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A Report Upon the Future Development of the Westward Expansion Area, West Palm Beach, Florida

Harland Bartholomew & Associates

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A Report Upon
THE FUTURE DEVELOPMENT OF
THE WESTWARD EXPANSION AREA
West Palm Beach, Florida

Prepared for
THE CITY OF WEST PALM BEACH AND
THE WEST PALM BEACH WATER COMPANY

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West Palm Beach

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St. Louis, Missouri

July, 1951.

June, 1951.

City of West Palm Beach
West Palm Beach Water Company
West Palm Beach, Florida

Gentlemen:

In accordance with our agreement, we are pleased to submit to your Committee of Engineers our report on the Long Range Expansion Program of the City of West Palm Beach and the West Palm Beach Water Company. The area studied is now popularly known as the "Westward Expansion Area."

The potentialities of the area are both unique and outstanding. Consistent adherence to the basic principles and standards recommended in the long-range development plan can assure maximum benefits.

Throughout this assignment, we have received the most helpful cooperation from local officials, corporations, and individual citizens. We particularly wish to acknowledge the very excellent assistance given by your Committee of Engineers. Likewise, we wish to express our appreciation to Gee and Jenson, West Palm Beach, Florida, Engineering Consultants, and to Roy Wenzlick and Company, St. Louis, Missouri, Economic Consultants, for their splendid assistance.

Respectfully submitted,

Harland Bartholomew and Associates

By

Russell H. Riley

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INTRODUCTION

The Palm Beach Area was one of the early resort developments along the east coast of Florida and has long been recognized as an outstanding resort community. Much of the present development was influenced by policies and practices prevailing in the early part of the twentieth century. Consequently, while West Palm Beach has outstanding characteristics and advantages, it also has many of the problems confronting other American communities, such as vehicular congestion, inadequate parking, intermingling of land uses, and blighted residential districts.

The majority of these problems can be gradually solved by consistent adherence to a modern planning, improvement and redevelopment program. While this requires expenditure of time and funds, it is the only course available to nearly all American communities. The improved living conditions fully justify the efforts required by this procedure, and, in fact, there is no alternative.

The need for planning and improvements prevails in West Palm Beach to about the same extent as it does in other American cities. However, the Palm Beach Area possesses an unusual opportunity for future expansion that is rarely, if ever, available to other urban areas. Within 1,600 feet of the center of the main business district is the eastern boundary of an area comprising more than 4,500 acres and adjoining present development within the city for more than three miles in a north-south direction. The tract contains two large lakes, but is otherwise vacant and almost completely unplatted. More than 3,500 acres can be made available for urban development. Of particular importance is the fact that practically all of the area is under a single ownership. The West Palm Beach Water Company has acquired and held the property for many years as a surface catchment area and for the protection of the terminal storage of its water system.

Drainage, dredging and grading are required to make much of the area available for urban development, but these are normal practices in much of the urban development along Florida's East Coast. The city has an unsurpassed opportunity to accommodate much of its future growth in an area that can be planned, using modern standards, without any restricting influences of existing development or platting, and under single, rather than diverse and conflicting, ownership. It is such an unusual opportunity that its many potentialities must be fully utilized.

This report upon a comprehensive study of the area is concerned with the methods whereby the City of West Palm Beach and the West Palm Beach Water Company can secure the maximum benefits from this area

which is appropriately called "The Westward Expansion Area". It contains: (a) an analysis of economic factors affecting the Palm Beach Area, (b) potential population growth and urban development needed to accommodate the growth, (c) an analysis of existing community facilities within West Palm Beach and the need for supplementary facilities within the new area, (d) a discussion of the development plan for the new area and how the development can be protected in the future, and (e) a description of the physical improvements necessary to achieve a good urban development, and the estimated cost and programming thereof.

A major objective of the study has been to provide for a high standard of development in the new area and to coordinate this with existing development. It has also been possible to design the development so that improved storage of water will be available to the company. Thus the city, the present and future citizens of the entire community, and the Water Company, can all realize substantial advantages as the project is progressively developed.

FOR
PLATES AND TABLES
SEE
ORIGINAL BARTHOLOMEW REPORT
ON FILE WITH
CITY CLERK

WEST PALM BEACH, FLORIDA

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PAST AND PROBABLE FUTURE ECONOMIC BACKGROUND

American cities have grown because they have provided certain essential functions and services. Some cities have grown primarily because of industrial development. Others are dominantly trade and financial centers. Some, such as the communities along the Florida east coast, have developed primarily as resort centers. In large metropolitan areas, many of the suburban towns are residential communities where the citizens who work in another portion of the area reside. The larger communities, usually have a combination of industry, retail trade and other facilities which afford employment opportunities. It is essential to determine the factors that have influenced the past growth of population in West Palm Beach and particularly to determine what conditions and factors will influence future growth. This is the objective of the following analysis.

Natural Advantages

Growth in the Palm Beach area began when Henry A. Flagler selected the site of what is now the Town of Palm Beach for a resort development. The construction of a hotel and the extension of the railroad southward from Rockledge were the major factors influencing this early growth. It was also the developer's desire to maintain the Town of Palm Beach as an unusual playground and resort for wealthy winter visitors. Consequently, he also initiated development of the present City of West Palm Beach so that it could perform the utilitarian functions essential in urban communities.

Climate and Soil

The climate of the West Palm Beach area is one of its major assets. The following data regarding temperature and rainfall reveals the very mild climate and comparatively small amount of precipitation that occurs during the winter resort season of January, February and March.

<u>Month</u>	<u>Temperature</u>	<u>Inch Rainfall</u>
January	68.6°	2.03
February	68.3	1.63
March	71.2	3.73
April	75.3	2.45
May	77.9	4.96
June	81.3	7.25
July	82.3	6.88
August	82.5	8.39

(cont.)	<u>Month</u>	<u>Temperature</u>	<u>Inch Rainfall</u>
	September	82.0	10.62
	October	78.1	8.63
	November	72.3	2.93
	December	68.8	3.05

In addition to the desirable temperature and small amount of rainfall during the winter resort season, the climate is also excellent for year-round living and is particularly favorable for the raising of agricultural products and livestock. The amount of rainfall together with sound irrigation practices and the long growing season as well as the range in soils from rich muck to fine sandy loam, is most conducive to agriculture production. Further, the dangers of frost are very rare, with the United States Weather Bureau recording only seven killing frosts in the spring and only eight in the fall over a thirty year period.

The growing of agricultural products and livestock is further facilitated by the drainage and irrigation program conducted by both the Federal Government and the Central and Southern Florida Flood Control District. This program is designed not only to facilitate rapid removal of flood water, but also to prevent overdrainage of the land and maintain a water level that will greatly enhance the value and productivity of the land for production of crops and grasses.

The lower east coast of Florida does have the danger of hurricanes which generally occur in the month of September or October. However, after years of experience, the residents have made substantial progress in reducing the losses of life and property with sound protective measures.

Transportation Facilities

The West Palm Beach area has a good system of transportation facilities connecting with all parts of the country. The Federal, State and County highways accommodate large volumes of autos and trucks. While improvements are desirable as are discussed later in this report, the highway and street system compares favorably with the systems in other Florida cities.

Two important railroads serve the area, namely, the Florida East Coast and the Seaboard Railway. Both provide passenger and freight service, the amount of which is related to seasonable and local demands.

The area also has the advantage of a modern port which is located immediately beyond the northern city limits of West Palm Beach. A large volume of freight passes through this port with direct railroad movement via car ferries operating to and from Havana, Cuba. There are also adequate terminal facilities for private boating with new piers and docking facilities along the west shore of Lake Worth containing excellent accommodations and being located only a few minutes walking distance from the center of the West Palm Beach business district.

The Palm Beach area also has a large, modern airport. Two airlines, namely the Eastern and the National which provide commercial air service in

the Palm Beach area, the amount of which service is adjusted to seasonal requirements. Bahamas Airways also operates into and out of this port.

Utilities

The area is served by water, electricity, artificial gas and telephones. The utility service is generally adequate with the possible exception of the gas supply during the peak winter season. The water supply is adequate for current needs and the recommendations contained in a later section of this report can insure an unusually large and adequate supply of potable water. There is no reason why the other utilities can not be expanded as local growth warrants. It is possible that the city may be served eventually with natural gas which would result in substantial advantages.

In summary, the existing natural advantages such as climate, rainfall and soil, together with the transportation and utility facilities present no handicaps for future growth and actually, provide many favorable conditions and advantages that should encourage and facilitate more local population increase than in many other American communities.

Tourist Trade

The tourist trade has been a major factor in the growth and development of the entire State of Florida and especially in the West Palm Beach area. The Florida State Chamber of Commerce estimates that the income from tourist trade represents one-third of the state's total income. It is, however, difficult to compile accurate data regarding the trends in tourist trade over long periods and in different sections of the country. A major advantage of the tourist business is that money spent by the tourists goes directly into almost all local trade channels whereas a portion of the gross income from manufacturing or commerce, is used for savings or investment purposes.

A major characteristic of the tourist industry is its seasonable nature. In Florida, the peak season is during the winter months, and the local temperature and rainfall are ideal during this period. The concentration of persons within the area during the peak season requires extensive accommodations and services which are not fully used during the balance of the year. This is particularly true of living accommodations and utilities. It results in higher costs than would be necessary with a more balanced usage.

Attempts are now being made to attract additional summer visitors to Florida so as to allow a more balanced use of facilities. Some progress has been made, and there are now far more summer visitors than in earlier years. However, because of the summer climate and the absence of ocean beaches in West Palm Beach, there is little probability that the summer tourist trade will ever approach that of the winter season. Any increase in the summer tourist trade, will be beneficial, however, and should be encouraged.

Tourist Attractions

The climate and beaches, particularly ocean beaches, are the major attractions for tourists in the State of Florida. This is evidenced by the large concentration of tourist facilities along the coast, especially in the southern part of the State. The local area has the advantages of both of these although West Palm Beach does not have direct ocean frontage.

