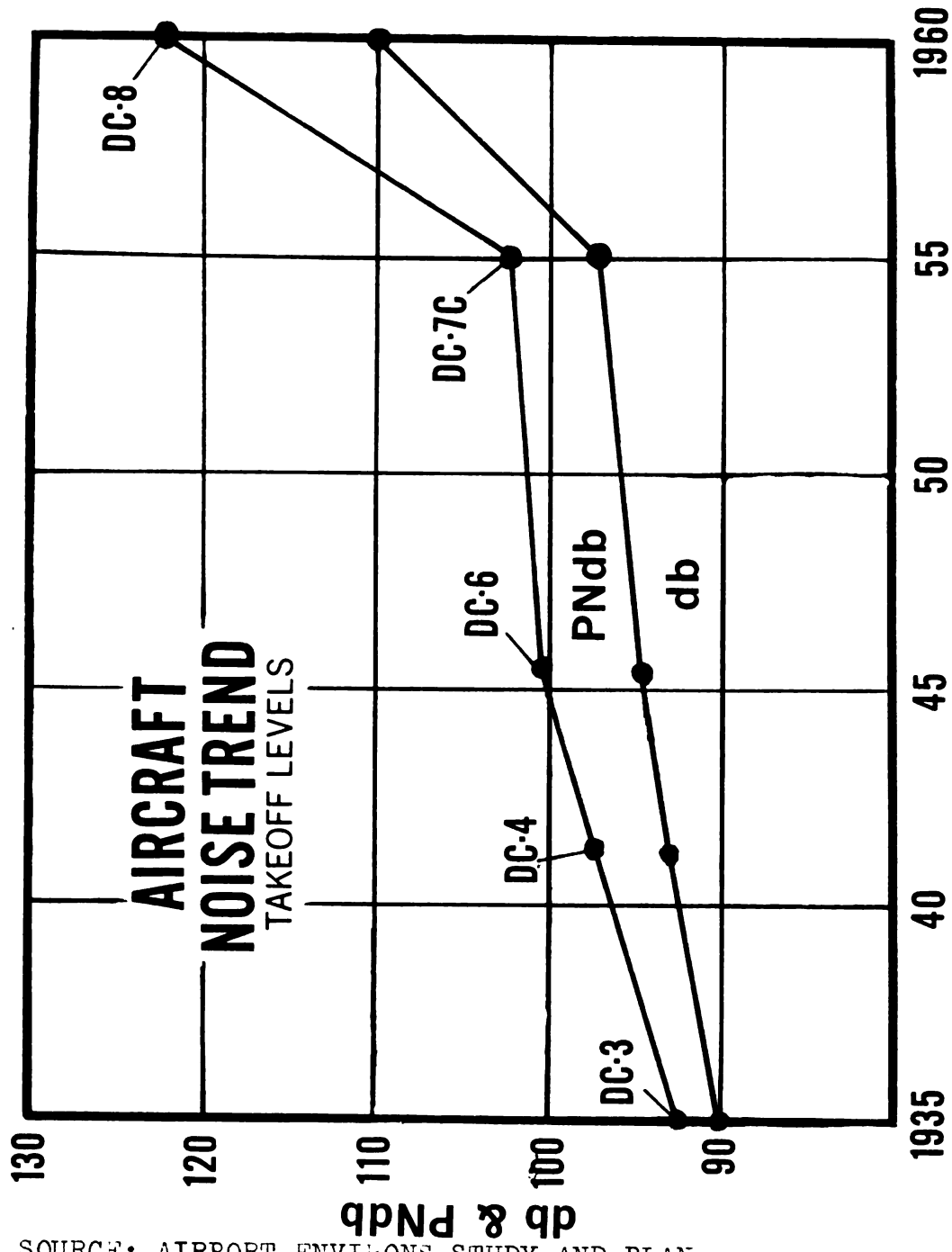

SOURCE: AIRPORT ENVIRONS STUDY AND PLAN
RUNWAY LENGTH TREND
1958
1955
1946
1935
1000ft.
2
3
4
5
6
7
8
9
10
11

FIGURE 6



SOURCE: AIRPORT ENVIRONS STUDY AND PLAN

This map is the basis on which the Regional Planning Commission staff based its generalized land use plan.

The acoustical consultant also evaluated the noise producing industries which might be located in the areas determined unsuitable for future residential use.

A summary of the technical information presented by Polysonics Inc. is presented in Appendix "B" and in Figures 5 and 6.

The Resulting Plan

The development of the plan through the efforts of the Regional Planning Commission staff, the acoustical consultant and the comments and reviews of the Airport Environs Advisory Committee took approximately two and one half years to complete. This included all the necessary research and writing of the report, but did not include the preparation of the many associated graphic materials or the approval of the final text by the Demonstration Grant Section of the Housing and Home Finance Agency. These two stages added considerable more time to the scheduled date of publication.

The most significant planning principle to emerge from the work of this study was the delineation of the area adversely affected by jet aircraft operations. This area became known to those most involved with the study simply as the "Affected Area." This area was plotted by Polysonics after extensive analysis on a scientific basis of the aircraft operations arriving and departing from Detroit "Metro" Airport. The data used in defining the "Affected Area" was further substantiated by the inclusion of materials which Polysonics Inc. had gathered at other major jet airports for the Federal Aviation Agency. Polysonics was also able to include material in this analysis of several types of jet aircraft which were later introduced into operation at Detroit "Metro" Airport.

The following discussion from the text of the Airport Environs Study and Plan best gives the essentials of the Plan:

The Critical Area

A. The Influences of Sound Factors in the Plan

1. The Affected Area

The affected area at Detroit Metropolitan Airport and environs comprises a total of 11.0 square miles of land located in Romulus, Taylor and Huron Townships (see map). This area is not suitable for the development of future residential construction, but is suitable for the development of many types of commercial, industrial and open uses. The affected area is broken down into four classes which are, in essence, decibel ranges and which have been designated for use by various types of industry and commerce.

The survey and analysis by Polysonics delimits the area in which non-residential uses should be provided for and promoted by the community.

The affected area map includes several other significant features. First is the proposed development of a second east-west runway parallel to the existing runway on the west but located approximately 2,000 feet to the south of it. This runway will permit takeoffs to the west without a direct flight over the village of Romulus.

A second reason for proposing this new runway, is that it aids in the development of a "preferential runway system" at Detroit Metropolitan Airport. This is a flight system designed to eliminate the prolonged exposure to sound by any one portion of the affected area. It is achieved by requiring planes under favorable wind conditions to take off and land on selected runways for certain periods of time and then shifting this traffic pattern to another runway for another specified period of time. This is done to prevent the cumulative build-up of noise in any one section of the affected area over a prolonged period of time, thus providing relief in the flight area from exposure to aircraft noise.

These factors, which are based on sound conditions present in the area and the methods by which partial relief from exposure can be attained, are used as an important base for the development of the generalized land use plan for the Romulus Township area.

2. Land Use in the Affected Area

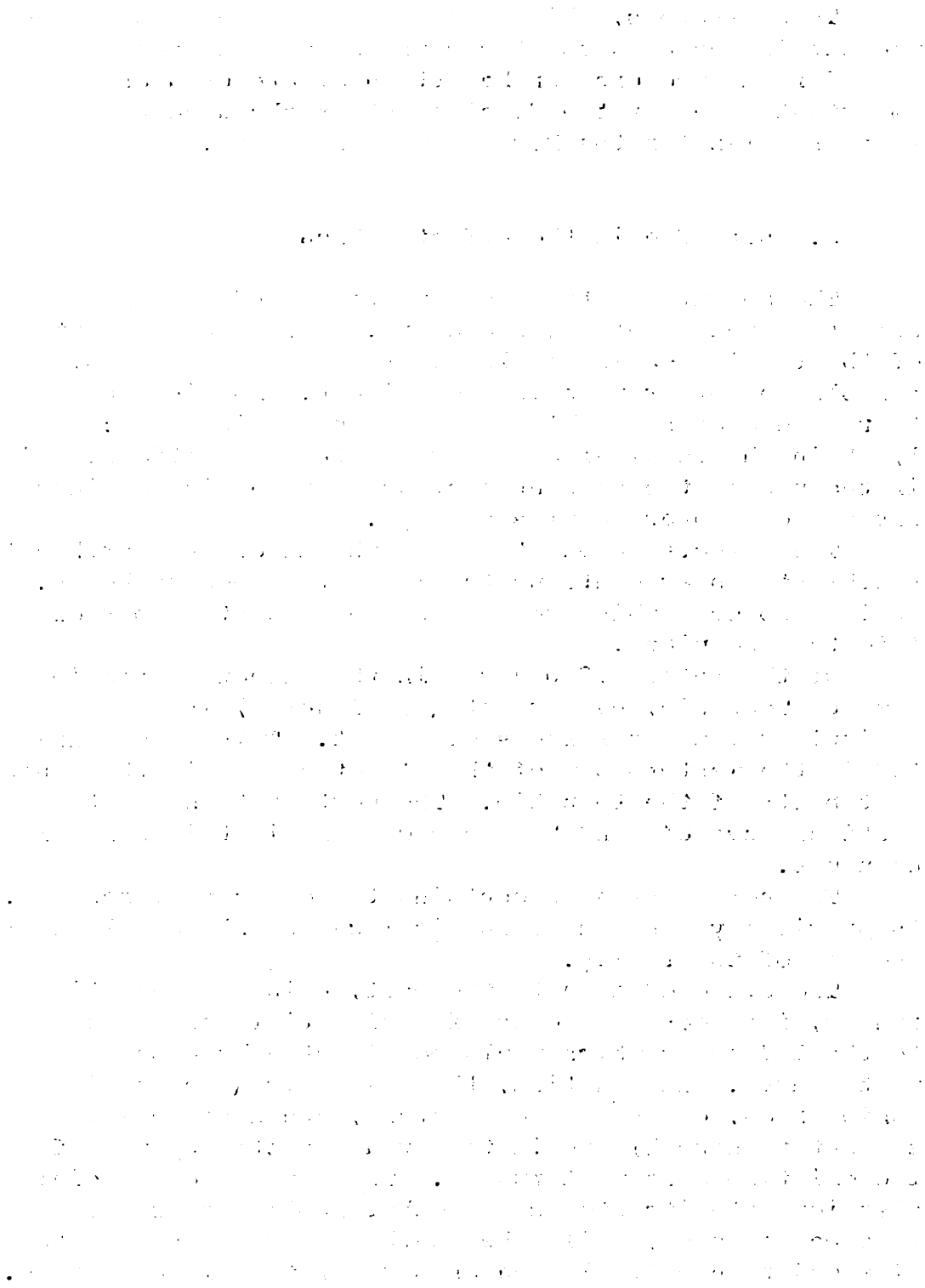
The amount and types of existing land uses in the affected area is of major concern. While the percentage of the total area is not large, the number of homes, schools and other uses is significant. For instance, there are a considerable number of homes involved: 1,585 in the total affected area with an additional 411 if the use of the present east-west runway is continued for takeoffs over Romulus village.

The affected area at the north end of the northeast-southwest runway contains the largest number of homes. It is also over this area where the largest number of flights take place.

Of the total 5,970 acres in the affected area in Romulus Township, 84 percent (5,031 acres) is in agriculture, major streets or vacant. This ranges from 65% in the west to 93% of the affected area in the southwest parts of the township. The northeast and east sections have 84% and 82% respectively in this kind of open use.

The northeast area contains two elementary schools. As previously mentioned, one is located only a mile from the end of the runway.

The affected area to the west, using the existing runway, includes 315 acres of residential land as opposed to the 153 acres which would be affected by a new east-west runway. In addition, three schools (one public junior high, one public elementary, and a parochial elementary school) are in the area affected by use of the existing east-west runway. The central commercial district with its stores and other public areas would also be affected, while the south runway takes advantage of a major industrial area as part of the affected zone.



B. Other Considerations Affecting the Land Use Plan

Romulus Township will experience accelerated urban growth and within twenty years can be expected to triple its 1960 Census population. By 1980, it is anticipated that 50,000 people will be residing in the township, 30,000 by 1970. To achieve these projections, an average of 380 new dwelling units will have to be erected annually during the 1960's and an average of about 460 per year during the 1970-1980 decade. These estimates are felt to reflect growth which Romulus can reasonably attain. They are based on the social and economic consideration discussed in an earlier section of this report.

As previously stated, Romulus is inextricably meshed with the growth trends of the Detroit metropolitan area. The township lies squarely in the path of the westerly spread of urbanization from Detroit. Upon completion of programs to provide all parts of the township with adequate water and sanitary sewer facilities, Romulus is expected to realize increased subdivision activity as a part of its natural growth pattern.

Another contributing factor, stated earlier, is the potential growth fostered by the airport. Many types of industrial and commercial establishments will be attracted to an airport location which is further enhanced by the advantages afforded by highways, railroads and proximity to the Seaway.

The existing land use pattern, with almost 70% of the township yet undeveloped, is a condition which allows much flexibility in the planning process. Except for a few uses, the pattern has not been set. Large sections have not developed for either residential or industrial purposes. The area directly affected by aircraft noise is again mostly undeveloped, although the amount and type of land use in this area is of major concern.

Finally, growth in Romulus Township will be channeled because of the findings of this report. In practice, the general policy of both the Federal

Housing Administration and the Veterans Administration has been not to insure mortgages for new homes abutting runways. The results of this report give direction as to which township areas are suitable for residential development.

C. The Generalized Land Use Plan

The Land Use Plan suggests the major land use categories in the study area. While Romulus Township is the focus of major concern, the plan also includes the remainder of the study area. The general goals of the Land Use Plan are:

1. To designate adequate lands to serve the anticipated needs of the people and enterprises of Romulus Township to 1980;

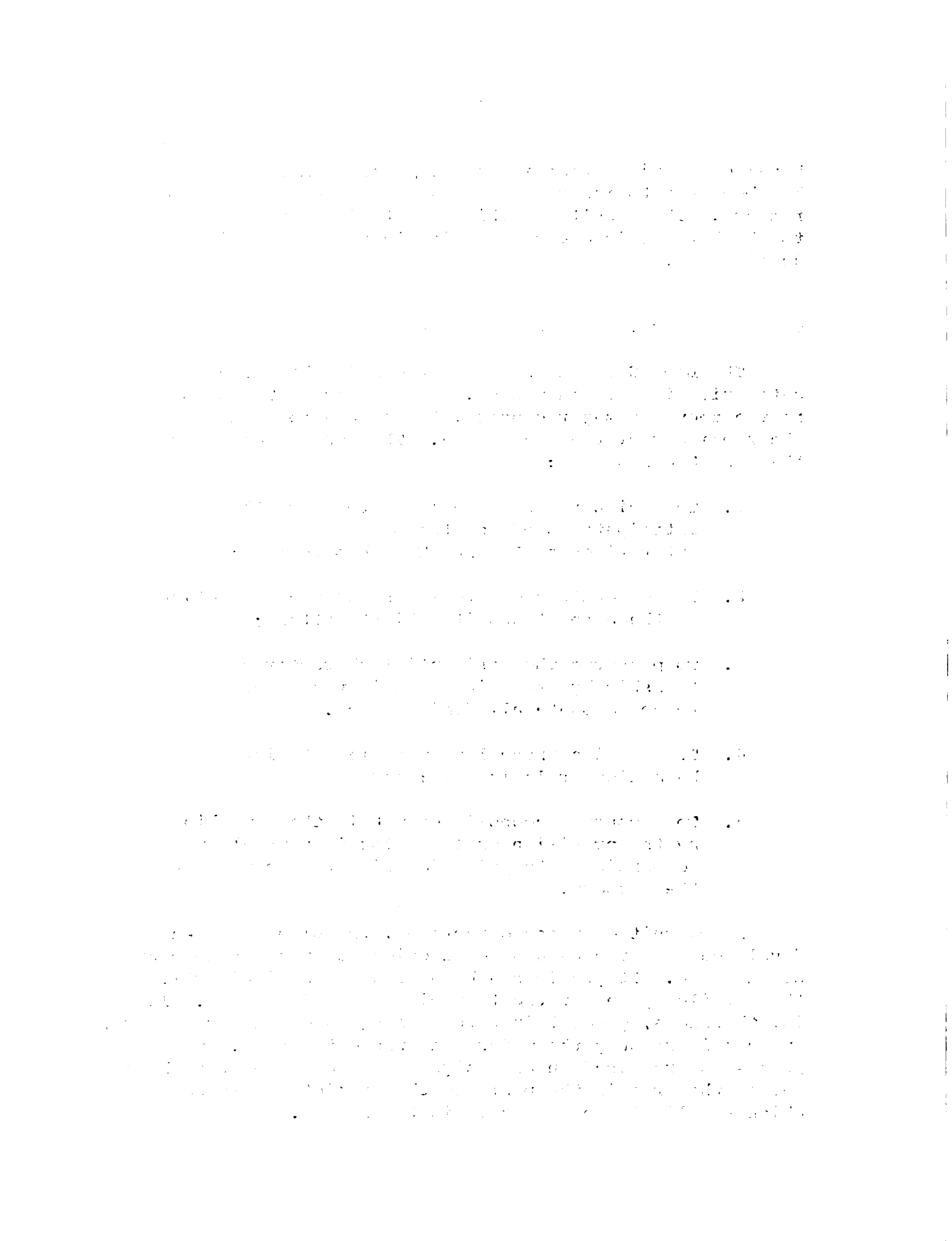
2. To designate adequate lands for the protection of the airport and its flight pattern;

3. To preserve the residential character of the township by providing a variety of densities to accommodate all family types.