The value and popularity of water front facilities is revealed by the following data:

Analysis of Hotel Income in Palm Beach County - 1948

	No. of Guest Rooms	Receipts Per Year	Average Receipts Per Room
Palm Beach County	6,049	\$9,388,000	\$1,552
Belle Glade	116	27,000	233
Delray Beach	398	537,000	1,349
Lake Worth	402	367,000	913
Palm Beach	3,128	5,649,000	1,806
WEST PALMBEACH	1,514	1,018,000	672

The preceeding data clearly reveals that higher prices are obtained from facilities located along the ocean front. A similar study of Dade County, Florida, revealed an average income per year per room in Miami Beach of \$1,470 while in the City of Miami, it was only \$938.

The City of West Palm Beach is within very convenient driving distance of the ocean beaches and has much frontage along attractive Lake Worth. While the lake is not now available for swimming because of sewage pollution, this condition should be corrected in the future. The lake is intensively used for boating and has many attractions for tourists. The proposed improvement of the two lakes in the Westward Expansion Area will afford additional water attractions for tourists in the West Palm Beach area. These two lakes together with Lake Worth are important assets as is evidenced by the tourist business that is attracted to interior cities such as Orlando.

A second major attraction for tourists is recreational activities. This should be varied and should include active outdoor sports such as hunting, swimming and golf as well as more passive games and social activities. The West Palm Beach area has many such facilities. Fishing and hunting opportunities are excellent, and there are several good golf courses in the area. West Palm Beach also provides a number of recreational facilities for tourists in the public parks, especially in Flagler Park near the business district. There is, however, a need for enlarging these activities in the future, and a large area is needed where varied activities can be enjoyed by large groups. Dog racing is conducted during the winter season, and the track is convenient to the city. The city has an additional advantage in the Norton Art Gallery which

is a popular attraction for many visitors.

A third requirement for the success of the tourist industry is an adequate amount of living space of the required type and character. Information was obtained from the State Hotel Commission regarding the number of tourist accommodations in Palm Beach County as of January 1951, and from this and other sources, the following data was prepared regarding the number of tourist accommodations in the City of West Palm Beach:

34 hotels & apartment hotels -	containing 2,065 rooms
13 motor courts -	containing 156 rooms & 136 apartments
410 apartments -	containing 6,120 rooms (2,007 units)
640 rooming houses -	containing 5,800 rooms

The city has more than 2,000 rooms in hotels and apartment hotels, but the largest concentration of hotel rooms is in the Town of Palm Beach. Apartments and rooming houses provide the majority of the tourist accommodations in West Palm Beach. A number of facilities are also available in duplexes and in garage apartments.

Plate 1 shows the location of existing rental units in West Palm Beach. This includes only the location of any unit that is listed as being available for rent and does not indicate the number of units or rooms in each. The rental facilities are scattered throughout the entire city rather than concentrated near the business district, which reflects the large number of rooming houses accommodating tourists. This also indicates wide scattering of rental units, particularly duplexes. Motor courts or motels are comparatively new but are becoming quite popular. There are thirteen motor courts within the city. In 1948, Palm Beach County had a total of 126 motor courts providing 1,390 living units, whereas Dade County then had only 116 tourist courts which provided 1,674 living units.

Tourist accommodations in West Palm Beach can be generally described as of the medium class rather than the luxury type, but there is a wide range in types of accommodations and in the rents during the peak season.

A study was made of advertisements of tourist accommodations appearing in the Sunday issues of the local paper during the past winter season. This revealed a large number of accommodations listed as available for rent throughout the year. Undoubtedly some of the hotels and apartments are completely occupied during the peak season, but there were always some accommodations available. Thus there is no apparent shortage of tourist accommodations at present, and additional tourists could be handled. However, this does not imply that no additional facilities will be needed. The number of tourists should continue to increase and attractive, modern facilities, renting at moderate, rather than luxury rates, will encourage this increase.

Summary and Potentialities

From the standpoint of the tourist business, the name "Palm Beach" reflects prestige and character throughout the country. Many persons are attracted to the West Palm Beach area because of this widespread recognition of the local development and its advantages. It is essential that these present advantages be continued in the future and if West Palm Beach is to gain maximum benefit from its natural potentialities, it must gradually improve its attractions and accommodations for tourists.

In view of the trend in the national economy and the government's tax policies, the city is fortunate that it accommodates tourists with moderate, rather than high, incomes for the former should afford maximum possibilities for future increases. However, the city does gain advantages from wealthy tourists who visit Palm Beach, and will undoubtedly continue to do so in the future. The tourist business should continue to increase in West Palm Beach and to be an important factor in the local economy. However, the relative importance of the tourist business may be slightly less in the future as agricultural and industrial activities increase.

Wholesale and Retail Trade

Wholesale and retail trade are important factors in the economies of urban areas. They normally bring a substantial amount of income to communities, return profits upon capital investments and provide employment. Furthermore, they prove an important source of tax income for public agencies.

Both wholesale and retail trade in Florida have shown substantial increases during the last 20 years. They are now on a sound basis, unlike the speculative one that prevailed during so much of the state's early boom period. The following is a discussion of the present and probable future importance of these activities in the Palm Beach area.

Wholesale Trade

The following data indicates the trend in the volume of wholesale trade in the six leading Florida cities:

	1939 Thousands of Dollars	1950* Thousands of Dollars	% Increase 1939-1950
Jacksonville	\$151,633	\$624,463	312%
Miami	88,065	379,994	331%
Tampa	87,997	302,610	243%
Orlando	17,683	77,134	336%
Pensacola	12,058	51,014	323%
WEST PALMBEACH	9,158	33,074	261%

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The volume of wholesale business in West Palm Beach increased from \$9,158,000 in 1939 to \$33,074,000 in 1950 - an increase of 261%. This increase was not as great as that in some of the larger Florida cities, particularly Miami, Orlando and Jacksonville. It was, however, more rapid than that of the country as a whole, and was also greater than the increase in Palm Beach County. This indicates that West Palm Beach is the major wholesale center for the Palm Beach area.

Between 1939 and 1948, 25 new wholesale houses were established in West Palm Beach, and 474 additional persons were employed. In 1948, local wholesale firms employed a total of 860 persons and had an annual payroll of \$2,668,000. While this is by no means the largest source of employment within the Palm Beach area, it is an important one.

With the anticipated increase in population, there should be further increases in the volume and employment possibilities of the local wholesale trade. However, the preceding data revealed that the rate of increase in local wholesale trade was less rapid than that in some of the larger Florida cities. With the continued improvement of highways and transportation facilities, this increase for the local area should continue to be less rapid than that in cities such as Jacksonville and Miami. Even so, wholesale trade should continue to provide an important source of employment and will require additional space in the industrial districts.

Retail Trade

The volume of retail trade in the City of West Palm Beach has shown an almost phenomenal increase during the last eleven years. It is now one of the major sources of income and employment. This large increase is clearly indicated by the following data:

	<u>1939</u> <u>Retail Sales</u>	<u>1950*</u> <u>Retail Sales</u>	<u>%</u> <u>Increase</u>
United States	\$42,041,790,000	\$140,317,250,000	234%
Florida	614,464,000	2,810,451,000	357%
Palm Beach County	35,950,000	160,642,000	347%
WEST PALM BEACH	21,925,000	93,134,000	343%

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The large increase in the volume of retail sales is partly due to the increased price of commodities, but this has accounted for only a portion of the growth. Retail sales in Florida have increased far more rapidly than those of the country as a whole, and while the increase in Palm Beach was not quite as rapid as that in the state, it was substantially above the average of the country. The following data indicates the comparative importance of retail sales in the eleven ranking cities of the state:

City	Retail Sales 1950 Est. Thousands		Retail Sales per Family		1950 Effective Buying Power per family	
	Rank	Volume	Rank	Volume	Rank	Volume
Daytona Beach	10	\$ 50,210	8	\$4,830	10	\$4,613
Fort Lauderdale	8	74,254	3	6,230	9	4,679
Jacksonville	2	281,488	10	4,660	4	4,948
Lakeland	11	46,888	9	4,780	8	4,740
Miami	1	447,459	5	5,640	3	5,192
Miami Beach	5	116,623	1	6,940	2	5,373
Pensacola	9	63,577	7	5,000	6	4,884
St. Petersburg	4	142,279	11	3,710	11	4,222
Tampa	3	196,593	6	5,080	5	4,931
Orlando	6	101,057	4	5,900	7	4,813
WEST PALMBEACH	7	98,134	2	6,770	1	5,502

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While the total volume of sales in West Palm Beach ranked it seventh among the eleven cities, this is generally in line with the size of the different communities. A more pertinent fact is that the city ranks second among the eleven communities, and only slightly below Miami Beach in volume of retail sales per family. Of particular importance is the fact that West Palm Beach has the highest standing in effective buying power per family. Retail sales are very high in the Palm Beach area in relation to the population. This is partially due to the tourist trade and partially to the large trade area.

The following data indicates the sales by major types of stores in the West Palm Beach area for the year 1948:

	No. of Stores	Sales 1948	% of Total Retail Sales
Grocery, meat, fish & dairy stores	151	\$13,704,000	17.1%
Eating and drinking places	231	6,136,000	7.7%
General merchandise & variety stores	20	8,396,000	10.4%
Clothing, apparel & shoes	54	6,622,000	8.3%
Furniture, furnishings & appliances	47	5,246,000	6.5%
Automotive & gasoline	135	21,654,000	27.2%
Building material & hardware	30	6,849,000	8.5%
Drug, proprietary & liquor stores	35	4,580,000	5.7%
All other	144	6,924,000*	8.6%
	847	\$80,111,000	100.0%

*All items not included.

The large volume of automotive and gasoline sales again reflects the influence of the tourist business, as does the number of establishments and the large volume of sales by eating and drinking places. An increase in sales volume of slightly more than \$18,000,000 between 1948 and 1950 is indicated by comparing this and the preceeding data.

The large volume of retail sales in West Palm Beach further indicates that it is the major shopping center for the entire county, including the nearby communities of Lake Worth and Riviera Beach. This practice can and should continue in the future.

In addition to the volume of sales is the important fact that local retail trade employed 3,809 persons in November, 1948. It is estimated that such employment now approximates 4,200 persons. It is clearly evident that retail trade is one of the most important factors in the local economy.