4. To organize these land use elements into a harmonious relationship; and

5. To encourage economic growth in the township by the provision of lands for industrial and commercial enterprise desiring to locate near the airport.

In pursuit of these objectives, the plan has been developed to serve as a general guide for the development of the area. It provides a broad framework within which the detailed plan for the township can be developed. It is, therefore, general in nature, long range in perspective, and considers only the major land use categories. The proposals are based on an analysis of the forces that have shaped the area in the past and the predictable forces which are likely to affect it in the future.



More land has been allocated for each of the major land uses that will be required by 1980. This excess allows for the freedom of choice of sites in each use. It also recognizes that some land in each category may not be suitable or available for development by 1980. In addition, some of these lands need to be preserved for their appropriate use beyond the planning period.

D. Effectuation of the Land Use Plan

The development and recognition of the general land use guide plan for Romulus Township affords the community with its first opportunity to deal effectively with both the problems and the potentials created by the airport. Romulus Township has the responsibility and the ability to take these broad recommendations and to detail them into an appropriate community plan for development and action.

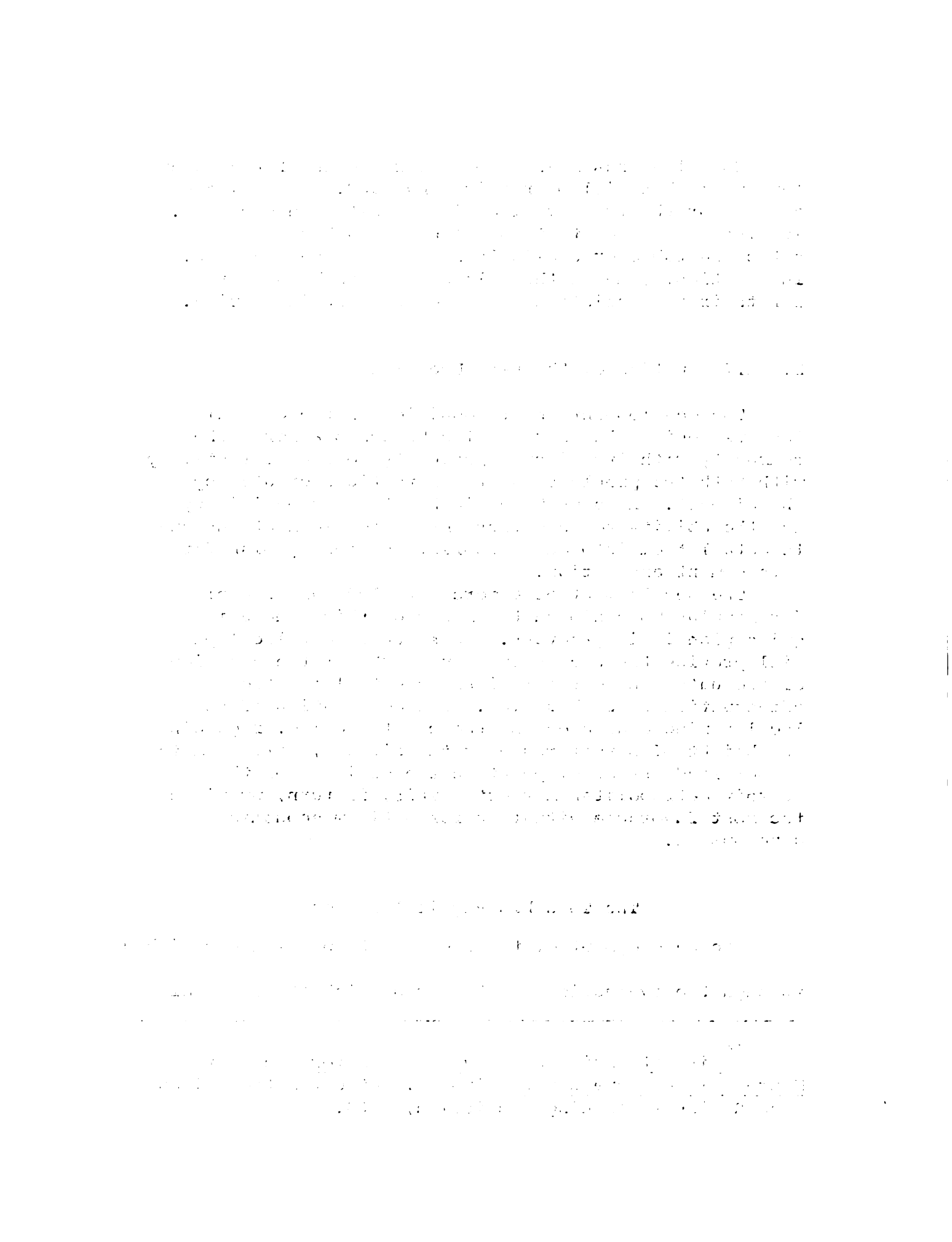
The development of a more detailed land use plan for Romulus Township on the basis of this generalized guide plan is in progress. This subsequent local plan will provide the necessary groundwork for the adoption of adequate zoning regulations essential for the effectuation of such a plan. The combination of the local zoning ordinance and the county zoning, regarding the height of structures near the airport, will promote proper land use development in the environs of the Detroit Metropolitan Airport. This, in turn, provides the most favorable situation for optimum economic development.[14]

The Township Physical Design

The development of the Township Plan was accomplished through the evaluations of the area which the staff of

---

[14] Airport Environs Study and Plan for the Detroit Metropolitan Wayne County Airport, Detroit Metropolitan Area Regional Planning Commission, 1964.



the Regional Planning Commission made and by the incorporation of this work into the data which Polysonics had presented to the Commission as part of its contract. This plan called for the inclusion of the "Affected Area" as an integrated part of the future development of the community. It was intended that the designation of the various parts of the "Affected Area" into logical economic elements for the community would bring about the desired land uses, and specifically eliminate the trend toward forms of residential development.

At the same time, it was also intended that this physical design would permit the Township to build a suitable tax base. This would offset the loss which had resulted because of the land that the airport had taken for its development.

A third goal of the plan was to produce within the "Affected Area" the land use which would also allow the airport to be developed to the maximum potential as the leading metropolitan airport for the Detroit regional area and for that matter all of southeastern Michigan.

The present location of the airport is ideally related to other forms of transportation including water, rail and highway.

In general, the final conclusion of the plan was to recommend that the area, so determined to be seriously affected by jet noise, be developed in airport related or oriented industrial and commercial uses.

The plan is presented here in map form (see Fig. 7).

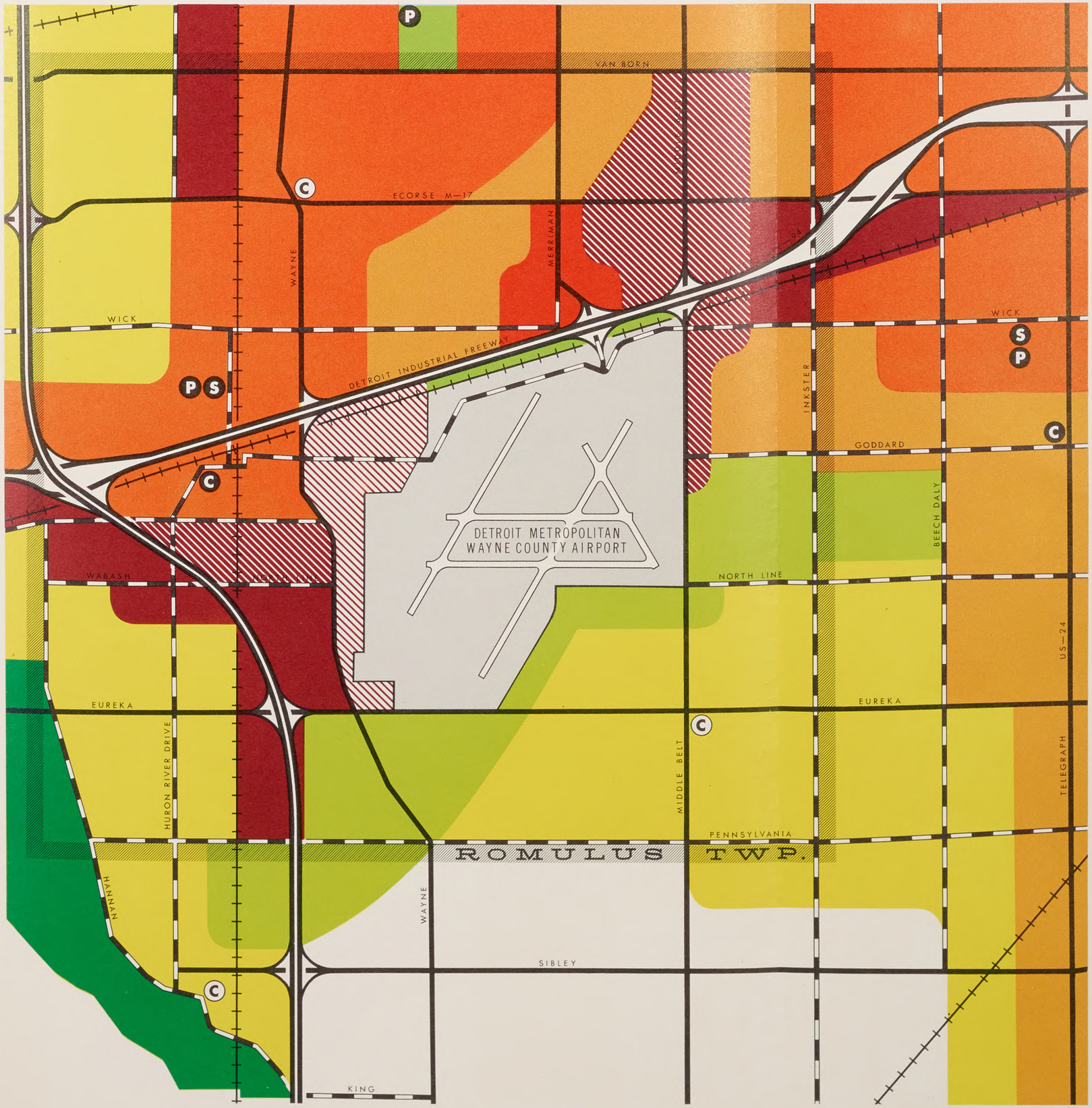
Presentation of the Plan to Public Officials and Citizens

The Plan as outlined in brief in the foregoing was presented to the various concerned officials as the next phase in the planning process. This was achieved through a sequence of events which began with approval of the Demonstration Grant Plan by the Airport Environs Study for release to various concerned officials and agencies on September 18, 1962.

Prior to this, a nearly completed progress report had been made to the top policy body responsible for the airport, the Airport Committee of the Wayne County Board of Supervisors. This was accomplished on August 1, 1962.

LAND USE PLAN

GENERALIZED



RESIDENTIAL
- MEDIUM DENSITY
- LOW DENSITY
- SUBURBAN

COMMERCIAL
- COMMUNITY CENTER
- SUBCENTER
- AIRPORT RELATED

INDUSTRIAL
- HIGH DENSITY
- LOW DENSITY
- AIRPORT RELATED

COMMUNITY FACILITIES
- HIGH SCHOOL
- COMMUNITY FACILITIES

OPEN USES
- REGIONAL PARK
- OTHER PUBLIC SPACE
- AGRICULTURAL
- TRANSITIONAL

TRANSPORTATION
- AIRPORT
- RAILROAD
- FREEWAY
- REGIONAL THOROUGHFARE
- LOCAL THOROUGHFARE

SCALE MILES

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 7

LAND USE PLAN

The next phase in this process was to present the Plan to the Romulus School District Board and the Romulus Township Board at a combined meeting on October 4, 1962. Shortly after this, copies of the report were sent to the local, regional and federal offices of the HHFA and the FAA for their consideration.

The last presentation of the material was to be citizens meeting held for the purpose of explaining the possibility of undertaking an Urban Renewal Program in the most seriously affected area to the north of the airport. The meeting was held in the Gordonier Elementary School, the building which was in part responsible for the undertaking of the Demonstration Grant, on May 11, 1963.

The next presentation of the material to the public will come with the distribution of the printed Plan by the Regional Planning Commission.

Significant Sidelights

This section has been included for the purpose of presenting some of the more significant events which

have taken place with regard to the problem of elimination of the aircraft noise at the federal level.

The six events which will be described here in the following played a most important part in the development of the principles, standards, and the plan at Detroit "Metro" Airport and its environs. They also show in depth the concern which the federal government has in this problem and the beginnings of efforts towards the formulation of some form of overall airport development policy. This is a two phased effort between the FAA and the HHFA, with backing in part by the Supreme Court.

How much influence the work of the Demonstration Grant program played in the formulation of some of these events is difficult to assess, but it has become obvious to those associated with the program that it did have some rather profound influences upon the federal decision makers.

The six events are as follows:

1. Publication of the Federal Aviation Agency Planning Series No. 3 in 1960.

2. Supreme Court decision of 1961, "The Griggs Case."

3. FAA Parallel Instrumented Runway Spacing Requirements of 1962.

4. Joint Planning Committee between FAA and HHFA started in 1963.

5. Proposed Amendment of the Housing Act of 1949, for aid to Areas Affected by Airport Operations, 1963.

6. Amendment to Federal Airport Act requiring Airport Operator to show evidence of planning in the environs of the airport before further federal funds for improvement can be granted. Signed into law in 1964.