With increases anticipated in the local and county population as well as in the tourist trade, there is no reason why retail trade should not continue to be a major source of income and employment. Three basic conditions, however, largely determine whether these potentialities can be fully utilized. The first is good modern stores and modern merchandizing practices. This is primarily the responsibility of the merchants, and there is no reason why it cannot be satisfactorily accomplished. The second requirement is adequate off-street parking space within and near the shopping centers. This is an extremely difficult problem, particularly near the central business district, but additional parking space can and should be made available. This is primarily the responsibility of the city officials, but it will require the cooperation and assistance of the local merchants. The third major requirement for continued increase in retail sales is an adequate system of major streets and bus routes, making it convenient for the customers to reach the major shopping centers. As will be discussed later, the existing street system is not entirely satisfactory and many improvements should be made in the future. These are not impossible to accomplish and the city officials, as well as the county and state highway departments, should assume the major responsibility therefor.

There is, therefore, good reason why retail trade should continue to increase in local importance. Several of the improvements proposed for the development of the Westward Expansion Area will facilitate this increase, particularly the new business districts and the new streets, giving access to the entire Palm Beach area.

Agriculture

The State of Florida has experienced a marked increase in agricultural production during the last 20 years. In 1950, it ranked 23rd among the 48 states based on gross cash income from farming. According to estimates prepared by Sales Management's current Survey of Buying Power, Palm Beach County, in 1950, ranked third in the agricultural production of the state's 67 counties. Cash income from farm product marketing during the year was \$29,128,000.*

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Palm Beach County has two basic types of soil; namely, the organic soil of the hinterlands and the coastal sandy loam. The latter type of soil requires extensive fertilizing and here it is the local practice to utilize practical hydroponics, a new science or practice of growing plants by controlled use of water and chemical fertilizer. The local sandy loam comprises a strip approximately 50 miles long extending westward from the ocean for a distance varying from 3 to 15 miles. Winter temperatures in this area are several degrees warmer than in the muck lands of the everglades. It thus possesses some decided advantages as its losses from frost during the past winter were not as severe as those in the glades.

Vegetables are the major product in the coastal area. During the past winter, approximately 18,000 acres were planted for this use. The majority of them are planted in time to be harvested early in the year and thus command high prices with little competition from other sections of the country. With the favorable temperatures and the use of commercial fertilizers, it is also possible to produce more than one crop per year.

Vegetables are also produced in the muck lands of the everglades as are other crops, especially sugar cane. For example, approximately 30,000 acres are now used for growing sugar cane in the Okeechobee area of which 23,000 acres are within the limits of Palm Beach County. In addition to the danger from freezing, another problem of farming in the everglade areas is pest control. This can increase production costs in some year to such an extent that profits are very limited. The following data indicates the volume of perishable vegetables that were shipped from the everglades stations, Maytown through Lake Harbor, during the 1949-1950 season. Beans, celery and mixed vegetables predominate.

	Carloads 1949-1950	Truckloads 1949-1950
Beans	1,348	2,003
Cabbage	807	284
Celery	2,834	923
Chicory	86	38
Escarole	522	203
Mixed Vegetables	1,486	1,313
Peppers	45	46
Potatoes	217	115
Radishes	73	78
Tomatoes	66	45

The cattle and dairy industry has also grown very rapidly in Palm Beach County during the last several years. Breeds of the Brahman, Aberdeen Angus, Shorthorns, and Devons, bred with the native Florida cows, thrive in the climate and on the land that 20 years ago was believed to be the nemesis of the cattle industry. Extensive forests, marshes and cut-over areas provide the major part of the grazing land. However, local cattle men are discovering greater profits can be realized by planting pastures and thereby furnishing a better grade of beef.

The trend of cattle production in Palm Beach County is revealed by the increase in the number of cattle and calves from 6,614 in 1940 to 17,400 in 1945, an increase of 163 percent. No data is available regarding the increase during the last five years, but it undoubtedly has been substantial. There was a 53 percent increase in the volume of milk produced between 1940 and 1945 in Palm Beach County. Thus, while the increase in the dairy industry is not as spectacular as that in beef cattle production, it is substantial and should continue in the future.

Even though there has been a substantial increase in the area used for agricultural production, there has also been a pronounced trend toward decreasing the number of individual farms. The average size of the farm increased from 99.2 acres in 1940 to 244.2 acres in 1945. This trend has many desirable aspects and should result in greater efficiency and improved methods of production.

There are two agricultural markets in Palm Beach County, one at Belle Glade and the other at Boynton. The Belle Glade market handles much of the produce, particularly that raised in the Okeechobee area. It is the larger of the two and has packing houses for vegetables, refrigerator plants, processing plants and good shipping facilities. The market at Boynton is more of a buyers' market. Both of these markets will undoubtedly continue in the future and as agriculture is increased, it is entirely possible that additional markets will be established, possibly one in the Palm Beach area.

The excellent opportunities for increasing agricultural production can be an important factor in the economy of West Palm Beach. It insures diversification of the sources of income of the area, which is a major advantage. Secondly, it will provide additional income, much of which should be attracted to the wholesale and retail markets in West Palm Beach. Finally, some employment should be provided by these activities either in production, or in handling and processing. Thus, the agricultural potentialities of the county should encourage future population increase in the West Palm Beach area.

Industry

There are several types of industrial employment that will influence the urban economy. For the purposes of this report, industry is divided into three major types; namely, manufacturing, the local port and the construction industry.

Manufacturing

Florida has not experienced as rapid an increase in manufacturing as it has in retail and tourist trade and in agriculture. In 1947, the state contained 2,807 manufacturing establishments, an increase of 120 percent since 1899. Much of the manufacturing activities in the state are concentrated in the larger urban areas of Jacksonville, Tampa and Miami.

Palm Beach County ranked seventh of all Florida counties in the number of manufacturing establishments in 1947, having a total of 91 plants. Of these, only one employed more than 100 persons. The number of persons employed

in local manufacturing activities was 1,229, or substantially less than the number employed in retail activities.

Data reveals that in 1948, the majority of the employment in the county's manufacturing establishments was in those using local resources, particularly food and lumber. Printing is also an important activity. Since this included the entire county, a large number of food processing plants were located in the Okeechobee area rather than in West Palm Beach, which were considered. While no current data is available, there have undoubtedly been substantial increases in manufacturing employment in the county during the last two years, for several large processing plants have been established in the Okeechobee area. Others are now under construction.

In 1947, the City of West Palm Beach accounted for 74.7 percent of the value of manufactured products in the entire county. The following data indicates the importance of manufacturing in West Palm Beach compared with the other five largest manufacturing cities in the state.

City	No. of Establish- ments 1947	No. of Employees 1947 (av.)	Value Added by Manufacture (Thousands)		Adjusted % In- crease *
			1939	1947	
Miami	380	7,086	\$11,066	\$35,288	61%
Jacksonville	267	12,221	24,310	65,219	35%
Tampa	267	14,417	21,422	51,839	22%
St. Petersburg	98	1,241	2,051	5,572	37%
Orlando	93	1,717	1,976	6,668	71%
WEST PALM BEACH	54	917	1,330	4,216	60%

*Corrected for changes in commodity prices 1939-1947.

The importance of manufacturing is less in West Palm Beach than in any of the other cities mentioned. However, the value of the local manufactured products is substantial. The city showed a great increase in the value of its manufacturing between 1939 and 1947, exceeded only by Miami and Orlando in this group.

Manufacturing activities should increase in the West Palm Beach area, but there is no indication that large industries will ever be established or that manufacturing will predominate in the city's economy. The absence of extensive sources of raw materials and the distance from large markets probably are the major reasons why large plants would not locate within the corporate limits. Actually, because of the importance of the tourist trade and the necessity of maintaining desirable residential districts, it would not be advantageous to attract the larger and more obnoxious type of industry. This does not, however, preclude the desirability of attracting the lighter types of industry, which will afford additional employment and further diversify and balance the economy of the area.

The increase in agricultural activities within the county will provide an important source of raw materials that should attract a number of processing establishments. These will probably be located nearer the center of the production area rather than in the city. The desire to escape city taxes will be another reason for such location. However, these plants will be advantageous to the economy of the West Palm Beach area.

The city should also attract a number of industries because of its excellent climate, good living conditions and good supply of labor. Another marked advantage of the city is its proximity to a market area of very high quality. The city should be a very logical location for manufacturing plants that will produce sport clothes of all types, ladies shoes and accessories. The proximity to the textile mills in Georgia and the Carolinas is another advantage for the establishment of plants producing sport clothes. There should also be excellent possibilities for manufacturing jellies, syrups and preserves because of the proximity to the raw materials. These types of plants would not be objectionable in the fundamentally residential community, yet should supply substantial future employment.

Even with the city's excellent possibilities for the establishment of additional manufacturing plants, much effort will be necessary to actually obtain them. Fortunately, existing organizations are already actively engaged in promoting industrial growth and expansion. In addition to the local Chamber of Commerce, there are two other such agencies. One is the non-profit organization known as the Palm Beach County Resources Development Board. Its major objective is to secure additional plants for the county. The other group is the Palm Beach County Resources and Industrial Corporation. Its major concern is to assist its members in securing additional business. Both of these organizations appear to be well organized and active. Their continued efforts should result in substantial benefits to the area's economy in the future.

Port of Palm Beach

The Port of Palm Beach, located immediately north of the city, is one of the largest such facilities in the coastal area. It provides employment for more than 115 persons, and thus is one of the most important single sources of employment in the West Palm Beach area.

The port is very modern, containing warehouses and docking and rail-to-port facilities. The West Indian Steamship Company's fleet of car ferries operates between the port and Havana, Cuba. The large majority of the port's trade is handled by this line and it affords unusually efficient and rapid transportation. The following table shows the volume and value of commodities handled through the port in comparison with the ports of Jacksonville and Miami.

<u>Port</u>	<u>Imports</u>	<u>Exports</u>	<u>Total</u>
WEST PALM BEACH			
Volume (pounds)	287,900,000	517,400,000	805,300,000
Value (dollars)	\$16,800,000	\$67,900,000	\$84,700,000
Jacksonville			
Volume (pounds)	2,211,100,000	253,500,000	2,464,600,000
Value (dollars)	\$53,500,000	\$14,200,000	\$67,700,000
Miami			
Volume (pounds)	684,600,000	72,800,000	757,400,000
Value (dollars)	\$15,300,000	\$17,100,000	\$32,400,000

The preceeding data clearly reveals that although a larger volume of commodities is moved through the Jacksonville Port, the value of shipments through the local port is higher than in either of the other cities. Farm machinery is one of the principal items exported to Cuba. The imports are primarily fruits, vegetables and sugar.

New car ferries are now available for operation to and from this port and the volume of shipping should increase substantially in the future. The port should not only continue to be an important source of employment and influence in the area's economy, but it should also assist in attracting additional industries, especially those that produce for the Cuban markets or process products received from that country.

Construction Industry

Because of its rapid growth and development, the construction industry has been one of the major sources of employment throughout the entire state. This is particularly true of the West Palm Beach area. In 1948, there were 3,307 persons employed in construction activities in Palm Beach County. This accounted for 14.4 percent of all the county's employment, whereas the national average in the construction industry was 5.6 percent of the country's total employment.

During the 1949-1950 fiscal year, a total of 1,139 dwelling units were erected in the City of West Palm Beach. This represents nearly 800 dwellings per 10,000 families in comparison with the average for all urban areas of only 294 dwelling units per 10,000 families.

The current limitations on construction will undoubtedly result in less construction during the current fiscal year, and it is possible that the past year may have been the peak year of residential construction in the West Palm Beach area for sometime. However, a substantial population increase is indicated, and consequently, additional residential construction should be anticipated in the future. Furthermore, industrial construction should continue at a rapid rate, particularly outside the urban area. Thus, while the percentage of total employment represented by the construction industry may decrease in the future, there is every indication that, except for an economical depression, such

as occurred in the 1930's, the construction industry will continue to be an important source of employment in Palm Beach County and particularly in West Palm Beach.

Summary

The preceeding discussion of major factors influencing the area's economy indicates that excellent possibilities exist for new growth. Of particular importance is the fact that the future economy should be more diversified and balanced than that of the past. Concentrated and sustained efforts on the part of the local officials and organizations will be necessary to fully achieve the potentialities.

POPULATION GROWTH

Fast Trends

The entire State of Florida and particularly its east coast, has experienced an unusually rapid increase in population since the beginning of the present century. This rate of growth has been far more rapid than that of the country as a whole, for in 1900 the state contained only 528,542 persons, while the 1950 census indicated a total population of 2,743,736, an increase of 419% in 50 years. The trend of population growth in the country, state, county, local communities and several typical Florida cities, is graphically shown on Plate 2.

There was a marked uniformity in the rapid rate of growth among many Florida cities between 1900 and 1930. For example, West Palm Beach grew from only 564 persons in 1900 to a population of 26,610 in 1930. Since 1930, however, there has been a marked change in the rate of growth of several of the political areas shown on the plate. The growth within the state has continued at an almost uniform rate of increase since 1900, there being only minor variations in the individual decades. However, in West Palm Beach County and in several other communities shown on the plan, the rate of growth has been less rapid during the last twenty years than between 1900 and 1930. Since 1930, the rate of growth in the City of West Palm Beach has been about the same as the rate of growth in Daytona Beach and Lake Worth. While there has been a substantial population gain in these communities during this 20 year period, particularly when compared with many other American cities, West Palm Beach, Lake Worth and Daytona Beach have not grown nearly as rapidly as Fort Lauderdale and St. Petersburg. Neither has it grown as rapidly as the adjacent City of Riviera Beach, although a more rapid growth is normally experienced in smaller communities, particularly in their early stages of development.

Plate 3 further compares the rate of growth in West Palm Beach and several other Florida areas with the average rate of growth of all metropolitan areas. The average increase in population between 1940 and 1950 in all metropolitan areas was 21.2 percent. The City of West Palm Beach exceeded this increase by 6.6 percent and grew more rapidly than certain other cities in Florida, including Pensacola, Jacksonville and Tampa. However, it did not grow nearly as rapidly as some of the other communities, nor did it grow as rapidly as Palm Beach County and the State of Florida.

The fact that Palm Beach County is growing more rapidly than its largest city, West Palm Beach, reveals two important conditions. First, the rural or agricultural population of the county is increasing, and further increases in this type of population can be anticipated in the future as more land is made available for cultivation. However, rural residents, while important, seldom represent a large proportion of the total population. The second condition

revealed by this trend is that whereas much of the earlier growth of Palm Beach County occurred within the corporate limits of the urban communities, particularly in West Palm Beach, much of the current growth is occurring in the smaller communities and especially in areas beyond the corporate limits. This is particularly true in the West Palm Beach section where a substantial amount of growth is occurring along Okeechobee Road and Military Trail. This is actually urban type population but it is not located within the corporate limits. A similar situation is found near a large majority of other American communities, and difficult problems of providing desirable standards of urban improvements and services result therefrom.

Probable Future Population

It is generally believed that the entire southeastern part of the country, and particularly the State of Florida, will continue to experience a substantial population growth. The economic studies also revealed that the West Palm Beach area has an excellent opportunity to enjoy substantial growth during the next thirty years. The amount of growth that will occur within the area will depend upon the extent to which concentrated efforts are made to utilize all potential advantages, and particularly to provide good living conditions and employment opportunities. Unless a realistic attempt is made to attract tourists, to increase employment in commerce and industry and to provide ample residential districts with a good standard of urban improvements and services, the City of West Palm Beach will undoubtedly grow at a slower rate than it has in the past and probably more slowly than during the last twenty years.

Plate 2 also shows the estimates for the possible future growth in both Palm Beach County and in the City of West Palm Beach. There is every indication that the county will continue to enjoy a substantial increase in population during the next thirty years, and a population of 221,000 should be realized by 1980. This is almost twice the county's present population, but on the basis of past trends and future possibilities, this is a realistic, rather than merely a hopeful, forecast.

Three different population forecasts are shown for the City of West Palm Beach. The lowest estimate is a mathematical projection of the past rates of growth and forecasts a population of not more than 60,000 persons, or an increase of only about 17,000 persons, within the present corporate limits. This would probably result if no substantial efforts were made to improve existing conditions, to attract tourists or to provide additional employment opportunities. The large increase in population that is expected in the county would simply locate in urban areas other than West Palm Beach.

The medium forecast is based on a sound and progressive program of improvements and attempts to provide employment opportunities, attract tourists and improve living conditions. This forecasts a population in the City of West Palm Beach of 73,000 by 1980, an increase of approximately 30,000 over the 1950 population. This is a very realistic figure, but it is probably the minimum increase that can result from a program of progressive leadership and substantial urban improvement.

The highest forecast is for a possible population of 85,000 persons in West Palm Beach by 1980. This forecast is not based on wishful thinking, but its realization will require substantial effort and initiative. It will require extensive opportunities for employment, particularly retail and industrial employment. Likewise, it will require substantial efforts and provision of facilities to attract the tourist trade which will, in turn, provide further opportunities for employment and retail sales. Finally, it will require a very concentrated effort in improving residential areas and in providing a high standard of urban facilities and services. The full development of the Westward Expansion Area to a high standard will be a basic factor in achieving this goal. The improvement of this new area with modern facilities and reasonably priced lots should attract a substantial amount of the urban development that is now occurring in unincorporated areas or in other communities.

The amount of future population within the West Palm Beach area will thus depend, to a large extent, on the local efforts made to attract future growth. The city has present and potential advantages that make possible the achievement of even the highest forecast and there is no reason why leadership and initiative cannot be organized to assure success.

Characteristics of the Population

In the early periods of the city's growth, particularly between 1920 and 1930, the white population represented only 60 percent of the total. However, during the next decade, the white population increased more rapidly than the non-white population, and in 1940, it represented about two-thirds of the total population. While the details of the 1950 census have not been released, it is believed that the white population is now a slightly larger percentage of the total than in 1940. It is anticipated that this general trend will be continued and that by 1980 the white population will be about 70 percent of the total.

In common with practically all other urban areas, the size of the average family is gradually decreasing. In 1940 the size of the average family in West Palm Beach was 3.51 persons, while in Palm Beach County it was 3.35 persons. For the State of Florida it was 3.65. The size of the average family in 1950 has not yet been released but it is anticipated that it will not exceed three persons per family in West Palm Beach.

The population is also becoming older, although the 1940 census revealed that the average age of Florida's population was less than the average age in many other sections of the country. There is a pronounced trend for retired and older persons to live in Florida and this will undoubtedly result in older persons predominating the local population during the next 30 years.

EXISTING AND PROBABLE FUTURE LAND USES

The existing land use pattern and the probable future requirements for the different types of land uses will have an important bearing upon the plan that is prepared for developing the Westward Expansion Area. The following discussion is concerned with the advantages and defects of the existing land use pattern within the West Palm Beach Area, and particularly with the probable future requirements for residential areas, facilities for tourists, and with commercial and industrial patterns and needs.

General Pattern of Land Uses

The general location and extent of existing land uses within West Palm Beach and the surrounding area are shown on Plate 4. For the purposes of this study, the many urban uses are grouped according to major classifications, namely: (1) single and two-family residences, (2) multiple dwellings including apartments, motels and rooming and boarding houses, (3) commercial, (4) industrial and (5) public and semi-public. Where no delineation is shown on property, it is vacant or unused. No attempt is made to show the use of each individual lot, and instead, the dominant use of the entire block is indicated. Consequently, there is much more scattering and intermingling of land uses than is revealed by this plan, but the plate does indicate the general organization of the city and its environs.

Urban development has extended in a north-south direction along the west shore of Lake Worth and the result is a long, narrow urban pattern ranging in width from about three-quarters to one and one-third miles. The Town of Palm Beach has an even more elongated characteristic. The shape of the urban development has resulted in certain peculiar and difficult problems not found in many communities. For example, the dominant traffic movement is in a north-south direction and the majority of the north-south streets are very heavily travelled. This presents difficult traffic problems, especially with the large amount of through traffic that occurs during the winter season. Most of the heavy traffic movement is forced through the main business district, which interferes with the efficient use of this valuable area and results in serious congestion and delays. Further, the large volume of traffic concentrating on so many of the north and south streets adversely affects a large amount of the residential development as it is practically impossible to eliminate through traffic from any large residential district. The use and desirable development of this elongated area is further complicated by the location of the two railroads, both of which traverse the city in a north-south direction, one being near the center and the other at the extreme western edge of the urban development. Finally, the railroads and several major streets that traverse the narrow urban development result in difficult problems in planning a system of elementary and high schools that can conveniently serve each residential district with maximum convenience and safety for the children.