Federal Aviation Agency, Planning Series #3

This document was the first attempt at defining the noise problem so that the airport administration and the community might take the initiative to develop together the area in a compatible manner. The objectives of this study or report are perhaps best expressed in the introductory remarks by former FAA Administrator, E. R. Quesada:

> September, 1960
>
> This aircraft noise abatement planning guide has been prepared to provide technical guidance to Federal agencies, airport authorities, local planning and zoning commissions, community

organizations and others concerned with aircraft noise, particularly at airport locations which have or expect to have turbo jet service.

It is incumbent upon all governmental agencies to take such steps as they can to prevent urban development from encroaching on the airport, particularly in those areas which lie under the takeoff and landing paths of dominant jet runways. This is necessary, not only to protect the enormous investment of public funds that has been made in the development of our major airports but for the protection of persons and property in the airport environment.

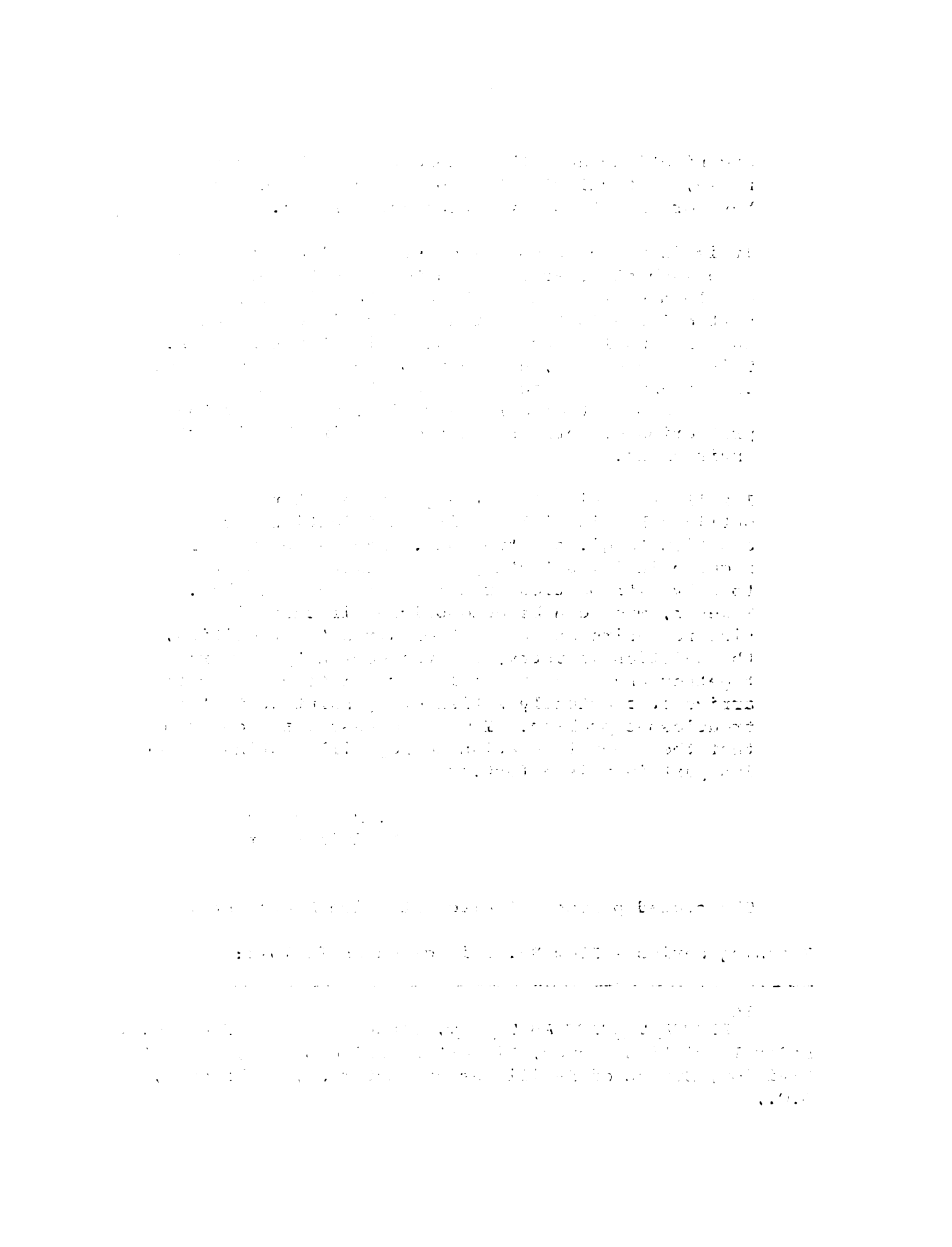
I fully recognize that the guidance material outlined herein will require modification for adoption to given situations. Each airport will require individual study to determine how best to solve its particular noise annoyance problem. However, much can be accomplished if there is a sincere desire on the part of airport authorities, the aviation industry, and the community to work together and undertake all appropriate measures to arrive at a mutually satisfactory solution to this troublesome problem. I wish to assure all concerned that the Federal Aviation Agency will continue to do its part in this effort.[16]

E. R. Quesada
Administrator

The stated purpose of Aircraft Noise Abatement in Planning Series - Item No. 3 is given as follows:

---

[16] AIRCRAFT NOISE ABATEMENT, Planning Series Item No. 3, Federal Aviation Agency, Airport Planning Branch, Airports Division, Bureau of Facilities and Material, Washington, D.C.,



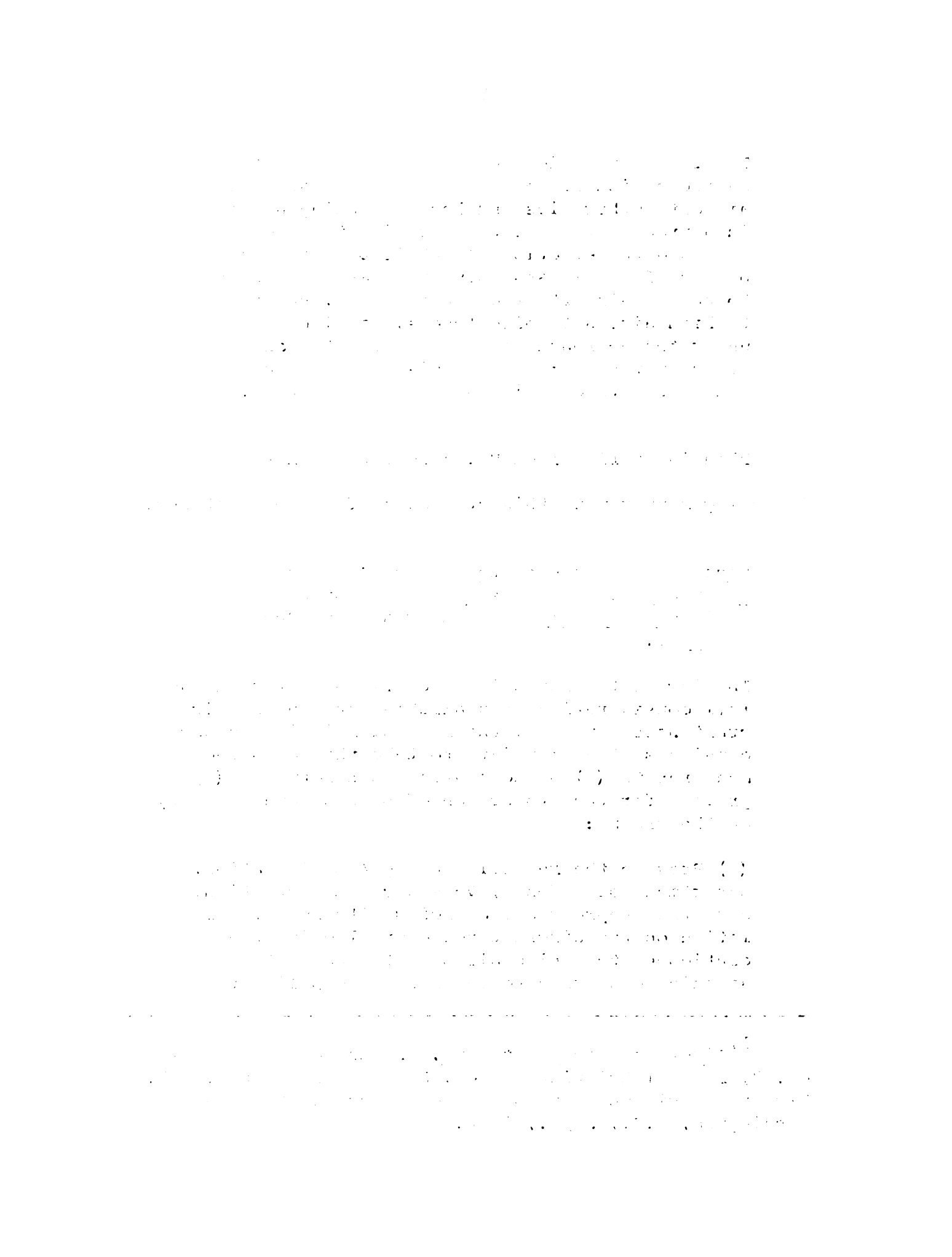
> To provide technical guidance and enlist the participation of appropriate Federal agencies, airport authorities and local planning agencies in a program to discourage residential development and the erection of public buildings and places of public assembly in areas contiguous to public airports and consequently, subject to high aircraft noise levels, particularly under the approach and departure paths of dominant runways; also to discuss certain other aspects of noise and noise elevation.[17]

Planning Series Item No. 3 concludes in the following manner with this statement of recommendations.

> Recommended Measures to Protect Approach and Departure Areas Against Encroachment by Residential Development and Places of Public Assembly.
>
> In view of the foregoing factors and after giving full consideration to available data on the aircraft noise problem, the Federal Aviation Agency considers it appropriate to take the following measures to (1) promote aviation safety and (2) provide for the protection of persons and property on the ground:
>
> (a) Provide the Federal Housing Administration, Department of Defense, Veterans Administration, and other appropriate agencies with full information on the aircraft noise problem in areas contiguous to public airports to enable the agencies concerned to determine the policy to

---

[17] Aircraft Noise Abatement, Planning Series Item No. 3, Federal Aviation Agency, Airport Planning Branch, Airports Division, Bureau of Facilities and Material, Washington, D.C., Sept., 1960.



> be followed in granting mortgage loans on dwelling units that will be subject to high aircraft noise levels.
> (b) Encourage the Departments of Health, Education and Welfare to take such action as may be proper within the limit of its authority to discourage the construction of schools and hospitals falling within the defined area.
> (c) Encourage airport authorities to buy or obtain additional land and aviation easements including the right to cause noise.
> (d) Bring to the attention of airport authorities and planning and zoning commissions the need for a review of the zoning powers of the political subdivisions in which the airport and adjacent areas are located to evaluate the potential of existing zoning laws. Recommend the exercise of existing zoning powers to the extent legally possible to prevent housing developments and places of public assembly from encroachment on the airport, particularly in the approach and departure areas of dominant runways, as described in this planning guide. In those cases where existing zoning powers are found to be deficient, recommend that steps be taken to obtain legislation to provide zoning powers adequate to prevent, to the extent legally possible, such encroachment on the airport.[18]

While the Planning Series No. 3 was a first attempt at solving the important noise problem in the area around jet airports in terms of defining the areas so affected, it did not attempt or consider in any way those land uses which could be permitted. It would seem that if this

---

[18] Ibid.

area had been treated more positively in this publication, it might have been more meaningful and useful at the local level.

The Griggs Case

The importance of the Board of Supervisors in the role of developing air facilities has been mentioned previously, but must be again emphasized.

The true importance of the County as an airport developer and operator was probably not considered too important until the decision of the Supreme Court in the Griggs Case and its resultant definition of responsibility. This case plainly stated that the County, as the operator of the airport, must assume the legal responsibility for any damages incurred in the surrounding vicinity by aircraft operating from the airport. In this particular case, Wayne County is the responsible body.

While the Griggs Case may be contested at some later date, the County is now in the position of having to abide by this ruling. This is a difficult situation in view of the current programs of expansion and the

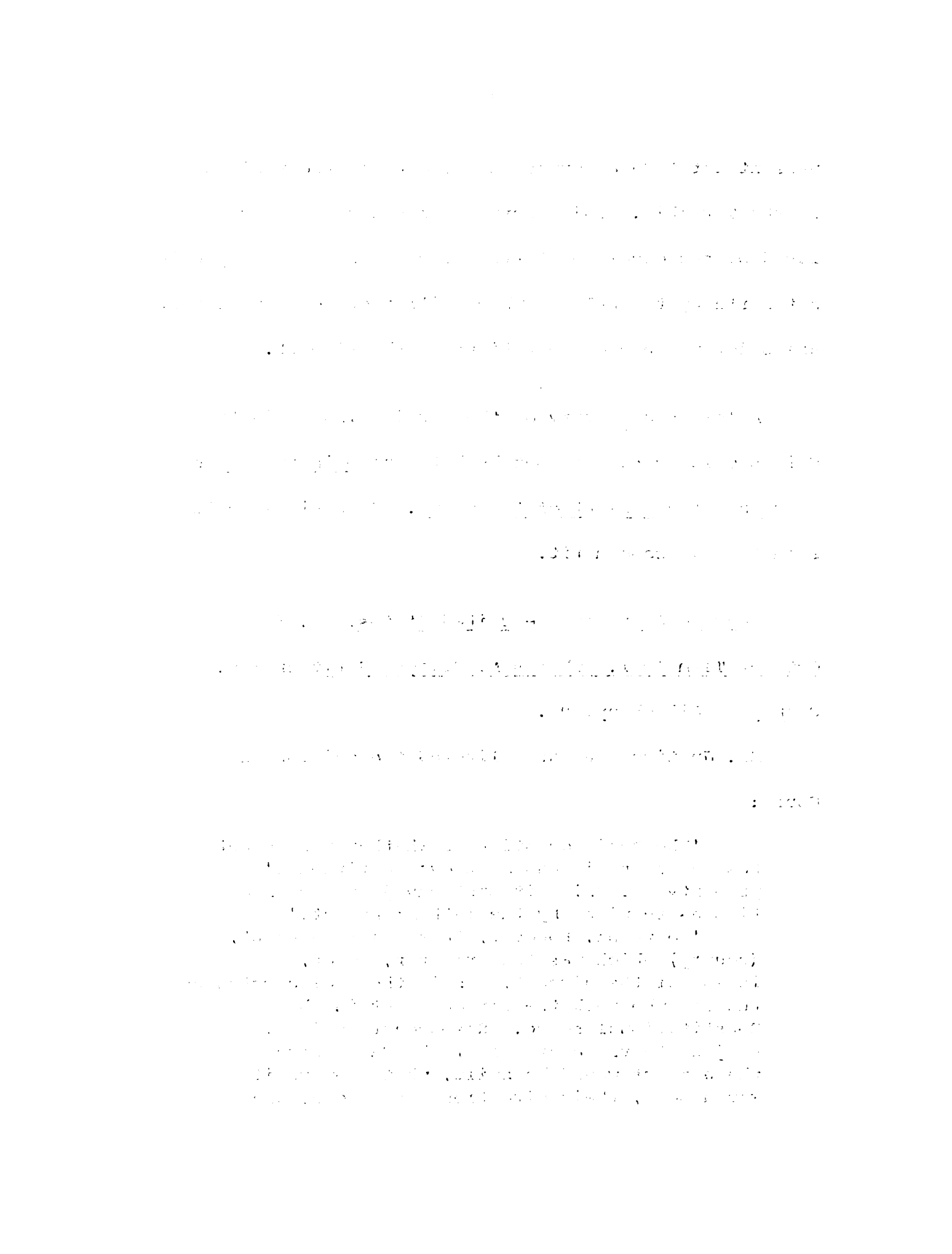
present attitude as expressed by many of the residents in the Township. This picture has become further confused by the development standards which are slowly being set forth by the FAA and which will require even greater areas for the needed operations of the airport.