The pattern of land uses within West Palm Beach is generally similar to that found in other communities of similar size. Around the central business district are found scattered industrial uses and a large number of multiple dwellings. One and two-family dwellings then extend beyond the more intensive uses in the central area and are interspersed with public and semi-public uses including schools, churches, hospitals and recreational areas.

The central business district is quite compact and it lies between the Florida East Coast Railroad and Lake Worth. As in the average community, business also extends beyond the central area along the heavily travelled highways, particularly Poinsettia. Commercial development is also found along certain major east and west streets such as Belvedere and Southern. Much of the new commercial development is occurring in the outlying sections where more space can be provided for off-street parking. This trend will undoubtedly continue in the future although more desirable results would be obtained if larger commercial districts - 20 acres or more - could be developed with a group of stores and surrounded by adequate parking space.

Since the Palm Beach communities have long been a resort rather than an industrial area, there is not as much industrial development as is found in the average city of this size. The majority of the industrial development is located along the Florida East Coast Railroad. The major concentration of industry is near the business district and also north of 23rd Street. South of the business district, industry is widely scattered through much of the city in a narrow band along the F.E.C. R.R. Here it conflicts with residential development to the disadvantage of both the residences and the industry for in many instances, industrial development has too small a site to adequately meet its needs. Even though the Palm Beach Area will probably never be an important industrial community, efforts should be made to provide larger, compact districts for the industrial development that does occur.

While the main concentration of multiple dwellings is around the business district, these are also found in many other sections of the city. For example, there is a substantial number of multiple dwellings north of Southern Boulevard and east of Olive Avenue. Another concentration is found between 18th and 22nd Streets and there are a number of scattered, multiple dwelling units north of 26th Street. A scattering of multiple dwellings does not bring about a satisfactory land use pattern nor does it provide effective and needed protection of the single-family uses. The Town of Palm Beach has much less scattering of the many land uses and there is a more uniform use of single-family homes than is found in West Palm Beach.

Although there is a substantial amount of vacant property in the corporate limits, which could accommodate a large amount of future urban growth, there is already a pronounced tendency for urban development to occur beyond the corporate limits. This is particularly true around the airport and along Military Trail. Here the urban development is much more widely scattered than it is within the city and many problems result therefrom. This scattered development and intervening vacant property makes it both costly and difficult to provide a desirable standard of urban facilities such as sewers, water lines, paved streets, schools and recreational areas. The provision of a desirable standard of urban facilities within the Westward Expansion Area should encourage much of the new growth that is now scattering over the outlying areas to locate in the new development. This will result in many advantages to both the city and to the future property owners, and further indicates the unusually fine potentialities of having such a large tract of land so conveniently related to existing development.

Existing Zoning

Private property within the City of West Palm Beach has been protected by zoning regulations for many years. The first ordinance was adopted late in the 1920's. The city has gained many advantages from the zoning ordinance but as almost invariably happens where regulations were adopted many years ago, there should be revisions in both the district map and the district regulations.

Plate 6 shows the location and extent of the existing zoning districts. The area included in the "E" Central Business District is far larger than is now occupied by commercial development and a substantial portion is occupied by multiple dwellings. As a result, this multiple dwelling development is not properly protected and could be adversely affected by the intrusion of stores and other types of commercial uses. Similarly, the area between 15th and 29th Streets and between the two railroads is zoned for industrial use, yet the general land use pattern reveals that more than 50 percent of this area is occupied by some type of residential development. The zoning has also permitted and probably encouraged the scattering of industries along the Florida East Coast Railroad in the southern part of the city, especially south of Southern Boulevard.

There should also be a closer relationship between the zoning and the single-family residential development and it is particularly important that the good types of single family homes be fully protected. The ordinance should permit only similar types of uses in these districts and should also require adequate lot areas and open yard space around the structures. There are extensive areas in which two-family residences and multiple dwellings can be located, particularly since they are permitted in both the "B" and the "C" Districts but many of these are located in the outlying sections where single-family uses predominate. In other instances, some of the older residential property lying near the business district is placed in the "A" Single-family District.

A substantial portion of the Westward Expansion Area, particularly the property lying between the railroads and the lakes, is now placed in an industrial classification. This will probably be satisfactory zoning for the area at the southeastern corner of Clear Lake, but adjustments will have to be made in other portions of this district. The majority of the Westward Expansion Area that now lies within the corporate limits is now placed in the "B" District. It is expected that a substantial amount of this will be made available for single-family homes and extensive changes in the zoning of this area should be made in accordance with the plan proposed for the ultimate development. In brief, a revision of the present zoning is desirable not only for the Westward Expansion Area but also for the entire city. It should result in substantial advantages in affording better protection for existing development and in securing a more orderly and logically arranged community in the future.

Areas Without Water or Sanitary Sewers

An adequate system of both water and sanitary sewers is essential for a satisfactory standard of urban development. This is especially true of water supply which is normally considered to be the most important facility in residential districts. While septic tanks can be used for the treatment of sanitary sewage under some conditions, this method of disposal eventually becomes very unsatisfactory, particularly when residential areas are intensively developed with small or medium sized lots.

Plate 5 shows, by different types of delineation, those areas within the corporate limits of West Palm Beach that are now unserved by water, sanitary sewers, or by both.

The largest area unserved by either sewers or water is that portion of the city lying west of the Seaboard Railroad and around the two lakes. This is, however, almost entirely vacant and practically all of it is included in the Westward Expansion Area, the gradual improvement of which is the major objective of this study. Consequently, this large unserved area has no relationship to present needs. The other major area that does not now have sewers or water is in the extreme western part of the city, south of Southern Boulevard. Practically all of this area is vacant and undeveloped and contains very few residences. A substantial amount of it is included in the Municipal Golf Course, the new park, and in the nursery lying south of Southern Boulevard. There is also a fairly large area without sewers and water in the extreme northwestern part of the city but this is also vacant and undeveloped. In addition, there are some scattered areas comprising from two to fifteen acres that are without sewers or water that are scattered throughout the city. The majority of these are in the southern portion of the city, particularly below Belvedere Road. The only one in the northern portion is a small area in the industrial district just north of 23rd Street.

There is only a very small portion of the present city that is without public water supply, but does have sewer facilities. This comprises the two small tracts lying north of 45th Street and while the area is subdivided, it does not now contain any residential development.

There are, however, large areas in the southern portion of the city, particularly south of Belvedere Road, that have water supply but do not contain any sanitary sewers. A study of the land use map (Plate 4) further reveals that a large amount of these areas that are not served by sanitary sewers, now contain residential development. In fact, some of the newer residential developments do not contain sanitary sewers. Here the sewerage is treated in septic tanks and while the sandy soil facilitates the disposal of effluents, the intensity of the development and the large number of septic tanks will eventually result in conditions that will not bring about a desirable standard or quality of residential development. The major reason why these areas and particularly the new developments, are improved with septic tanks rather than sanitary sewers, is that the State has prohibited the disposal of any more untreated sewage into Lake Worth. Consequently, a collecting and treatment system for the sanitary sewage will be required before this rapidly growing residential section in the southern portion of the city can be improved to a desirable standard. The Plate indicates, however, that a large majority of the city is provided with both water and sewers and the vacant lots in these areas can be improved with homes or other uses. An early solution of the sewage collection and treatment problem is essential in both the present city and the Westward Expansion Area.

Residential Development

Residential facilities normally occupy more area than any other type of urban use. Consequently, their character and appearance have an important influence not only upon the occupants, but also upon the entire community. Unfortunately, the 1950 census data regarding housing is not yet available and so 1940 census information has been used and supplemented by other data wherever possible.

Existing Facilities

Since West Palm Beach is a comparatively young city, the residential facilities are newer than in most other communities of similar size. Only 1,790 units in use in 1940 had been erected prior to 1920. Because of the large amount of new residential construction that has occurred since 1940, the percentage of homes that have been standing for 30 years or more is now even smaller. Thus the dominant housing characteristic is one of newness, which is always desirable. There will be less need to remove old structures because of obsolescence and depreciation during the next ten to twenty years than would be the case in the average community.

Another important characteristic of the present residential facilities is the comparatively small number of homes that are substandard or in need of major repairs. In 1940, only 11.7% of the residential units were listed as needing major repairs. Because of the large amount of new development and the number of homes that were repaired during the past ten years, this percentage should now be substantially less than in the preceeding period.

It should not be inferred, however, that there is no bad or sub-standard housing in West Palm Beach. There are a number of old, undesirable homes around the central business district and a few more are scattered throughout the community. Furthermore, obsolete and substandard homes predominate in the non-white residential areas. It is estimated that approximately one-half of the present negro residential facilities do not conform to the minimum desirable standards. This condition is not unusual, as it is found in the majority of other cities of similar size, but it does indicate a serious need for the improvement of non-white housing facilities in the future.

Because of the requirements of the tourist trade, a substantial number of the residential units are of the multiple-family, rental type. According to the 1940 Census, 17% of all the living units in West Palm Beach contained accommodations for two or more families. There is also a substantial number of garage apartments. Single-family construction predominated, however, during the last 5 years. For example, during the city's last fiscal year (October 1, 1949-October 1, 1950), a total of 1,022 permits were issued for single-family homes, while only 46 permits were issued for duplexes and only 5 for apartment buildings. This is similar to the trend occurring in many other cities with the possible exception of Ft. Lauderdale and Miami Beach. It is influenced by financing requirements, rental controls and cost of operating and maintaining rental facilities.

It is anticipated that this trend will continue in the future, and that 80% or more of the future living units will be of the single-family type. This does not imply that only a few rental units will be needed in the West Palm Beach area. The anticipated increase in tourist trade will make additional rental facilities necessary and new duplexes and apartments will be required to replace existing ones that become obsolete. It is especially important that extensive new rental facilities be made available for the non-white families. Duplexes are a logical type of rental facility in this area and ample provision should be made for this type of use in the future.

Little data is available regarding current rental ranges and values of the new construction. In 1940, nearly 90% of the tenant-occupied, non-white facilities rented for \$20 per month or less, and nearly 70% of the white facilities rented for \$30 per month or less. According to a survey made by the West Palm Beach Real Estate Board early in 1951, there were 1,040 single-family houses, renting from \$50 to \$150 per month, and averaging \$92.50 per month, and 1,320 rental units with a monthly rental range of \$50 to \$150 per month, averaging \$80 per month. It is believed that this information reflects current conditions, and assuming that if present economic and price conditions continue, the majority of the new construction should follow this general pattern. There will be, however, a pronounced need for non-white facilities that can be rented for \$30 to \$40 per month or less, and there will also be some need for white facilities which can be rented for \$50 per month or less.

In determining the general areas where new residential construction should and probably will occur, study was given to the availability of lots and areas within the existing residential sections. Plate 7 shows the general location and extent of vacant lots and lands within West Palm Beach. There is a very large amount of vacant property within the corporate limits. In fact, it is estimated that more than 8,500 vacant lots with 50-foot frontage are now available or could be subdivided. The majority of these are concentrated in the southern portion of the city, although some are scattered throughout all sections of the community.

This vacant property obviously could accommodate much of the new development that will occur during the next 25 or 30 years. However, builders and developers will never utilize all vacant land within existing developments before starting new subdivisions. This is made evident by the definite current trend towards decentralization. Secondly, some of the vacant lots and land will be needed for non-residential use, particularly for public and semi-public purposes. Finally, the preceding discussion of existing sewer and water facilities revealed that extensive sewer improvements will be necessary before some of the vacant tracts can be satisfactorily used for residential purposes.

Probable Future Requirements

There has been a gradual decrease in the number of persons per family throughout the country, which in turn has increased the number of living units necessary to accommodate the population. While the 1950 census data regarding family size has not been released for the West Palm Beach area, it is believed that the average size of the white families is 3.0 persons. The average size of the non-white families is about 3.7 persons, including roomers. Because of the limited number of non-white living facilities, there are many roomers and overcrowding results therefrom. It is estimated that in the future, the average size of the white families in West Palm Beach will be 2.9 persons and the average size of the non-white families will be 3.3 persons.

The preceding section on population indicated that the 1980 population in the West Palm Beach area should show a minimum increase of 30,000 over the present population and good possibilities that the increase might reach 40,000. It is further expected that the non-white population will not exceed 30% of this total. A 30,000 increase in population will require 2,727 additional living units to accommodate the non-white population and 7,242 additional living units to accommodate the white population. The larger population gain of 40,000 would require 3,636 additional non-white living units and 9,655 additional white living units.

In addition to the new units required by the increase in population, there will be a need for replacing some of the old, existing residences, particularly non-white residences, as well as those absorbed for commercial and industrial purposes. While these replacements will not be as extensive as those in other cities of similar size, the total amount of new residential development, on the basis of the minimum growth, would probably be about 8,000 units for whites and nearly 3,500 non-white units. The total number of additional homes necessary to accommodate the maximum population increase would require more than 10,000 units for white families and more than 4,000 units for the non-white population.

It is not expected that all of the new units will be erected in the Westward Expansion Area. Improvement of sewers, streets, schools and parks in currently developed areas should attract additional residential growth to these sections. Furthermore, the competition of the Westward Expansion Area may result in slightly lower land prices in the other area which would further encourage additional construction. However, a substantial number of the new

homes would be located in the Westward Expansion Area because of its modern character and desirable standard. It should even attract population that would otherwise locate in nearby communities or in unincorporated sections.

It is particularly important that a substantial amount of the non-white population be included in the Westward Expansion Area. This is a logical location for these families for their existing districts are restricted, and the amount of vacant property is limited. It is not expected, however, that all of the non-white growth will occur in the new area. A substantial amount of redeveloping should occur in the present non-white district. Many of the substandard and obsolete living facilities should be removed, and then redevelopment can accommodate many non-white families with modern and desirable types of facilities.

Commercial Development

The most important concentration of retail trade facilities is in the central business district which comprises approximately 14 city blocks. The center of this district is along Clematis between Narcissus and Poinsettia Avenues. Here are concentrated department stores, specialty shops, and chain stores as well as the other outlets that enjoy the largest volume of retail sales. Here also are located the majority of the offices serving the community. There are opportunities for more intensive use of this district, and there is adequate room for expansion to the north and south although the lake and the railroad restrict expansion to the east and west.

The present business district should continue to be the major retail center in the West Palm Beach area. However, as previously indicated, many improvements are necessary to maintain the value and usefulness of this district, particularly improvements of access streets and of off-street parking facilities. In addition to the future retail outlets that may be located within this center, it is particularly desirable that additional office space be concentrated therein.

In accordance with current trends, a large proportion of new commercial outlets will locate in areas beyond the central business district. It is very desirable, however, that the stores be concentrated at strategic locations rather than to be widely scattered along the main streets. Such concentrations provide many advantages to shoppers. They can visit several stores, parking only once. It is also imperative that such centers be improved with adequate off-street parking facilities.

In the larger metropolitan areas, there is a pronounced trend toward the development of large regional shopping districts comprising 20 acres or more and providing ample off-street parking space. Examples are the Crenshaw Center in Los Angeles and the Northgate center in Seattle. A properly located regional shopping center would be desirable, eventually to serve the West Palm Beach area. It should definitely be located within the corporate limits so that the city would continue to gain the advantages of the high assessed valuation (and consequent greater revenue) prevailing in the commercial districts.

Studies of many cities reveal that an average of approximately 0.25 acres of commercial development has been required to serve each 100 persons of the local population. This ratio has, however, been increasing during the last ten years because of the trend toward lower buildings and the provision of off-street parking facilities within the business districts. It is expected that this trend will continue in the future, and during the period covered by this report, the local population should require approximately 0.5 acres of commercial development for each 100 persons.

In accordance with this standard, an increase of 30,000 population would require 150 additional acres of commercial development, while an increase of 40,000 persons would require 200 additional acres for commercial use. A portion of this future area will undoubtedly be developed within the present, improved sections of the city. However, a substantial amount of it should logically be distributed throughout the Westward Expansion Area.

The smaller neighborhood centers should include the usual grocery and drug stores, filling stations and similar service facilities, but the new regional shopping center might well contain a department store, chain stores, and specialty shops. In fact, it should contain facilities to meet all the retail needs of the family. The luxury specialty shops will undoubtedly continue to be concentrated in the Town of Palm Beach, and few, if any, of these would be needed in the development of West Palm Beach.

Industrial Development

The location, character and extent of the existing industrial development has been discussed in preceding sections. There is certainly ample space available within the present city for much future industrial growth but there are no facilities that would accommodate large plants requiring 20 to 40 acres or more.

Since the type of industrial development that is anticipated in the future will not require large individual tracts, there should be little difficulty in accommodating the majority of the new industries in the existing districts. However, the availability of industrial districts having adequate railroad service and containing considerable vacant land, so that industries can choose from a variety of sites and find one to meet their peculiar requirements, is an important advantage. It would, therefore, be logical to provide a district of this nature near the southeast corner of Clear Lake. Furthermore, serious consideration should be given to providing a large and compact area for future industrial development between the Seaboard and Florida East Coast Railroads just west and north of the port. Ample vacant land is still available in this general location which would be conveniently accessible to the existing urban development. This area is located so that it will have a minimum amount of adverse effect upon the existing and future residential development.

EXISTING COMMUNITY FACILITIES

It is essential that the plan for improving the Westward Expansion Area provide for supplementing the major community facilities within the present city. Consequently, a study was made of the more important facilities now available in West Palm Beach, particularly major streets, transit lines, schools, parks and public buildings. This section contains a brief summary of the modern, desirable standards for such facilities and an analysis of the adequacies, defects and needs of such facilities within the City of West Palm Beach.

Major Streets

In urban communities, transportation is one of the major problems. In a motorized economy, streets are one of the most important physical facilities affecting the welfare and growth of an urban area.

Major streets should normally be about one-half mile apart. Such spacing will mean not more than one-fourth mile travel distance between these streets and residential structures. In the vicinity of the central business district, major streets should be less than one-half mile apart since more routes are needed to accommodate the large volumes of traffic entering and leaving this important center. Some of the major streets serving the main business district and outlying shopping centers should extend beyond the city as state and county highways serving the rural areas. Such routes will normally carry the largest volumes of traffic and should be improved to a high standard.

Minor streets can, and logically should, be comparatively narrow, curving and indirect. Such design of minor streets will discourage their use by large volumes of fast-moving or through traffic, and thus the adjoining residential areas will be properly protected and can continue to be desirable locations for homes.

The width of a street should be related to the volume of traffic it will be expected to carry. Streets leading to the business district, and especially those accommodating traffic from the rural areas, should normally be improved for two lanes of moving traffic in each direction and generally one parking lane on each side of the street. Where right-of-way widths of 100 feet are obtainable, it is highly desirable that opposing traffic streams be separated by a median strip four to six feet in width.

Intermediate between the arterial thoroughfares and the minor residential streets are the wide local streets running between the streets of major importance and acting usually as collectors for neighborhood areas. These should provide one moving lane for traffic in each direction and one parking lane on each side. Right-of-way widths should be 60 to 70 feet.

The minor streets need provide only one moving lane for traffic, but should be of sufficient width to permit parking on each side. Right-of-way widths of 50 feet are usually adequate.

The Existing Streets of Major Importance

The existing streets of major importance are graphically shown on Plate 9 which also shows schools and parks. As mentioned elsewhere in this report, the existing development of West Palm Beach has channeled all north-south traffic (and this is the major movement) into a very few streets, only three of which (Poinsettia, Clive and Flagler Drive) afford direct and convenient access to the Central Business District. Obviously, these are much less than one-half mile apart and their rights-of-way are too narrow. Poinsettia and Clive - even operated as one-way streets - have just about reached capacity at the present time (judging from recent traffic counts made by the State Highway Department). There is urgent need for additional north-south thoroughfares in the West Palm Beach area to care for future traffic and to relieve the burden on the existing streets. Recognition of the necessity of providing a by-pass route for through traffic is particularly important. This need has been anticipated in the planning for the interstate route located in the Westward Expansion Area.

The present location of the Florida East Coast Railway interposes a barrier to crosstown traffic throughout the City of West Palm Beach, since many of the east-west streets "dead-end" at the railroad. The numerous and lengthy trains operated over the F.E.C. Railway cause considerable delay to traffic. The city does have a few good cross-town streets, particularly Ckeechobee and Belvedere Roads and Southern Boulevard. Some of these extend into the outlying rural areas as well as across Lake Worth to provide connections with the Town of Palm Beach. The location of the streets of major importance are shown on Plate 9.