Below is a summary of the wording issued in the Griggs Case as spelled out by both the Opinion of the Court and the Dissent of the Court. Both sides would seem to have some merit.

Supreme Court of the United States, No. 81, October Term 1961. Thomas N. Griggs, Petitioner v. County of Allegheny, Pa.

Mr. Justice Douglas delivered the opinion of the Court:

> 'The basic question is whether respondent has taken an air easement over petitioner's property for which it must pay just compensation as required by the 14th Amendment.'
>
> 'We think, however, that the respondent, (county) which was the promoter, owner, and lessor of the airport, was in these circumstances the one who took the air easement in the Constitutional sense. Respondent decided, subject to the approval of the CAA, where the airport would be built, what runways it would need, their direction and length, and



what land and navigation easements would be needed. The Federal Government takes nothing; it is the local authority which decides to build an airport (vel non), and where it is to be located.'

'An adequate approach way is as necessary a part of an airport as is the ground on which the airport, itself, is constructed. Without the "approach areas," an airport is indeed not operable. Respondent in designing it had to acquire some private property. Our conclusion is that by constitutional standards it did not acquire enough.'[19]

Mr. Justice Black, with whom Mr. Justice Frankfurter concurs, dissenting:

'There is no such duty on the local community to acquire flight airspace. Having taken the airspace over Griggs' private property for a public use, it is the United States which owes just compensation.'

'The construction of the Greater Pittsburgh Airport was financed in large part by funds supplied by the United States as part of its plan to induce localities like Allegheny to assist in setting up a national air transportation system.'

'The planes that takeoff and land at the Greater Pittsburgh Airport wind their rapid way through space not for the peculiar benefit of the citizens of Allegheny County but as part of a great, reliable transportation system of immense advantage to the whole Nation in time of peace and war.'[20]

---

[19] Supreme Court of the United States, Thomas N. Griggs v. County of Allegheny, No. 81, October Term, 1961.

[20] Ibid.

The case, as can be seen clearly, spells out who the responsible body or agency is. This seems to have had some effect with regard to the future development of the airport and in airport, township relationships.

It is interesting at this point to guess what might have happened if the Court had ruled five to four in favor of the Federal government for payment of the damages.

Instrumented Runway Spacing

The following sidelight is one which created the most concern with regard to the Airport Environs Study and Plan, and eventually may necessitate some revisions in the plan for physical design.

Why the FAA, which had been working with the Airport Environs Committee, did not notify those involved in developing the plan, of the intent to impose these standards during the plan formation, is difficult to assess. The fact remains however that the Regional Planning Commission, the Airport Environs Committee and the Airport operator were not notified

until after the release of the following newsletter, and after the plan had been made public.

The following newsletter created on the positive side a much needed standard for runway spacings of an instrumented nature. On the negative side, it created a certain attitude of mistrust on the part of those at the local level having interaction with the FAA. Perhaps time will clarify this event. Figure 8 shows the existing and proposed spacing.

The newsletter as received by the Regional Planning Commission is reproduced as follows:

RUNWAY SPACING

EXISTING

RPC PROPOSAL

NEW FAA REQUIREMENT

SCALE MILES

1961 Survey

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 8

RUNWAY SPACING

FAA NEWS RELEASE CITING REQUIREMENTS FOR MINIMUM SPACING OF PARALLEL INSTRUMENTED RUNWAYS

Copy of FAA News

Federal Aviation Agency
Office of Public Affairs
Washington 25, D.C.

FAA #87
FOR IMMEDIATE RELEASE
December 11, 1962

PARALLEL LANDINGS ON DUAL RUNWAYS APPROVED BY FAA FOR CHICAGO-O'HARE AIRPORT

Parallel approaches and landings under instrument procedures will be conducted on dual runways for the first time at a civil airport on December 15, 1962, when the Federal Aviation Agency will initiate the procedures at Chicago's O'Hare International Airport.

The program will serve as a prototype for other busy airports that can meet the qualifications for conducting similar programs.

Although the dual ILS runways at Chicago-O'Hare are separated by 6,510 feet, Administrator N. E. Halaby has approved a minimum spacing of 5,000 feet as a standard for parallel runways intended to be used for simultaneous ILS approaches under instrumented conditions.

The program has been under test and study for two years. It is designed to increase the acceptance rate of an airport in handling large volumes of traffic and to appreciably reduce arrival delays during peak periods.

Aircraft taking part in the parallel ILS (Instrument Landing System) approach system at Chicago-O'Hare will be required to operate under IFR (Instrument Flight Rules) procedures regardless of weather and to have the

necessary navigational and communications equipment for making accurate approaches to the assigned ILS runway.

These aircraft will be radar vectored by the FAA tower's approach control facility to either of two final approach ILS courses from four feeder fixes. To insure safety while turning to final approach, planes will be separated by at least 1,000 feet vertically or three miles horizontally by radar. This separation is maintained until the planes are about eight miles out from touchdown. All turn-ons and final approaches will be monitored by radar.

A "no-transgression zone," 3510 feet wide, will be established between centerlines of each course and when aircraft are noted to be following a track that would penetrate this zone, controllers will issue immediate instructions to pilots to take corrective action. A minimum of three miles of radar separation will be maintained between planes flying on the same ILS course.

The FAA air traffic control tower at Chicago-O'Hare Airport had the largest number of operations of FAA's 263 towers during fiscal year 1962. It led in total aircraft operations (landings and takeoffs) with 374,000 -- at times handling as many as two operations a minute -- and in total IFR operations which numbered 247,466. Generally speaking, IFR procedures are those followed by pilots when weather falls below certain minimums.

A recent FAA study found that major delays occur at airports serving large air traffic hubs such as Chicago. In fiscal year 1961 terminal delays in excess of five minutes due to air traffic control contributed about 10 percent of $363.8 million estimated by the study as the cost of excessive delays in the terminal area due to all causes. It was also found that airport congestion coupled with multiple departing and arriving planes created an average delay of 8.75 minutes at the nations's busiest 245 airports.

Parallel ILS runway operation for other airports would be approved on an individual basis, depending upon

runway spacing, airport traffic, and the availability of the appropriate procedures, navigational aids including radar, and personnel staffing.

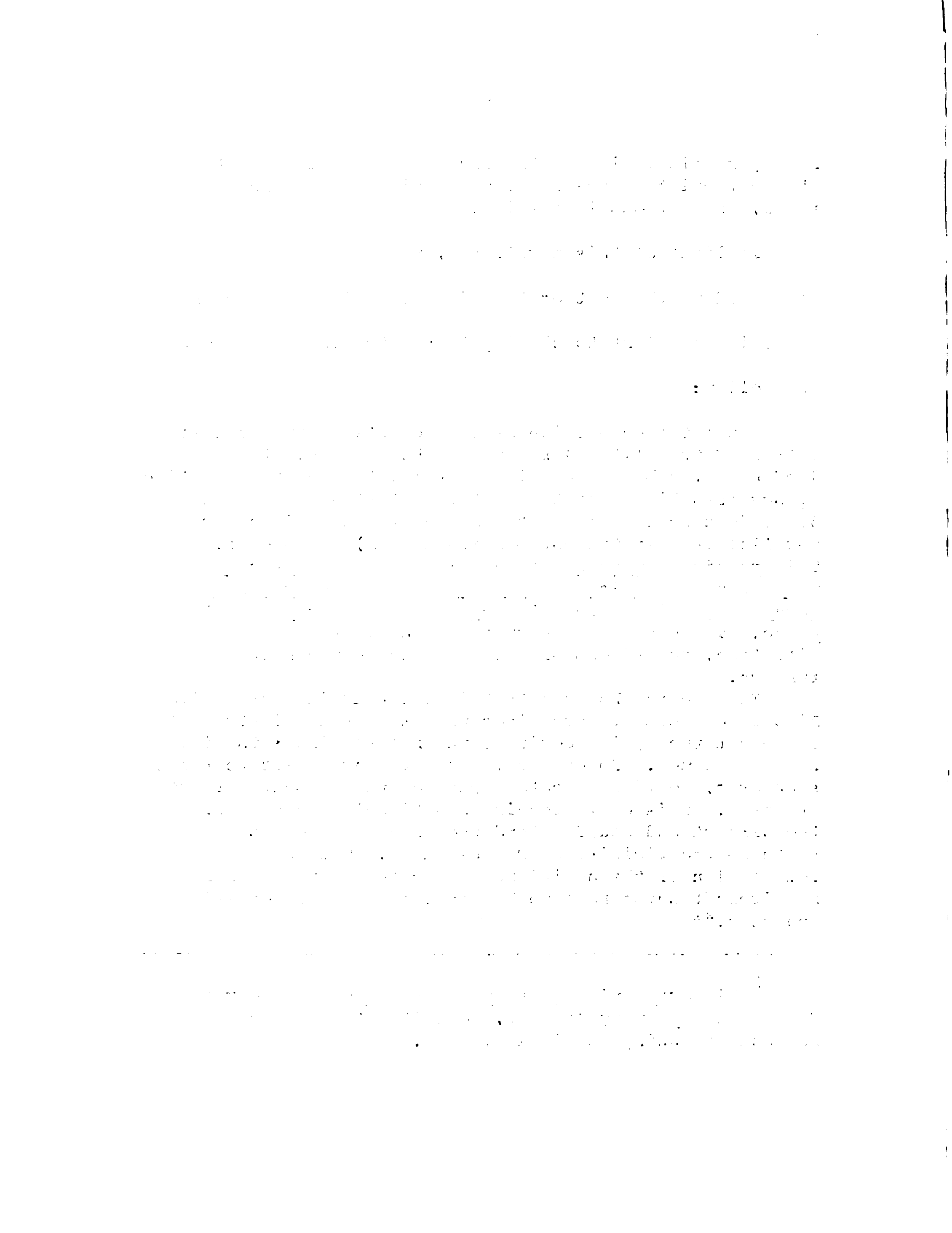
In light of this newsletter, the following footnote was added to the text of the Airport Environs Study and Plan, in an effort to clarify this situation of concern and policy:

Since the completion of the acoustical analysis at Detroit Metropolitan Airport and the development of the land use plan based on this analysis, the Federal Aviation Agency established criteria stating that a minimum of 5,000 feet is required between runway centerlines for parallel ILS (Instrument Landing System) approaches. This requirement does not invalidate the acoustical methods utilized in this study or the procedures for developing a land use pattern in relation to aircraft noise. These same techniques will apply to each situation, regardless of the distances between the runways.

It appears, however that if the Detroit Metropolitan Airport management determines that a parallel instrumented east-west runway is required, the FAA requirements will have to be met. In general, a new runway, built to these standards, would be located south of the present airport property. This would require additional expansion of the airport and would extend the affected area to the south in the vicinity of Phoenix Road. The actual delineation of the additional lands that would be affected by aircraft noise have to be determined by an acoustical analysis.[21]

---

[21] Airport Environs Study and Plan for the Detroit Metropolitan County Airport, Detroit Metropolitan Area Regional Planning Commission, 1964.



Joint Committee of the FAA and HHFA

One of the most enlightening events which has occurred as a result of the nation wide concern over the aircraft noise problem has been the formulation of a joint committee between the FAA and the HHFA or more specifically the URA portion of this agency. The effects which this committee may have can perhaps best be seen later in this section.

The following letter outlines the objectives of this committee:

HOUSING AND HOME FINANCE AGENCY
URBAN RENEWAL ADMINISTRATION
WASHINGTON 25, D.C.

URBAN PLANNING ASSISTANCE PROGRAM

February 22, 1963

PLANNING AGENCY LETTER NO. 38

SUBJECT: Airport Planning

In order to facilitate better coordination of airport planning with urban planning, the Federal Aviation Agency and the Urban Renewal Administration have established a joint committee to develop procedures to accomplish this objective.

The importance of airports to local economies, the relatively large amounts of land required for modern airports, the need for effective land use compatible with airport operations, and the importance of adequate provisions for ground transportation from airports to population centers are major considerations bearing on the sound growth and development of cities and their surrounding areas. States and metropolitan areas, as well as other applicants for urban planning assistance grants, are encouraged to include in their comprehensive planning programs studies and plans related to airports.

The following criteria shall be used in preparing applications for grants to assist in such studies and plans:

1. Eligible activities shall be concerned with airport requirements to determine the number, type, and general area locations of airports, for both commercial and general aviation, that are needed to serve the area covered by the application. The studies would encompass the relationship of airports to community development, taking into account, among other things, economic factors and needed amounts of land; land use controls in the vicinity of airports, such as zoning; and relationship to existing and proposed transportation facilities and routes. Examples of surveys and plans under these activities are set forth in an attachment of this Letter.

   The preparation of detailed design or development plans for individual airports is not an eligible activity.

2. As is the case with other specialized elements of a comprehensive plan for a community, the following listed basic elements shall be prepared either before or concurrently with the preparation of airport studies and plans:

   a. Population growth, forecast, and distribution.

   b. Economic base data, growth, and development.

   c. Present and future land use.

   d. Transportation.

   The above studies and plans should serve as common base data and forecasts for both airport planning and all other elements of the comprehensive plan.

3. Methods of liaison between the Planning Agency and the public agency responsible for the development of airports shall be clearly set forth. Any existing agreements between the agencies shall be included in the application.

4. FAA and appropriate State requirements and standards shall be taken into account. Close and continuing coordination with the FAA should be maintained.

FAA publications regarding airport study programs, standards, airport zoning, and avigation easements, as well as the National Airport Plan, are available from FAA Regional and Airport District Offices, addresses and jurisdictions of which are listed in an attachment of this Letter.

William L. Slayton
Urban Renewal Commissioner

Attachments

Proposed Amendment to the Housing Act of 1949

This is yet another most encouraging sign with regard to the attitude of policy and decision makers in an attempt at solving the aircraft noise problem. The amendment as presented below would create federal financing for the redevelopment of critical noise areas around airports for commercial, industrial or other land uses compatible with airport operations.

At present this Bill is still in committee, but it is hoped that it will soon be acted upon. An extract of the Bill is presented as follows.

EXTRACT

88th CONGRESS
1st Session S. 2031

IN THE SENATE OF THE UNITED STATES

August 8, 1963

MR. CLARK (for himself, MR. HUMPHREY, MR. PELL AND MR. RIBICOFF) introduced the following bill; which was read twice and referred to the committee on Banking and Currency

A BILL

To extend and amend laws relating to urban conservation and development, the provision and improvement of housing, the availability of mortgage credit, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that this Act may be cited as the "Community Development Act of 1963."

TITLE I—URBAN RENEWAL AND PLANNING CAPITAL GRANT AUTHORIZATION

SEC. 101. Section 103(b) of the Housing Act of 1949 is amended by striking out "$4,000,000,000" and inserting in lieu thereof "$7,000,000,000."