Substantial improvements are thus necessary in the existing major street system. Street widening within and near the central business district will probably prove impracticable because of high costs. Consequently, it is essential that the major street system in the Westward Expansion Area be designed to relieve congestion upon the north-south major streets within the present city. Furthermore, some good east-west connections should be provided between the new area and the Palm Beaches, and the more important of these should overpass the railroads.

Local Bus Routes

The use of transit facilities (busses or street cars) to supplement the transportation of persons by auto is most essential in cities the size of West Palm Beach. Furthermore, bus routes are particularly important in resort centers since many of the tourists do not bring their cars.

Plate 8 shows the location of existing bus routes serving the West Palm Beach area. The majority of the bus lines extend in a north-south direction in order to accommodate the major traffic movement. The bus routes are located upon the more important major streets, which is a sound principle of transit routing.

Some adjustments of the bus routes might be desirable in the future, particularly to eliminate the large loops. However, the present operation of the routes either into or through the central business district is both sound and desirable. This is the major objective of the transit riders, and they should be able to travel between their homes and the business district with a minimum of delay. It is also desirable that some of the local routes extend from the central business district to nearby communities, thus encouraging customers from these communities to visit the main business district in West Palm Beach.

Currently, the busses on some of the routes operate at substantial intervals, but this is probably related to the riding habits along such lines. Normally, the operating companies are willing and anxious to provide more frequent service as it is warranted by the number of passengers riding a particular line.

No bus lines now extend into the Westward Expansion Area but because of the proximity of this area to the West Palm Beach business district, it will not be difficult to establish new routes to serve development in this new section.

Parks, Schools and Public Buildings

Parks

The City of West Palm Beach now possesses a combined area of about 550 acres in parks, including the Municipal Golf Course. This total acreage compares favorably with the accepted standard of one acre per 100 urban residents. The distribution of the parks is shown on Plate 9.

The largest park consists of 186 acres which were recently acquired and is located along the eastern side of the Seaboard Airline Railway between the Municipal Golf Course and a line just north of Francis Street. This large park is not yet developed and is being improved piecemeal because of financial limitations. Because of its location at the southern end of the city, it is now very well situated for city-wide use. The next largest area is found in Howard Park which fronts on Lake Street between Park Street and Ckeechobee Road. A large portion of its 50 acres is developed for active recreation and because of its central location, its facilities are within reasonable access of many of the residents of the city. Howard Park would, however, be used by a relatively small portion of the future population in the Westward Expansion Area. Phipps Park, the third largest, is centrally located for the southern half of the city and comprises about 30 acres. The remaining parks, with the exception of Flagler and Currie Parks, which front on Lake Worth, are very small and serve principally as open spaces for passive recreation. The golf course is well patronized and is more than self-supporting according to latest figures.

It will be noted that the majority of the parks are located in the southern half of the city, and there is a marked inadequacy of these facilities in the northern portion. Here, there is less vacant area and land acquisition for

Table I
ATTENDANCE AND CAPACITIES OF PUBLIC SCHOOLS
West Palm Beach, Florida

<u>White Schools</u>				
<u>Map No.</u>	<u>Name</u>	<u>Type</u>	<u>Capacity</u>	<u>Attendance Mar. 1951</u>
100	Central	Elementary	800	719
101	Central	Junior High	490	323
102	*Palm Beach	Senior High	1,200	1,137
103	Northborough	Elementary)	700	967
		Junior High)		
104	Southborough	Elementary	400	442
105	Palmetto	Elementary	250	318
106	Conniston	Junior High	550	456
116	Belvedere	Elementary	<u>500</u>	<u>495</u>
Sub Total			4,890	4,924
<u>Colored Schools</u>				
95	Palmview	Elementary)		
		Junior High)	1,000	1,340
		Senior High)		
96	Pleasant City	Elementary	225	235
98	Roosevelt	Senior High	<u>650</u>	<u>565</u>
Sub Total			<u>1,875</u>	<u>2,140</u>
Total			6,765	7,064

* Also serves Town of Palm Beach

Source:- Palm Beach County School Board.

parks will be difficult and costly. However, it is most desirable that neighborhood parks and playgrounds be acquired in this section during the next 30 years.

With the golf course and the new large park in the southern part of the city, there is no need to provide large park sites in the Westward Expansion Area. Adequate neighborhood parks and playgrounds to serve the new residential areas are, however, necessary.

The Anderson Football Field of the Central High School, is the only facility in West Palm Beach where stadium type sports can be held. Wright Field provides the only satisfactory baseball diamond and is used for the spring training of the Philadelphia Athletics' baseball team. At the present time, there are no municipally operated swimming pools and consideration has been given to the possible construction of one or more public pools. Much discussion has also been given to the construction of a municipal auditorium which, in addition to the normal use of auditoriums, would be available for tourist activities during the winter season. Because of the importance of large competitive athletic events and the need for tourist activities, serious consideration should be given in the planning of the Westward Expansion Area, to the future construction and improvement of these facilities.

Schools

The schools of West Palm Beach are administered by the Palm Beach County School Board. The 6-3-3 system of grades is now being followed except for certain instances wherein physical facilities have not been altered to permit the changeover. Within West Palm Beach, there are now seven elementary schools, four junior high schools and three senior high schools. Two of the elementary schools, one junior high school and two senior high schools are utilized for colored pupils.

Figures for school attendance in March, 1951 indicate that attendance now exceeds desirable capacity in the West Palm Beach schools. This data is contained in Table and is also graphically shown on Plate 9. Crowding is most marked in the colored schools with these having a desirable capacity of only 1,375 and a March attendance of 2,140. The data further reveals that the existing school system in West Palm Beach could accommodate no additional enrollment from the Westward Expansion Area, and consequently, it is essential that adequate new school facilities be provided in this new development.

The location and size of the school grounds are shown on Plate 9. The senior high school is centrally related to the attendance since it is near the center of the city. However, the School Board is tentatively planning to erect two new high schools - one to serve the northern part and the other the southern section of the city. Several of the elementary schools are not well related to the residential areas that they serve. For example, the Northborough Elementary School in the northern part of the city is very close to Lake Worth, but much of its attendance comes from the residential development west of the Florida East Coast Railroad.

With the possible exception of the Belvedere Elementary School and the Conniston Junior High School, all of the sites fail to meet generally accepted standards. Desirable modern standards propose that elementary school sites contain a minimum of 5 acres, junior high school sites 10 to 15 acres, and senior high school sites, 20 or more acres. Some of the older schools within the city, particularly Southborough and Pleasant City, contain far less area than these desirable standards.

Commendable progress has been made toward the joint use of play facilities at the school grounds by the County School Board and the city's Recreation Supervisor. It is expected that complete arrangements will be made in the near future for the combined use of all school recreational facilities. The arrangements will provide for the turning over of school recreational facilities to a paid city Recreation Supervisor at a specified hour in the afternoon of regular school days and for the full day on Saturdays. Such an arrangement should insure maximum use of school play areas by the community. The school would thereby become the center of neighborhood activities.

Public Buildings

The majority of the public structures including the City Hall, the Court House, the Jail and the Library, are located at the northern edge of the central business district. These are in close proximity to each other, but no progress has been made toward the development of an outstanding grouping of public structures with common open space. These buildings are, however, well related to the main business district and to the city as a whole. Consequently, they should be retained in their general location rather than moved to the new development area.

The Central Fire Station is also located in this general area and will be within reasonable distance of the eastern portion of the Westward Expansion Area. However, one or more new fire stations will be needed to serve the new development that is anticipated within the project.

PROPOSED PLAN OF DEVELOPMENT

The proposed plan for the development of the westward expansion area is shown on Plate 10. The major objective of this plan was to provide a development that would conform to good current standards for modern urban living yet insure maximum efficiency and economy. There were, however, many other influencing factors that had to be considered in the design. For example, it was necessary that the major street system be fully coordinated with the surrounding street pattern and particularly with the street system in West Palm Beach. The minor street pattern was frequently controlled by factors of economy in providing for satisfactory disposal of storm water. The various land uses had to be located so as to insure maximum economy in muck removal and in filling operations. The size and shape of the two lakes was adjusted to providing adequate material for filling. A major requirement was that adequate area be provided for the future development of residential and other urban facilities that would serve the cohesive minority groups. Following is a description of the major elements of the plan and how they are related to the overall needs of the entire Palm Beach area.

Major Streets

The most important major street influencing the development of the Westward Expansion Area was the proposed express or super highway. This is an important portion of the federal interstate highway system and when completed, will be a new U. S. Highway Number 1, extending along the entire east coast. This highway will be improved to extremely high standards and ultimately, there will be no intersecting streets at grade and no adjacent development will have access to the main traffic lanes. It will be used primarily for through traffic and, as such, will be the route over which vehicles from the north and south destined for Palm Beach will reach the community. Of particular importance to the City of West Palm Beach is the fact that this route will accommodate practically all the through traffic (especially trucks) that is now forced through the central business district and the balance of the community. The highway will thus have a major influence upon the entire Palm Beach area.

The general location of this highway had been determined prior to the initiation of this study and considerable right-of-way had been acquired within the city south of Ckeechobee Road. While the location does separate the southwestern portion of the Westward Expansion Area from the balance of the tract, it otherwise has a very satisfactory relationship to the entire project. The location along the western part of the tract is particularly satisfactory, and in addition to providing convenient access to the area as well as to the city, it will have the important advantage of insuring that the new development will be seen by many persons.

Two traffic interchanges, of the clover-leaf type, which will provide a convenient means for traffic to leave the highway and enter the local major streets, or vice versa, will be provided in the project. One of the traffic interchanges is located at the intersection of the express highway with 45th Street Extension. This will give access to and from the northern portion of West Palm Beach and will also serve Riviera Beach. A second interchange is in the southern portion of the Westward Expansion Area just west of Clear Lake. This interchange is of major importance, not only to the Westward Expansion Area, but also to both of the Palm Beach communities. It will be the location where practically all of the visitors to this area will leave the express highway to reach the local development.

The most important major street in the proposed development is the route that will provide access from the interchange at the southern portion of the area to the center of the project and to both West Palm Beach and Palm Beach. It is proposed that this new route will connect with a new street that will be developed between 7th and 8th Streets east of the Seaboard Railroad, and after overpassing both the Seaboard and the Florida East Coast Railroads, will curve to the south and connect with the Flagler Memorial Bridge. This route is extremely well related to both West Palm Beach and Palm Beach. It is at the northern extreme of the West Palm Beach central business district, and its connection with the Flagler Bridge provides for very convenient access to the Town of Palm Beach.