AREAS AFFECTED BY AIRPORT OPERATIONS

SEC. 103. Title 1 of the Housing Act of 1949 is amended by inserting after section 114 (added by section 102 of this Act) a new section as follows:

URBAN RENEWAL FOR AREAS SPECIALLY AFFECTED BY AIRPORT OPERATIONS

"SEC. 115. (a) Where the Administrator determines that (1) land uses which existed on the effective date of this section and which currently exist in an urban area are incompatible with the operation of an airport or airports located in the immediate vicinity of such area because of noise, wind damage, safety hazards, or other conditions attendant upon such operation, (2) such imcompatibility, considered in the light of other conditions

in or affecting such area, has become so severe as to have changed substantially the character of the area and to require its redevelopment for uses compatible with airport operations, and (3) financial assistance for such redevelopment cannot otherwise be extended under this title, he is authorized to extend financial assistance under this title for an urban renewal project for the redevelopment of such area for uses compatible with airport operations without regard to the following:

"(1) the requirement in sections 102 and 110 that the urban renewal area be a slum area or a blighted, deteriorated, or deteriorating area;

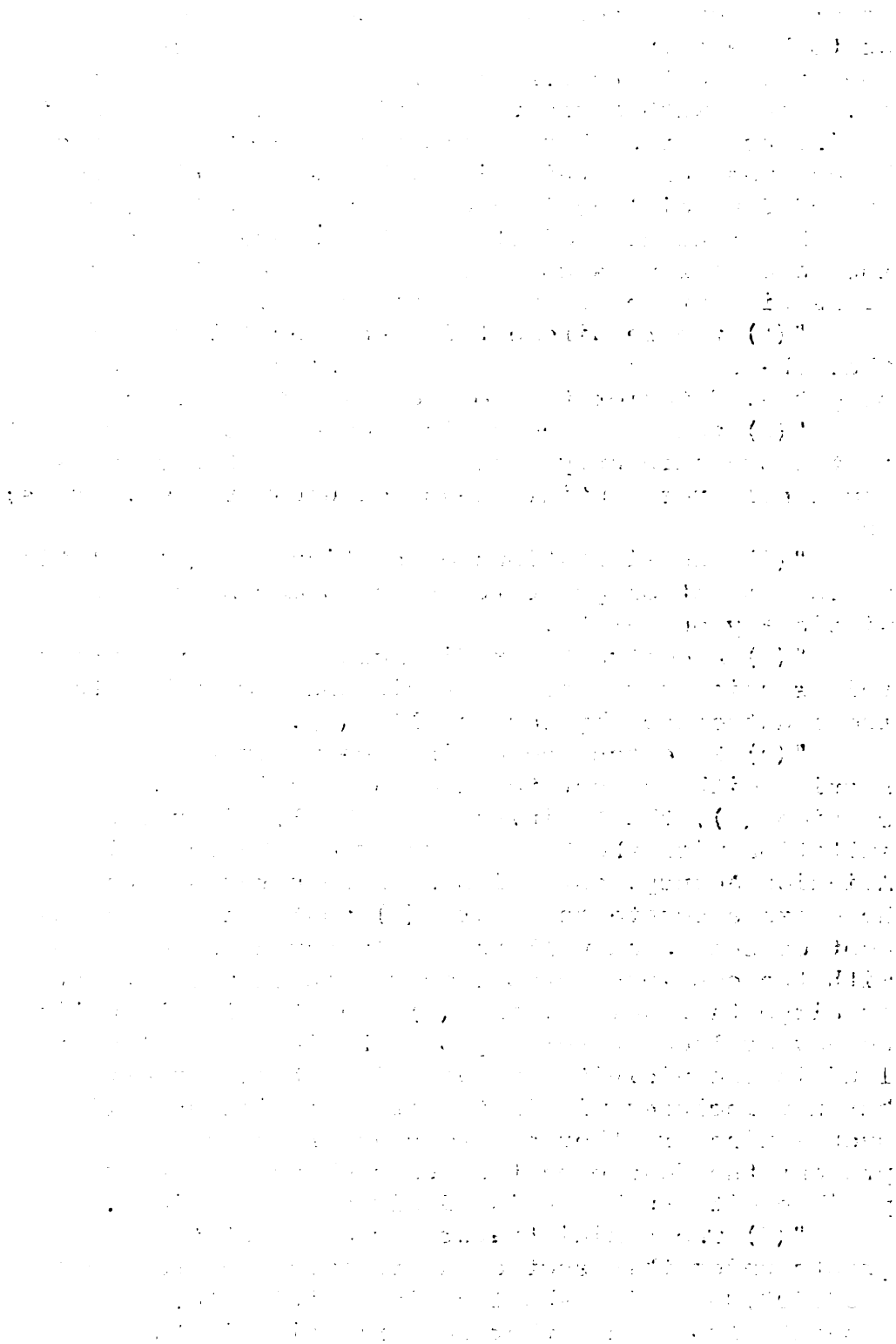
"(2) the requirement in section 110 with respect to the predominantly residential character or predominantly residential re-use of urban renewal areas; and

"(3) the limitations of section 102 (b) relating to the amount of grant funds which may be expanded within any one State.

"(b) A contract for financial assistance under this section may include provisions comparable to those authorized by section 113 (c).

"(c) In extending assistance under this section with respect to an area described in subsection (a), the Administrator shall, after consultation with the Administrator of the Federal Aviation Agency, establish such requirements as he deems adequate to assure (1) that the redevelopment of such area will be solely for uses compatible with the continued proper operation of the airport or airports involved, and (2) that the local public agency or local governing body having control over land in the vicinity of such airport or airports but not included within the project will establish such zoning or other controls as are necessary to prevent the development of uses which are incompatible with such continued airport operations.

"(d) The Administrator may contract to make grants under this section aggregating not to exceed $250,000,000 which shall be in addition to, and separate from, any other authorization in this



> title and shall not be taken into account for purposes of any percentage limitations in this title relating to the use of grant funds authorized under this title."

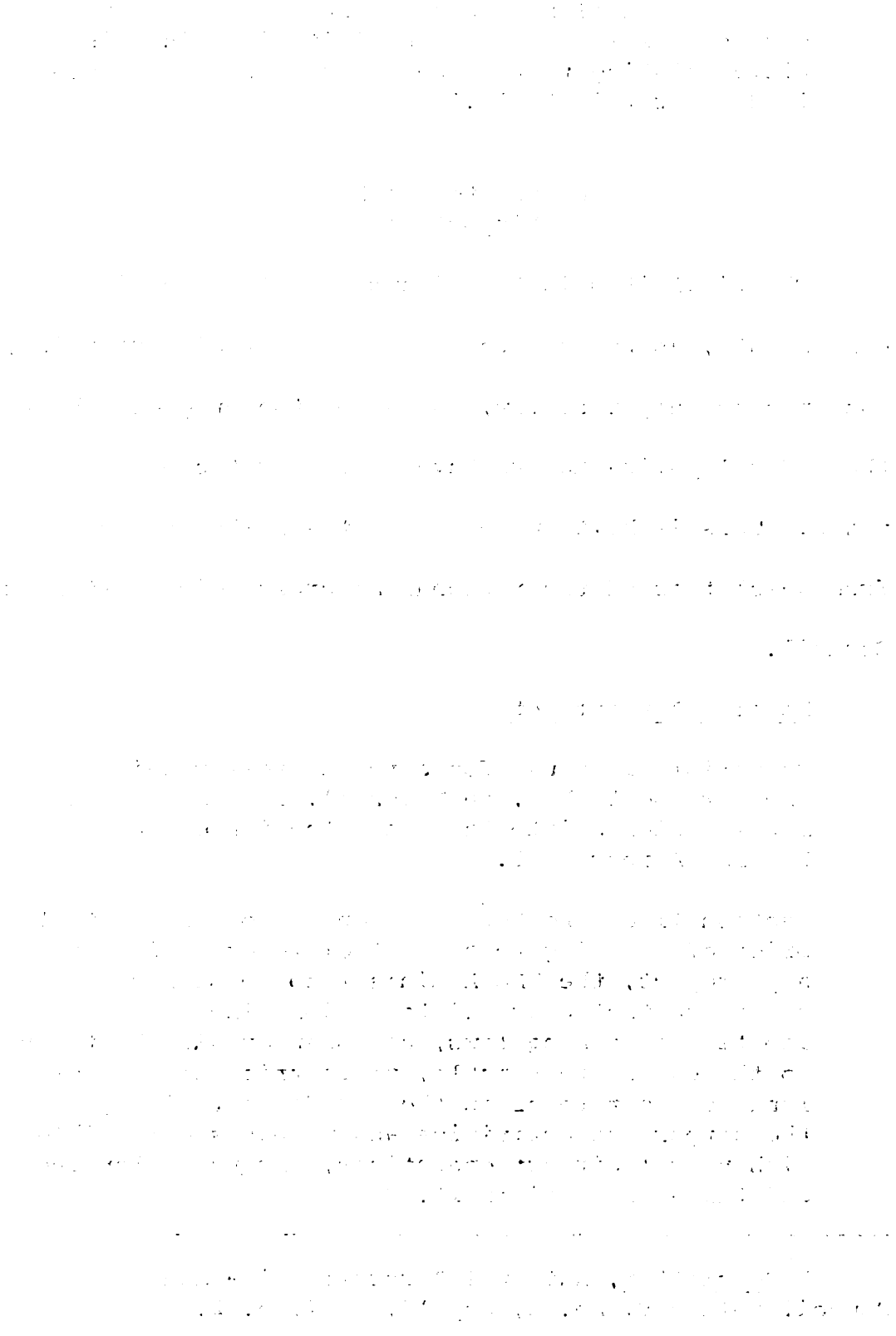
Amendment to the Federal Airport Act

The final item in the discussion of these significant events, as related to the problem of airport noise, was enacted only recently, and shows the progress which the federal policy makers have made over the past four years. This is best summed up in the following quote from Newsletter of the National Aircraft Noise Abatement Council.

> Federal Airport Act
>
> Compatible land use for airport areas received another boost when, on March 11, 1964 President Johnson signed into law the extension of the Federal Airport Act.
>
> Section II of the Act was amended to provide that prior of agreeing to a grant of federal aid for any project, the FAA Administrator must receive assurance that appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and take-off of aircraft.[22]

---

[22] Newsletter, National Aircraft Noise Abatement Council Volume V, No. X, May 15, 1964, p. 2.



CHAPTER IV

THE USE OF THE PLAN AND RECOMMENDATIONS

The Township of Romulus

The Romulus Township Board and the Romulus School District Board had the work of the Airport Environs Study and Plan presented to them in detail on several occasions by the staff of the Regional Planning Commission. The work of the Airport Environs Advisory Committee was also related to them by the members serving on this committee from the Township. In general, the Township residents and officials seemed to be in favor of the Plan as presented to them. This is evidenced by the direction which they encouraged their own planning consultant, Waring and Johnson, to take in developing for them a Land Use Master Plan and Zoning Ordinance.[23] The consultant recently produced these two items for consideration by the Township Board. These are both based on the

---

[23] Master Plan, Township of Romulus, Michigan, Waring and Johnson, Planning Consultants, May, 1964.

work done in the Demonstration Grant, and can be considered a valuable result of the investigation.

The following discussion will center on four areas in which the residents, through the Township Board and the School District, have taken some form of action.

Tax Base Concern

One of the most vital of the economic concerns is in the area of property taxation in the eyes of the residents of the Township. These people have seen the airport grow and grow, eating away, piece by piece, the land area of the Township and slowly fragmenting it into separate parts.

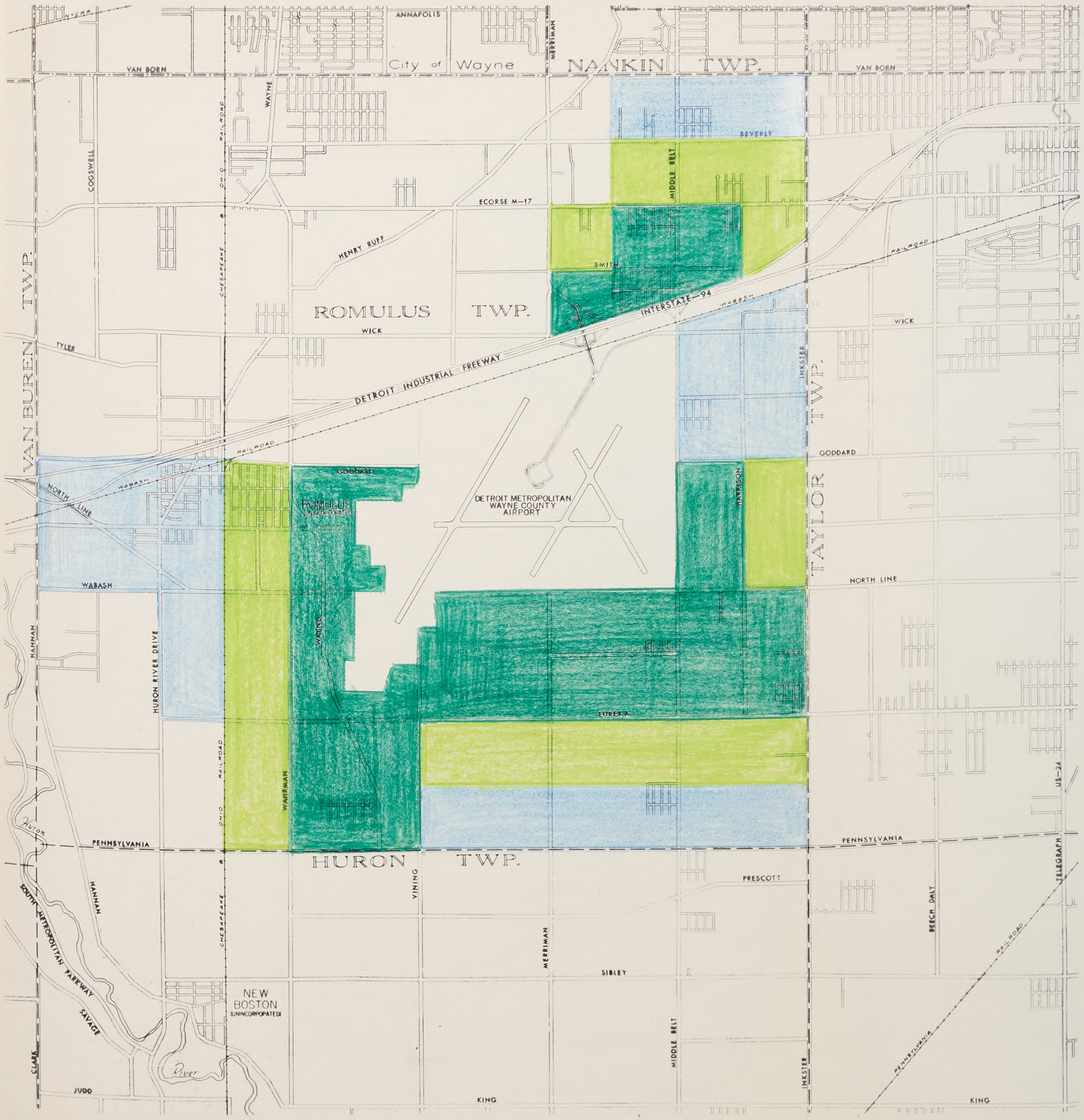
The decrease in taxable area is still a problem of considerable concern today. This comes with the requirement that the FAA has set forth recently with regard to the distance needed between parallel instrumented runways. This concept may result in the airport operators acquiring another one to three square miles of land area in the Township, thus reducing the tax base still further.

It would seem that most of the Township Officials and the citizens in general are convinced that the growth of

the airport will probably in time be sufficient enough to offset the tax base loss. As such, the new zoning ordinance and plan both call for the extensive development of industrial and commercial land in the vicinity of the airport. Some of this anticipated growth has already begun to take form.

The Township Board has gone one step further in an attempt to relieve the concern over the tax base loss. This step involved the reduction of property taxes in the general area considered to be adversely affected by sound as determined in the Demonstration Grant. This was a move which was prompted by the Township Board and agreed to by the Wayne County Board of Taxation in the last part of 1961 (see Fig. 9).

This action can not be underplayed as it probably helped reduce the complaints being registered at the airport and with the Township Supervisor. It also prevented the instigation of a lawsuit by the more concerned residents in the affected area. A map is shown here to indicate the extent of these reductions.



1961 REDUCTION IN TAX ASSESSMENTS

- 10% REDUCTION
- 15% REDUCTION
- 20% REDUCTION

SOURCE:
OFFICE OF THE ROMULUS TOWNSHIP CLERK

SCALE MILES

1961 Survey

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 9

PROPERTY TAX REDUCTION MAP

Water and Sewer Development

While the Township Officials moved in one direction to stop residential building and create a plan for community development and the zoning with which to implement it, they moved in the opposite direction at the same time by expanding and constructing residential extensions of the water and sewer lines in the affected area. This was a total disregard of the principle and standards which were being developed by the Airport Environs Study and Plan. At the present, the Township is now trying to receive a reimbursement for these same facilities from the Wayne County Board of Supervisors.

School Development

The area of school facilities is perhaps another of the most significant problems in the eyes of the residents of the Township. The present operations of the airport result in flights passing almost directly overhead or in close proximity to several of the schools. The result has been a deep concern expressed by all with regard to this problem. The protection of children seems to be the concern of many and one of the most strongly stated feeling on the part of the citizens.

The future location of schools is an area of concern. At present the School Board has no plan for development, but is waiting to see what future course the urban pattern is going to take, and also to see in what direction the airport will construct new runways. This does not mean that school officials in the district would prefer not to have a plan, but that under the present conditions they are unable to develop one. On several occasions they have consulted with the staff of the Regional Planning Commission in an effort to develop a plan, but as yet they have been unable to work out a solution to meet future needs.

Urban Renewal

In an effort to eliminate the housing already located in the flight pattern and described as being unsuitable for housing, the Township hired the Urban Renewal consulting firm of Parkins and Rogers. This firm studied the area and offered a proposal for the elimination of housing to the north east of the airport. The approach offered the residents a chance to leave the area through the urban renewal process. The plan was deliberated by the Township Board and placed before the citizens in the form of an advisory vote open to all property owners.

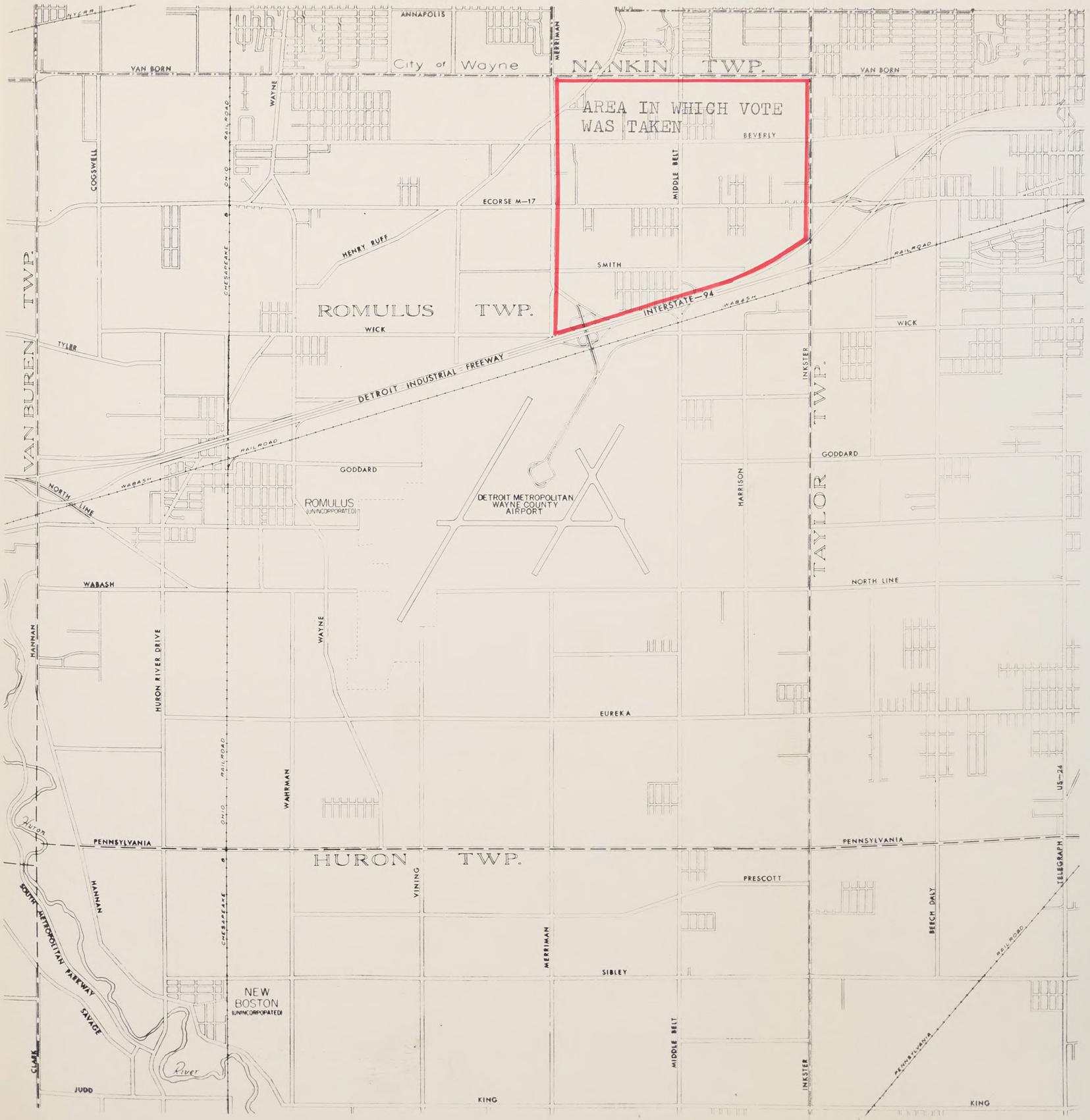
The result was a defeat of the proposal by a substantial margin of better than three to one. The advisory vote took place in May of 1963.(see Fig. 10).

Airport Management

The use of the Plan and Recommendations by Airport Management has not been what one might expect in light of the events which have taken place with regard to airport planning. The airport has developed a Master Plan which is only a statement for the programmed construction of facilities in the terminal areas and not a long range plan for capacity or future needs.

It would appear that, even though airport management has worked closely with the Airport Environs Advisory Committee, they have in fact been more influenced by the FAA runway spacing requirements and have elected to follow this course at present. This is in direct conflict to the plans set forth by both the Demonstration Grant and the local community consultant.

The following letter best concludes the current position of the policy makers now guiding the airport in both development and operation.



VOTE DATA FOR POSSIBLE URBAN RENEWAL PROJECT IN ROMULUS TOWNSHIP

ELIGIBLE VOTERS	2,516
TOTAL VOTE CAST	504
FOR URBAN RENEWAL	159
OPPOSED TO RENEWAL	345

VOTE CAST ON MAY 20, 1963

SOURCE:
OFFICE OF THE ROMULUS TOWNSHIP CLERK

SCALE MILES

1961 Survey

DETROIT METROPOLITAN AREA REGIONAL PLANNING COMMISSION

FIGURE 10

URBAN RENEWAL VOTE

DETROIT METROPOLITAN WAYNE COUNTY AIRPORT
3rd Floor Terminal Building
Metropolitan Airport
Michigan, 48141
CRestwood 8-3910

May 28, 1964

Romulus Township Planning Commission
Romulus Township Administrative
Offices
36572 Goddard at Sterling
Romulus, Michigan

Attention: Mr. Joseph Wallis, Secretary

Gentlemen:

The Board of Wayne County Road Commissioners at its meeting of April 9, 1964, concurred in a recommendation by staff that the proposed location of a new east-west runway be some 5,000 ft. south of the existing east-west runway. They also authorized the master plan for the Airport be amended to reflect this new runway.

The purpose of this letter is to advise that the runway location has now been fixed and the master plan, subject to the approval of the Federal Aviation Agency, will be amended to show this new location.

If there is any further information we can give on this matter, please feel free to call upon us.

Yours very truly,

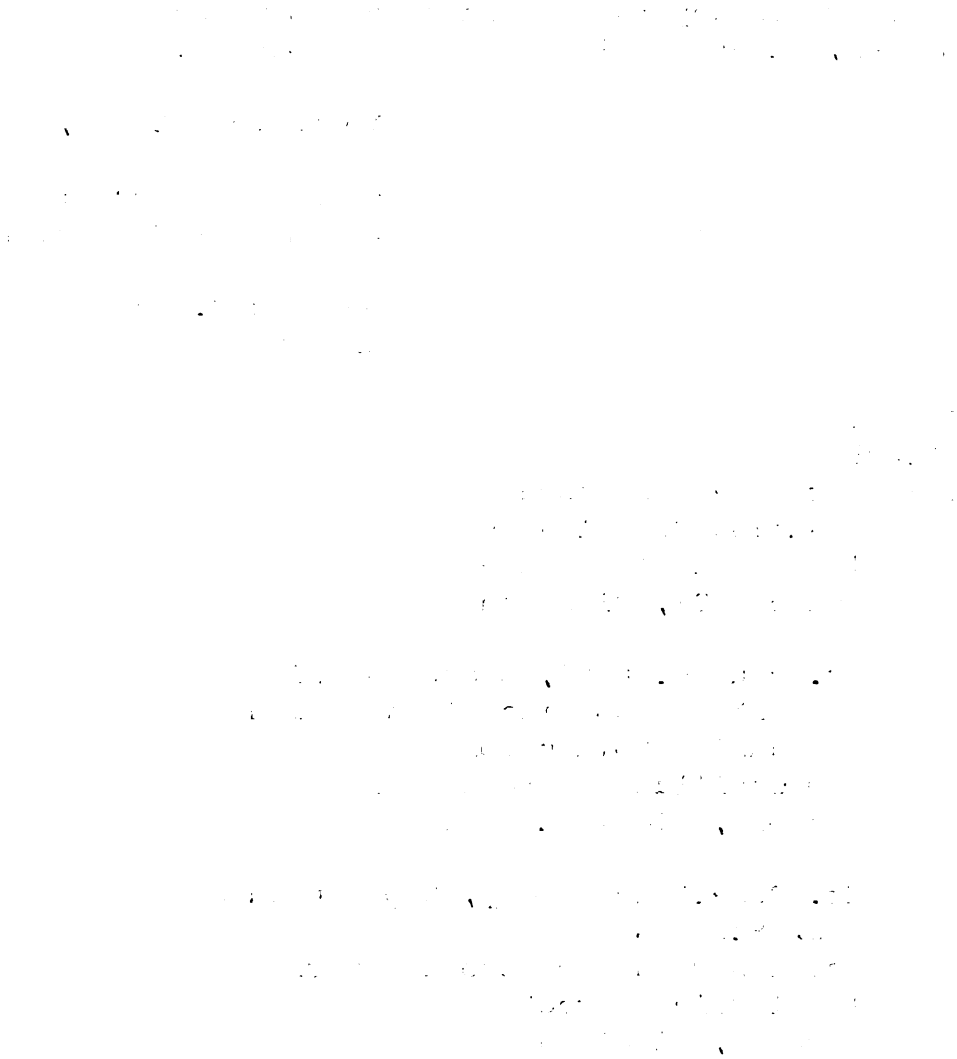
DETROIT METROPOLITAN
WAYNE COUNTY AIRPORT

Douglas C. Wolfe
Airport Manager

DCW/ds
Attached
cc: Waring and Johnson
Planning Consultants
14800 Fenkell Avenue
Detroit 27, Michigan

Mr. Paul M. Reid, Executive Director
Detroit Metropolitan Area Regional
Planning Commission
800 Cadillac Square Building
Detroit, Michigan 48226

Mr. Robert McGonaghy, Superintendent
of Schools
Romulus Township School District
11401 Olive Street
Romulus, Michigan



The Local Office of the FHA

Perhaps the most significant use of the Airport Environs Study and Plan, as prepared by the Detroit Metropolitan Area Regional Planning Commission, has come from the local office of the FHA. This locally administered office has faced the responsibility of developing land uses in the "Affected Area" squarely and taken the following action as a means toward the implementation of the Plan. The effects of this action will be far reaching as time moves on and may be eventually looked upon as the most significant result of the work of the Regional Planning Commission.

The following letter from the local director of the FHA spells out the action which is now being taken. Since the writing of this letter, no new subdivision activity has taken place within the affected area.

FEDERAL HOUSING ADMINISTRATION

March 22, 1963

Office of
THE DIRECTOR

In reply please refer to
Valuation Section

Mr. Paul M. Reid, Executive Director
Detroit Metropolitan Area Regional
Planning Commission
800 Cadillac Square Building
Detroit 26, Michigan

Dear Mr. Reid:

We duly acknowledge the receipt of and express appreciation for "The General Land Use Plan," "The Affected Area Map," and outline of "The Airport Environs Study Report."

As indicated by the thoroughness of these data, yours and co-operating agencies who conducted the acoustical and density studies undoubtedly worked untiringly to accomplish this result.

We at the Federal Housing Administration are cognizant of the problems associated with this type of analysis and commend you for a job well done.

Further, we feel that these data, integrated with our existing materials, can be implemented into our feasibility and subdivision analysis of subdivisions in this geographical area.

This will afford the Federal Housing Administration with a really fair and equitable approach to the acceptance or rejection of subdivisions and/or individual properties situated in or at the perifery of the approach-departure zones of the Detroit Wayne Metropolitan Airport.

As a matter of policy, it is our firm desire to provide adequate housing and safe environment for persons seeking housing in this geographical area, with a minimum of risk to the mortgage security.

We wish to thank you again for these reports and will welcome any further information from this study, when it is completed.

Yours very truly,

(Signed) D. K. Hamborsky

Dwight K. Hamborsky
Director

Summary of The Current Situation

At present the current situation may be summed up in the following with regard to the implementation of the Airport Environs Study and Plan.

1. The Township has not officially adopted the Master Plan or Zoning Ordinance based on the Airport Environs Plan.

2. The Airport Management has not applied for federal funds with which to build a new east-west runway.

3. The County Board of Supervisors has not agreed to pay for the Romulus Township extension of sewer and water lines.

4. Residential builders are still attempting to secure FHA approval for subdivisions in the affected area and are being turned down.

5. The School Board still does not have a plan for future development.

6. Some construction of a commercial and industrial nature is beginning to take place in the vicinity of the airport.

CHAPTER V

CRITIQUE OF THE DEMONSTRATION GRANT PROJECT

It is obvious that there are both positive and negative features to the study as presented in this effort. These will be discussed here in an attempt to evaluate the study and to point to some conclusions relative to the planning process. The approach will be to first present the negative features and conclude with the positive results of the study.

The first and most significant negative feature is with regard to the timing involved in the study. The study is nearly two and one-half years late in being presented in printed form to the public. The delays were created in the following three areas. First, the acoustical consultant requested and was granted an additional six months in which to present his work. Second, the Demonstration Grant Section of the HHFA took nearly six months to approve the final text of the report and an additional two months to approve the final

dummy of the report as required for printing. The third source of delay was created in part by the action of the Airport Environs Committee relative to a final decision created by the required 5,000 foot runway separation, and the committee's desire to solve this problem in some way if possible. This delay in final presentation has not helped in the presentation of the plan or the principles and standards developed in the program to the concerned public.

The second negative feature of this study lies in the presentation of the work undertaken by the acoustical consultant, Polysonics Inc. In their effort to define the "Affected Area" and present it to the public in a simple and understandable fashion, the firm omitted much of the quantitative data with regard to aircraft noise. Only in a very general way has this been touched upon. It might be pointed out that much of this data is perhaps only really understood by the person trained or with knowledge of acoustical engineering. A summary of several of the pertinent sections of this work is presented in Appendix "B" of this work.

With regard to the presentation of the acoustical data, the most serious question which now arises concerns itself with the creditability of the "Affected Area" map. Polysonics has presented only a general guide for an area which is not considered suitable for future residential development. At the same time they have only presented a few of the industries and commercial activities which produce similar noises within a given decible range.

In conclusion the author is of the opinion that the acoustical consultant should have included a more detailed explanation of how the "Affected Area" was determined to give the study more scientific backing. At the same time a more detailed summary of the proper land uses which can be located in this "Affected Area" should also have been included in the report.

The third negative feature of the Demonstration Grant effort lies with the Regional Planning Commission and the detail with which the Plan was developed. This detail is not sufficient enough perhaps to show what might be done in the vicinity of other major jet airports.

The lack of detail is the result of two policy decisions determined at the beginning of the study program. First, the local planning consultant was charged with the responsibility of developing a detailed plan and zoning ordinance in conjunction with the Regional Planning Commission study. Hence, at the outset the Demonstration Grant was to offer only a broad concept of development and uses. Second, the Regional Planning Commission has only an advisory power with regard to plan development and implementation, and as such has treated such studies as this in the broader context, leaving the development of detailed plans and implementation in the hands of the local units of government. The author is of the opinion that to some degree the role of the Regional Planning Commission should be strengthened to aid in the development and implementation of plans such as this. Such strengthening would increase the importance of Regional Planning in the Detroit area, especially at the Township level where planning efforts are often in the formative stages.

Finally, the report would have no doubt been strengthened by the addition of a set or list of specific land uses

suitable for the "Affected Area." Such a list would no doubt be useful to other areas interested in developing similar community-airport land use plans. The question of population density within these areas should also have been analyzed in more detail. The author is of the opinion that both the Regional Planning Commission and the acoustical consultant should have done more in this area.

The area which has been set aside as the "Transitional Zone" should likewise have been spelled out in more detail. This designation was intended to be more of a holding devise than anything else at the present, as the Regional Planning Commission was unable to justify its development for either industrial, commercial or recreational open space at the present. However, the work of the acoustical consultant seemed to indicate that the land should not be designated for any future residential development.

On the positive side of the ledger the study has accomplished several significant steps in the direction of community-airport planning in the opinion of the author.

First, it has in general set forth a set of general principles, standards and findings which should be applicable to other major jet airports throughout the nation. These are presented in a general manner, but should provide an acceptable starting point for other such studies. These results are included in Appendix "A" of this writing.

Second, the Demonstration Grant Program has shown that community leadership and airport management have the ability to make an attempt at solving the problem of community-airport development, if they are willing too.

Third, the study has shown, though admittedly in a weak way, that scientific determination of the area seriously affected by jet aircraft noise is possible. It has also been pointed out by the new requirements for runway separation, that a constant vigil must be kept toward the new technological developments in aircraft operations and techniques, and that the plan must be changed when necessary to reflect these innovations.

Fourth, the Airport Environs Study and Plan points up the need for close cooperation between all levels of

governmental agencies concerned with airports and the communities within which they are located. Much of the present cooperation which has now been developed has no doubt come as a result of the Demonstration Grant Program in the opinion of the author, though at present it is difficult to say especially how much effect the study has actually had.

Finally, the study has, in the opinion of the author, pointed up the need for the establishment of some form of authority charged with the responsibility of airport community development. The author is of the belief that this should be instituted at the regional or metropolitan level and within the existing framework of governmental organization. This authority must be responsible for all airports within the given region, regardless of their magnitude. This recommendation was not made in the study as prepared by the Regional Planning Commission, the author believes that it should have been included.

In conclusion the solving of the airport-community problem is not a simple one. There exist many complex and difficult problems, attitudes and beliefs which must be

solved and fully understood. The ever potential problem of technological advancement is perhaps the most critical of these in terms of total value to the region. While the problems of technology are being solved, decisions with regard to present day land use must be solved to the best degree possible.

It is the contention of the author that the Airport Environs Study and Plan did provide a much needed look at this problem and did set forth in a limited, but useable, way steps which might be taken with regard to the solving of this problem for the benefit of all concerned, and that the Township of Romulus and the Detroit "Metro" Airport will in the future both profit from these general guidelines if they are followed. The author is likewise of the belief that these procedures are applicable to other jet airports throughout the nation.

CHAPTER VI

CONCLUSIONS

In light of the many events which have taken place at the local, county and federal levels during the course of the preparation and presentation of the Airport Environs Study and Plan, it is difficult to assess the value of this planning function. However, there appears to be a number of conclusions which can be drawn from these events.

1. There is a basic concern on the part of township, county and federal officials with respect to future airport-community development.

2. Demonstration Grants are a most useful vehicle with which to explore unique planning problems, and to present workable solutions to them.

3. The involvement of key officials through an Advisory Committee charged with guiding such a program is useful, meaningful and will aid in the long range implementation of the plans and recommendations set forth.

4. The Federal Government through legislation and appropriation of funds is accepting the responsibility for co-ordinated airport-community development.

5. Local officials tend to move in a less co-ordinated manner toward the implementation of such plans and recommendations.

6. The Demonstration Grant has forced all of the concerned agencies into a process of self-analysis which will likely continue into the future.

7. Romulus Township has the responsibility and the ability to implement the Plan and Recommendations of the Demonstration Grant. The FAA and the Detroit "Metro" Airport likewise have a similar responsibility and ability to regulate flights to aid the Township in achieving sound community development.

8. The Airport Environs Study and Plan as presented to the public should have included more quantitative data to support the defined "Affected Area."

9. The study likewise should have perhaps contained more substance with regard to the selected uses which will be compatible in the "Affected Area."

APPENDIX A

THE FINDINGS, PRINCIPLES AND STANDARDS AS DEVELOPED IN THE AIRPORT ENVIRONS STUDY AND PLAN

It has been mentioned throughout this text that the primary concern in undertaking the Demonstration Grant Study was to present a set of principles and standards for the development of the environs of a major jet airport. These concepts were to be general in nature so that they might be applied in basic principle to any other such airport community.

The following material has been extracted from the text of the Airport Environs Study and Plan for the purpose of presenting this most significant material:

Summary

Purpose

> The purpose of this Demonstration Grant project is to develop a set of principles and standards for the planning of land use of areas surrounding jet airports, with the Detroit Metropolitan Wayne County Airport as a case study.

Features of the Study

One feature of this project is the scientific determination of noise effects of jet aircraft operation on land uses in the environs of a major jet airport. This was accomplished by means of an acoustical engineering study. This study resulted in the demarcation of the area affected by sound to a degree that restriction of land uses is required. The affected area pattern as developed in this study cannot be applied indiscriminately to other airports. The methods and techniques used for developing such a pattern can be applied to the distinctive conditions of each airport. The project also provides certain principles that can be used in other situations.

The other major feature of this project is the development of a land use plan of compatible land uses in relation to the conditions imposed by jet aircraft operations, and anticipated future aircraft traffic. The formulation of the plan was directly related to (1) the noise contour pattern in the environs of the airport that is expected to prevail in 1980, (2) the amount and character of airport-generated land use and (3) the normal increment of suburban growth anticipated by this date. Such a plan is necessarily long range in scope to provide a compatible land pattern in the vicinity of the airport which will reflect the dynamic character of the airport industry.

Findings

1. At present there is no direct relationship between blighted areas and airport operations in the environs of Detroit Metropolitan Airport.

2. It has been objectively established that landing of jet planes due to low trajectory create greater noise problems than takeoffs.

3. Aircraft traffic at Detroit Metropolitan Airport has been growing. During the next two years with the complete shift of commercial operations from Willow Run Airport, there will be a sharp increase. After this period, traffic then will parallel the national rate of increase.

4. Land in the area affected by aircraft noise is not suitable for residential development.

5. The area affected by noise is suitable for development in industrial, commercial, agricultural and other open uses.

6. Generally, the higher the property (home) values and the greater the personal income, the larger the community level of complaint.

7. The westerly spread of urbanization from Detroit is gradually extending over significant portions of Romulus Township and will continue to do so.

8. Over time, Detroit Metropolitan Airport can be expected to generate certain land uses and also to encourage industrial development that is a part of the suburban spread of manufacturing locations.

Summary of Technical Acoustical Analysis

1. The recommended noise zoning of this project is based on the aviation noise picture at Detroit Metropolitan Airport as forecast by this study through the year 1980.

2. The aircraft operations determine the zoning boundaries of overt action areas surrounding Detroit Metropolitan Airport.

3. The takeoff noise of subsonic jet transports will continue to lessen somewhat with aerodynamic improvements. Because of the inherent limitation in aircraft land technique, the landing noise of subsonic jets will show little if any improvement.

4. Jet aircraft exhaust noise suppressors have reached their limit of development.

5. The intake compressor noise of jet transports should be capable of being reduced with only minor effect on engine performance.

6. The turbofan aircraft can be somewhat quieter on takeoff but creates more community complaint on landing. The development of short-medium haul jet transports designed for 5,000 foot runways will ease the community noise load somewhat.

7. From the historical increases in aircraft noise and runway length for each new generation of aircraft, it is concluded that supersonic aircraft will require greater runway length and create greater noise, particularly on landing, than present jet transports.

8. Detroit Metropolitan Airport will handle all major domestic and international traffic of the greater Detroit area.

9. A study of passport issuances in the Detroit area indicates a substantial increase in international air traffic originating from Detroit Metropolitan Airport. The majority of such heavily loaded international operations occur during the hot summer months which constitute the critical period for overt action areas.

10. Detroit Metropolitan Airport is in a very favorable position with regard to noise zoning, since the airport is in an early stage of operation, and the area surrounding it have low density of population. However, airport operations will more than double in the next two years at Detroit Metropolitan Airport when it absorbs the Willow Run commercial operation. This abrupt increase in noise load will require planning to avoid undue community reaction.

11. Psychoacoustical studies of the Detroit Metropolitan Airport communities indicate their behavioral patterns to be consistent with the national pattern.

12. Air conditioning and acoustical treatment of residential homes at moderate cost would permit such homes to be located closer to the overt action area under the flight paths.

13. No ground-borne vibrations are transmitted from the airport into the community. The only vibration experienced in the community is resonance rattling induced by airborne sound waves.

Principles and Standards

1. It is imperative that the critically affected area surrounding a jet airport be defined by scientific methods and on an objective and measurable basis.

2. The unit of government (local, county or state) with the power to formulate and adopt a detailed comprehensive plan has the responsibility for establishing compatible land uses in the environs of a jet airport. Zoning authorities must exercise their responsibility for the proper zoning of land uses in the jet airport environs and for the enforcement of these regulations, including control of the height of structures and the density of occupancy.

3. The safety and welfare of people, both in the air and on the ground, is a primary consideration in determining land uses in the environs of a jet airport.

4. A jet airport (i.e. management) and its environs (government and people) have sufficient mutuality of interest to live together in harmonious relationships.

5. The achievement of the desired results of a comprehensive plan of compatible land uses in the environs of a jet airport requires the close cooperation of the responsible unit of government, airport management and the Federal Aviation Agency.

6. Housing land uses in the critically affected areas may become blighted unless immediate and progressive steps, such as those recommended by this study, are undertaken.

7. Existing housing in the critically affected area should be protected by acoustical treatment or eliminated. A change in use from residential to a more appropriate use (commercial or industrial) may, in time, cause a raise in land values.

8. Other land uses, on a graduated scale or noise compatibility and of occupancy density, can be developed in the critically affected area, except in the "clear zones" at the end of runways.

Recommendations

1. Romulus Township authorities should immediately formulate and adopt a detailed and comprehensive land use plan for the environs of the airport and provide for the implementation of this plan by proper zoning regulations.

2. The Federal Aviation Agency and the airport management should establish by progressive steps a preferential runway system to accommodate 1980 anticipated air traffic in order to eliminate the present noise problem in the village of Romulus and to modify the effects of jet operations on other portions of the environs.

3. The airport management should establish an additional east-west runway in order to accommodate anticipated expansion of aircraft traffic and to achieve an adequate preferential runway system.

4. The airport management should purchase additional land to provide for longer runways and to eliminate or forestall non-compatible land uses adjacent to the existing airport property.

5. The airport management and the township authorities should jointly undertake to prepare the people living in the environs of the airport for maximum community acceptance of the increase traffic that will arise from the movement of all commercial air carriers to Detroit Metropolitan Airport and from the introduction of new types of jet aircarft.[24]

---

[24]Airport Environs Study and Plan for the Detroit Metropolitan Wayne County Airport, Detroit Metropolitan Area Regional Planning Commission, 1964.

APPENDIX B

SELECTED MATERIAL FROM POLYSONICS INC. AS DEVELOPED FOR THE AIRPORT ENVIRONS STUDY AND PLAN

Aircraft Noise Contours

Actual aircraft noise in the communities under the flight paths of the major jet runways at Detroit Metropolitan Airport were measured during three noise survey periods:

February 16 through February 26 - For winter time conditions.

May 24 through June 1 - For intermediate conditions.

August 19 through August 28 - For hot weather conditions.

Since the boundary of the community overt action area under the flight path is associated with a specific noise level, the boundary line accordingly would follow an equal decible contour line. Hence the basic noise measurements for this study were made on the approximate 90 and 100 decible contour lines on each side of the flight path to avoid acoustical extrapolation inaccuracies that would result for the conventional method of single measurements taken directly under the flight path.

Since the location of the overt action boundary line (as in the case of other zoning lines)must be fully justifiable, it is considered that the acoustical measurements taken on which the line is based must be of the highest order of accuracy. To achieve this accuracy, five simultaneous measurements were made at three ground stations for each aircraft landing and takeoff.

Because Detroit Metropolitan Airport now has less than half of the Detroit air passenger traffic and several major airlines are still operating at Willow Run, a number of new aircraft types not now operating at Detroit Metropolitan will do so when the Willow Run traffic is absorbed. It was necessary therefore, to measure the noise of these aircraft at other airports to determine the composition of aircraft noise the Detroit Metropolitan communities will experience from 1964 through 1980. In addition to forecasting the noise of the next generation of aircraft not yet flying, all currently operating jet airlines were measured and analyzed for this report to provide the most comprehensive coverage of aircraft noise in existence today as the base for this study.

Summary of Detroit Noise Levels

To determine the noise compatibility of industrial and commercial activities suitable for location within the overt action areas, the noise levels of a number of industrial and commercial operations were measured in Detroit during the three noise survey periods.

Certain manufacturing plants that would be suitable for location under the flight path because of low silhouette and low density employment were measured inside such establishments and one hundred feet from their nearest buildings. Noise levels within stores, restaurants and super markets were also measured inside and outside as well as in the parking areas of shopping centers. Though potentially noiser activities were selected, the noise levels outside industrial and commercial activities proved generally quite low and without exception were lower than the noise of passing automobiles and truck traffic. The noise for trains operating close to the north end of Detroit Metropolitan were also measured and proved to have substantially high noise levels, including prolonged low frequency horn warnings as the train approached crossings.

Our measurements and analysis clearly showed that the adjoining street transportation noise dominates the external noise of industrial and commercial activities. This basic conclusion is a design parameter for the location of industry and commercial activity, particularly when bordering residential areas along the boundary of the overt action areas.

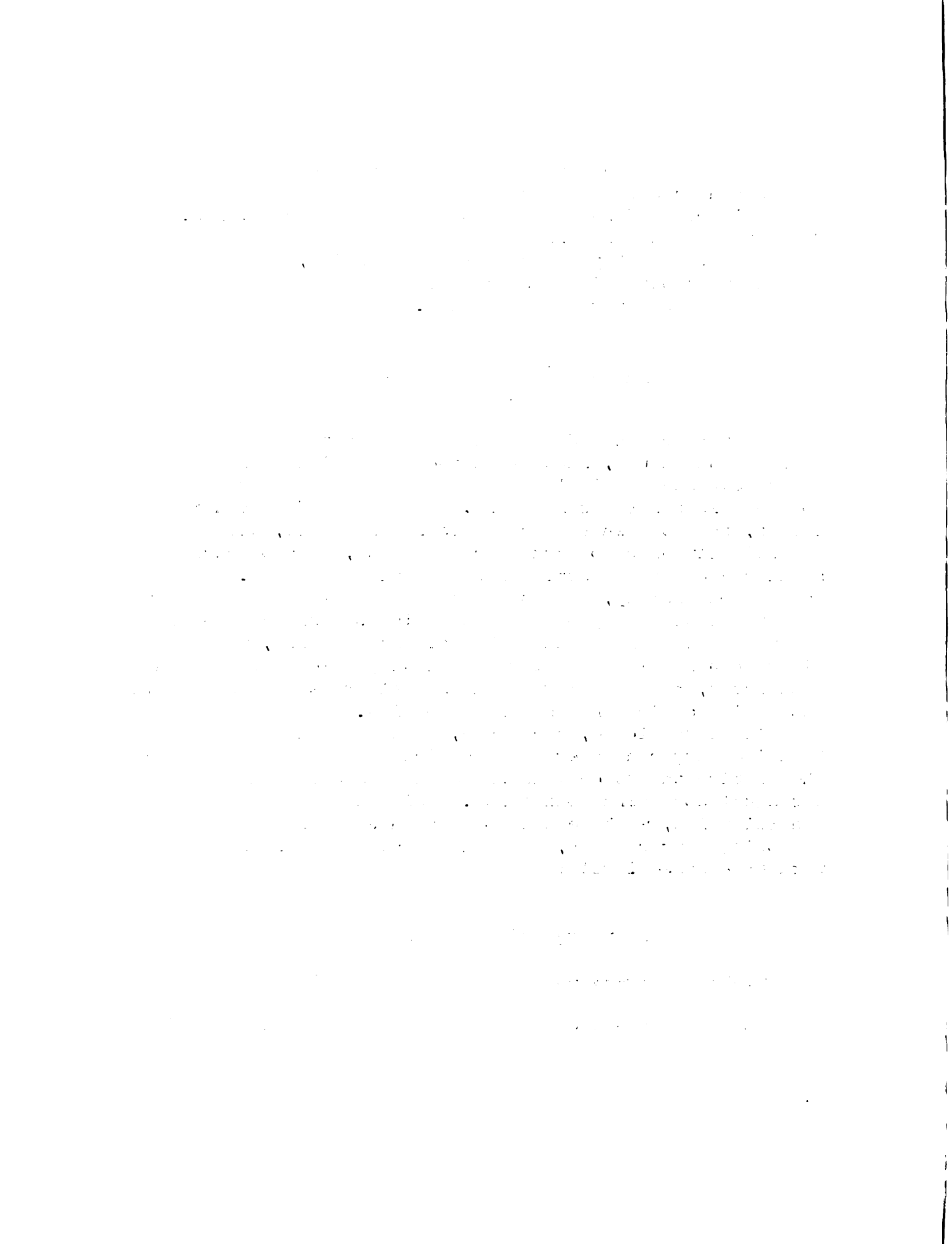
Noise Guides for Location of Industries

Though designated as overt action areas with regard to residential use, industrial and commercial activities can be satisfactorily located in these areas according to the guides set forth herein. Internal industry noise levels, as shown in the schedules in this part, are sufficiently high to mark aircraft noise, thus producing smaller and more tolerable incremental intrusions. Psychoacoustically, the increased pace of work makes noise less apparent to employees than it is to residents in the relaxed atmosphere of their homes. In addition, where aircraft noise is a major residential problem during night time hours, the majority of industrial areas are essentially unoccupied during this sensitive period.

It is concluded, therefore, as a general parameter that industry can tolerate 15 decible higher levels during the daytime and 25 decible higher levels during night time for equal complaint motivation. Using the parameter as a general guide, we have categorized industry into the following four classes, generally based on their internal work area noise levels:

Industry Noise Classification

CLASS A	80-89 db	CLASS C	100-109 db
CLASS B	90-99 db	CLASS D	110-120 db



Knowing the aircraft noise distribution in the overt areas from our intensive noise surveys, classes of industry have been located to balance their internal noise levels with the outside noise levels. Thus, a class D industry with an internal noise level of 110-120 decibles is placed close to the runway end, as shown on the Industrial-Commercial Noise Zones Master Chart. Each industry class having a lower internal noise level is located farther from the runway, commensurate with the decreasing aircraft noise.

The industry noise zones set forth in detail on the Master Chart are idealistic and intended as a general guide only. Variables such as air-conditioned buildings and sound proofing may reduce the intrusions of external noise levels by 10 to 15 db, thus changing industry noise classifications by one or two classes.

From the noise viewpoint, there must be compatibility between adjoining classes of industry, since the internal noise of an industry class, such as one using heavy diesel-driven generators, could affect adjoining industry of a lower noise classification. The compatibility is more significant where the industrial or commercial area adjoins a residential area in the outer fringes of the overt action area.

The impact of low aircraft takeoff and landing flight paths on the type of industry activity and the height of structures must also be considered. It is well established that a number of aircraft accidents occur in the immediate vicinity of an airport, particularly within the overt action areas; therefore, it is desirable to avoid industrial activity which utilizes a dense population of employees. Recognizing this condition, the FAA has set forth runway end clear zones wherein, for safety, no structures housing people are to be located. The standard dimensions of FAA clear zones are shown in this part. The maximum allowable heights of structures within the overt action areas as defined by the FAA in their Obstructions Clearance Standard TSO-N18 is also included in this part.

Typical commercial activities which fulfill the low structure height and employee density requirements are warehousing, automobile truck hauling trailer lots, and lumber and building supply yards.

Noise Guide for Location of Industries

Overall Noise Levels in General Work Areas

80-89 db

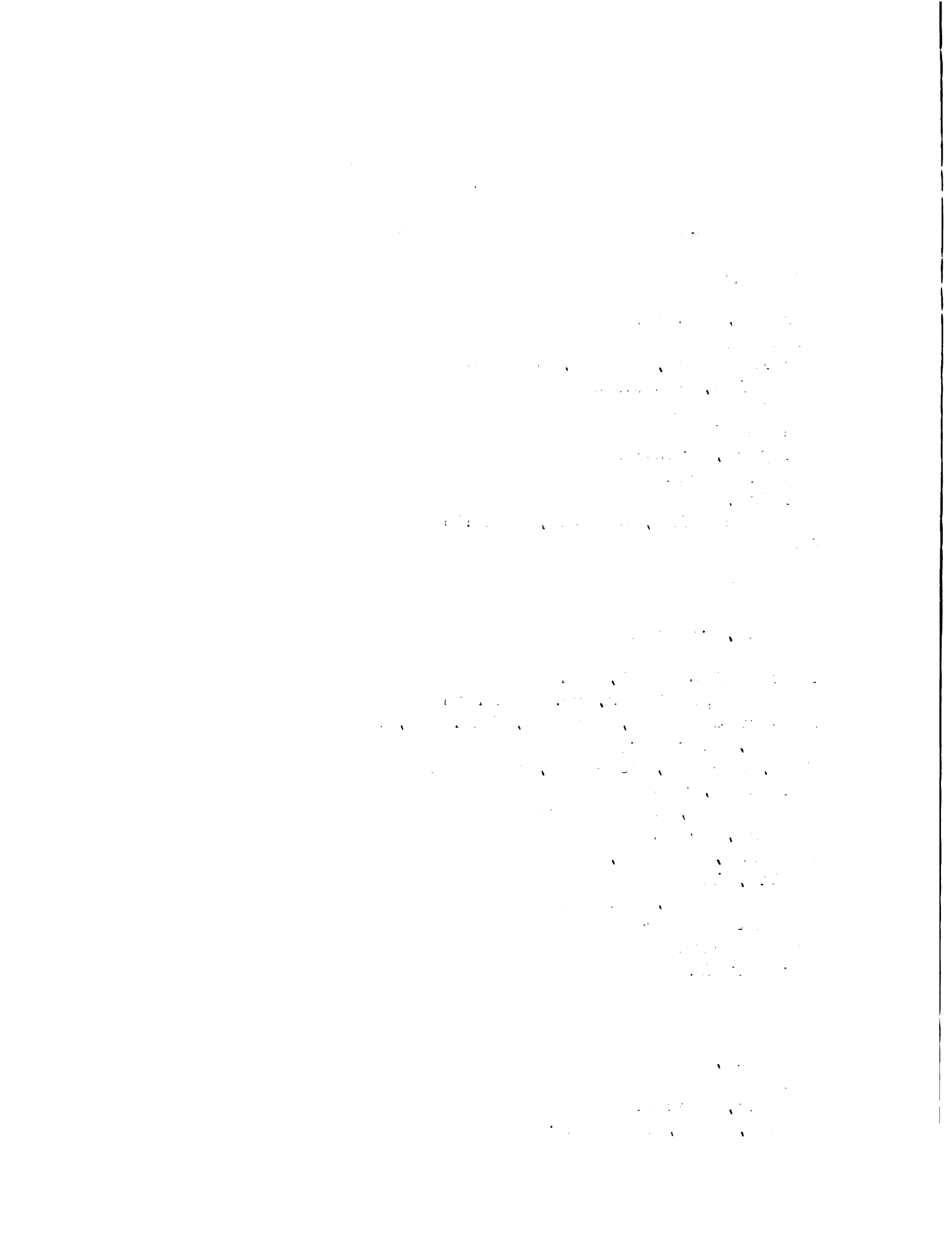
Furnace, annealing
Grinding
Machine Shops, lathes, presses
Machining, aluminum
Milling machines
Sand molding
Spraying, varnish
Veneer department
Welding, arc
Wood finishing, sanding, plaining
Jointing

90-99 db

Casting, cleaning
Core room
Fabrication steel, handling cutting
Foundry operations, sand slinging
Furniture making, planers, jointers, saws
Hammer, drop forge
Mill, bloomer, roughing, stripping
Mill shop, wood
Power plant, alternators
Ramming, pneumatic
Riveting, routers, aircraft
Sawing, logs
Screw machine, automatic
Shot blast room
Steel pouring
Wire drawing

100-109 db

Chipping, castings
Conveyor
Furnace, electric
Hammer, drop, automatic



Molding, push-up machines
Punch press, automatic
Riveting, pneumatic, large steel plate tanks
Tumblers

110-119 db

Shakeouts
Chipping, pneumatic, cleaning steel tank welds

Noise Measurement Procedures

A high degree of accuracy in aircraft noise measurement was achieved at Detroit Metropolitan Airport through use of a highly comprehensive electro-acoustical measurement system developed by Polysonics. This system, using three separate but simultaneous measuring stations, provides five synchronized noise measurements of each aircraft takeoff of landing.

The system comprises a central control station directly under the flight path and two satellite or side stations using identical equipment directly opposite but at varying distances from central control. The three stations move back and forth on a grid system to provide a wide coverage in the areas adjacent to the airport which underlie the takeoff and landing paths of primary runways.

Airground communications are monitored by central control to alert side stations, via radio intercom, of oncoming aircraft and thus facilitate setting of acoustical controls. Each side station also sights the aircraft through a special transit while it is immediately opposite the station. At the precise moment, the side stations trigger automatic markers on the short paper to record instantaneous noise levels in relation to the precise position of the aircraft.

Precision automatic recording sound level meters are used to make permanent record traces of the buildup, peak and decay of each aircraft noise. These traces allow careful laboratory analysis of the composition and duration of the peak noise level and eliminate the human error inherent in reading the vibrating needle of conventional noise meters.

All field noise measurement instrumentation was regularly calibrated during each measurement period. Because the instrumentation used was of the highest order of accuracy, the linear overall sound pressure decible level values measured (re;0.002 dynes/cm^2) required no adjustment.

Development of this comprehensive noise measurement system to operate day after day under a wide range of operations and airport meterological conditions encountered a number of research and development problems. Notable among these was the impact of high wind noises on the various instrumentation microphones. No suitable windscreens for the microphones were available commercially. Polysonics therefore undertook an intensive program of windscreen development and devised a unique windscreen system which permitted measurements in 20-knot winds without any effect on the frequency spectrum of the aircraft sounds measured.

In order to realistically base the final noise zoning requirements on aircraft noise as the community experiences it on a day-in, day-out basis, measurements were taken of scheduled air carrier aircraft taking off and landing at Detroit Metropolitan Airport under regular operation conditions. A mass accumulation of data was acquired through this procedure which required carefully developed data reduction methods and aircraft identification procedures. The airlines were very cooperative in providing gross weights and detailed identification of each flight measured in this program.

Psychoacoustics of Airport Communities

Community reaction to aircraft noise is determined by the following factors:

Acoustical

(1) Overall sound pressure level
(2) Character of aircraft noise (frequency distribution, spike frequency)
(3) Ambient or background noise level in community
(4) Resonance rattling

Psychoacoustical

(5) Number of exposures per hour
(6) Time duration of length of exposure
(7) Time of day or night
(8) Speech interference (telephone, radio, etc.)
(9) Aircraft disaster history (fear compulsion)
(10) Method used to introduce new aircraft into service
(11) Community attitude toward airport

Socio-Economic

(12) Impact of airport on community economics
(13) Property values and income
(14) Degree of community organization
(15) Degree of indoor versus outdoor living
(16) Degree of air conditioning used

BIBLIOGRAPHY

Aircraft Noise Problems, Subcommittee Hearings of the Committee on Interstate and Foreign Commerce, House of Representatives, 86th and 87th Congress, Washington, D.C., 1963.

H. Belden and Company, Illustrated Historical Atlas of County, Detroit, 1876.

Burton, Clarence M. and Burton, Agnes M. History of Wayne County and the City of Detroit, Vol. 1 Detroit, 1930.

Brown, Mason L. Wayne County, published by Silas Farmer and Company, 1894.

Detroit Metropolitan Area Regional Planning Commission, Airport Environs Study and Plan for the Detroit Metropolitan Wayne County Airport.

W. S. McAlpine Map Company, Wayne County Farm Atlas, Burton Abstract and Title Company, 1936 and 1942.

The Report of the President's Airport Commission, The Airport and Its Neighbors, May, 1952.

United States Department of Commerce, Census of Housing: 1960, Michigan, Washington D.C., 1961.

United States Department of Commerce, Census of Population: 1960, Michigan, Washington, D.C., 1961.

Waring and Johnson, Master Plan Township of Romulus, Michigan, Detroit, May, 1964.