Within the project, this major street is planned to have a 200 foot right-of-way which will provide for three moving lanes of traffic in each direction and a very wide parkway in the center. The character of this route will be very similar to Royal Poinciana in Palm Beach. In addition, the new route is located so that it will pass the proposed recreational center at the northern part of Clear Lake and the area occupied by the West Palm Beach Water Company, (which will also have park-like characteristics.) A narrow park strip is also proposed on the north side of this highway between the railroad and the canal between the two lakes to assure outstanding views. It would be almost impossible to find a more unusual and attractive entrance to any community, and it should substantially improve the character and advantages of the entire Palm Beach Area.

This new route would also extend south of the express highway connecting with Congress Avenue and providing a very direct and convenient access to the airport. It will also be used as a direct entry to the city for the traffic that enters the Palm Beach Area via Okeechobee Road. This street will ultimately accommodate large volumes of traffic and adequate pavement widths must be provided to accommodate the many vehicles. A detail of this improvement is included elsewhere in the report.

Another important major street will be a branch of this route which will extend generally northward along Lake Mangonia and provide direct access to the entire northern part of the area. This will also have a width of 200 feet as far north as the 15th Street Extension. Thereafter a width of 100 feet will be adequate.

Another street of major importance to both the Westward Expansion Area and the City of West Palm Beach is the extension of 15th Street westward through the area and on to Military Road. It will be carried over the express highway in the western part of the area, but no traffic interchange is proposed. This route will eventually carry much traffic to and from the west and will also be used as direct entry into West Palm Beach by many of the vehicles originating in the northern part of the project. As new development occurs, both 7th and 15th Streets will be needed to accommodate the vehicular movement between this new area and the central part of the existing development. The 15th Street route has a proposed right-of-way width of 150 feet between the Seaboard Railroad and the wide major street west of the canal between the two lakes. This will permit an adequate number of traffic lanes as well as a wide parkway strip in the center. It is recommended that eventually this highway be elevated wherever it crosses the railroads.

Another important major street is the one located between the railroad and Lake Mangonia. This will not only serve the intensive development anticipated in this section of the area, but will also connect with streets extending north of the area and thus should accommodate much through traffic movement that now uses streets within the City of West Palm Beach. Between this street and the existing development within the city will be major streets connecting with both 23rd and 36th Streets. Thus there will be four important major street connections between the new area and West Palm Beach in addition to the existing 45th Street and Okeechobee Road.

Several other major streets are proposed both in a north-south and an east-west direction. For the most part, these major streets are located about one-half mile apart, and thus would leave a large compact area for residential development that can be improved with indirect minor streets and the residential development should be almost entirely free of any through, fast-moving vehicles. These routes should adequately accommodate all necessary movements of vehicles between major traffic objectives. They will have a right-of-way width of either 100 or 90 feet, depending upon the volume of traffic which is anticipated thereon. Suggested cross-sections of the improvement of these major thoroughfares is contained in a later section of this report.

Residential Areas

An analysis of local building permits in the West Palm Beach area reveals that single-family dwellings have been the predominant type of residential units constructed during the past several years. Consequently, a substantial amount of the residential sections in the Westward Expansion Area should be restricted for single-family use. However, the area is so large that it would be neither sound nor practicable to plan or restrict all of the residential property for single-family use and instead, adequate provisions should be made for duplexes and multiple dwellings as well as for the more commercial type of living facilities such as hotels and tourist accommodations.

Table 2
SUMMARY OF AREAS
OCCUPIED BY PROPOSED USES

Westward Expansion Area

West Palm Beach, Florida

	<u>Acres</u>	<u>Percentage of Total</u>
Lakes, Ponds and Canals	1,190.43	22.5
Parks	64.15	1.2
Playgrounds	29.32	0.6
Schools and Neighborhood Parks	170.74	3.2
College Site	26.94	0.5
Community and Recreational	48.78	0.9
Golf Course	142.02	2.7
Semi-Public	22.98	0.4
Commercial	114.53	2.2
Industrial	78.76	1.5
West Palm Beach Water Company	62.81	1.2
County Farm Addition	30.58	0.6
Right-of-way for Superhighway, Inter- changes and 7th Street Connection	246.00	4.6
Streets	854.65	16.1
Hotel Sites	21.63	0.4
Motel and Trailer Areas	86.42	1.6
White Rental Areas	303.75	5.7
Non-white Rental Areas	154.23	2.9
White Single-family Areas	1,581.04	29.9
Non-white Single-family Areas	70.56	1.3
Total	5,300.32	100.0

The plan proposes that practically all of the property west of the Seaboard Railroad and between the two lakes be used for multiple dwellings and also that multiple dwellings be permitted in the areas around the major shopping center. These locations are very convenient to existing development within West Palm Beach as well as to existing employment and shopping centers. Further, these are the areas that will be traversed by the largest volumes of vehicular movements and consequently, would be somewhat less desirable for single-family development. They should also have the most convenient and adequate transit service and their proximity to the new shopping center is particularly important. While the areas would be close to streets carrying large volumes of traffic, they would contain many desirable locations since a portion of the rental property would front upon either Lake Mangonia or Clear Lake or upon the ponds or small lakes that are a part of the storm water drainage system. They also have convenient access to public schoolgrounds and to recreational areas.

A third multiple dwelling area is proposed in that portion of the project lying at the southwestern corner and which is separated from the remainder by the express highway. This, together with the proposed shopping center, single-family development and school and park would provide for a self-contained neighborhood. It is probable that many of the apartments and duplexes erected in this section would be in the medium to lower rental ranges.

It is recommended that the privately developed area east of the new canal between the two lakes and also the narrow strip extending northward along the east side of Lake Mangonia as far south as the school and park area and the Water Company area, be used for non-white residential purposes. The majority of this will be for rental development but there will also be some single-family residences. This area is very convenient to the proposed school and parks as well as to a new shopping center. These neighborhoods could conform with all desirable modern standards and should attract much new growth.

Larger lots have been provided in the multiple dwelling districts with the majority having dimensions of 100 by 200 feet. This will accommodate a large apartment building and still leave ample surrounding open space including area for the off-street parking of the tenants' autos. Somewhat smaller lot sizes have been proposed for non-white rental housing although here there is ample opportunity to acquire more than one lot if a larger building is desired. It should further be noted that while both minor streets and lot lines are proposed in the rental area, it would be entirely possible for a developer to acquire an entire neighborhood or a substantial portion thereof and to change the minor street pattern so as to provide a different arrangement of buildings and open spaces such as the modern garden type apartments. The proposed lot arrangement should prove desirable in the non-white area, however, for it appears that there will be considerable demand for the acquisition of individual lots and the erection of multiple dwelling units thereon.

In addition to the construction of apartments within this area, it would also be possible and practicable to develop duplexes and to operate rooming and boarding houses and tourist homes.

Table 2 contains data regarding the area occupied by the several uses proposed in the plan. The multiple dwelling area comprises a total of 458 acres of which 154 acres are proposed to be used by the non-white population.

This latter area will probably be developed at a somewhat higher density than the remainder of the multiple dwelling area and could easily accommodate 1,665 families or a gross density of 32.6 persons per acre. This density compares very favorably with desirable densities in other communities. It would provide very satisfactory living conditions and should enable the neighborhood to maintain its value and desirable character over a long period.

The balance of the residential area should be reserved for single-family homes and the street pattern has been arranged to provide for maximum protection for the single-family developments. Through traffic is discouraged and there are many dead-ended courts or blocks. It will, however, be noted that adequate access is provided between the residential neighborhoods and that a few secondary major streets extend through several neighborhoods, particularly to provide access to schools, recreational areas and shopping centers.

Three general lot sizes are provided in the single-family development. The larger lots have a width of about 100 feet and vary in depth from 150 to 200 feet. These larger lots are generally located near the lake, around the ponds and in areas fronting upon the golf course and some of the recreational developments. Medium sized lots have an average width of 75 feet and a depth of 115 to 150 feet. The smaller lots have a width of 60 feet and a depth of from 115 to 135 feet. Some of the lots that are proposed for colored occupancy have a width of 50 feet. With so much area available, there is no reason why satisfactorily sized lots can not be provided, particularly since the current trend is toward wider houses and there is definite need for ample open spaces between residences.

It should be noted that the different sized lots are not all confined to one location but instead, many of the single-family neighborhoods contain all three sizes and all of them contain small and medium sized lots.

The plan provides that lots will rear on the more important major streets so as to provide better protection for the residences and to also result in a minimum of interference with the heavy traffic movements. However, because of economy, the homes are proposed to front upon the other major streets. All residential development rears rather than fronts upon the express highway and thus there will be no need for local service roads along the expressway within the project.

Industrial, Commercial and Hotel Areas

Industrial Areas

The only industrial district proposed within the project is south of the present water plant on the east and southeastern shores of Clear Lake. The area is not well suited for residential use but because of its frontage along the Seaboard Railroad and proximity to the generating plant of the Florida Power and Light Company, is a sound location for industrial development. It is also close to the existing industrial development along the railroad east of Okeechobee Road. In fact, with the removal of some poor residences, the proposed and

the existing industrial developments could be combined into a large, compact and logically located industrial section. The proposed industrial tract area contains 78.7 acres and can be readily served with switch tracks from the Seaboard Railroad.

Study was also given to the desirability of utilizing other portions of the project immediately adjacent to the Seaboard Railroad for industrial use. However, this is not practicable because of several conditions. First, it is very important that a north-south major street be located west of and generally parallel to the railroad and the narrow width between the lakes and the tracks would not permit an adequate depth for industrial sites between the railroad and the major street. Further, some of the best residential districts within the city are now located immediately east of the railroad and it would not be sound planning to separate this residential development from the proposed residential development along the east side of Lake Mangonia with industrial uses. If additional area, particularly large sites, is needed within or near the city, it is recommended that an industrial district be provided along the Seaboard Railroad, north of 45th Street.

Commercial Areas

Two major types of commercial area are proposed. One might be called a major or regional business district and the other, the smaller, neighborhood type of shopping center which is distributed through the residential areas.

It is expected that the present central business district within West Palm Beach will continue to be the major business center for the entire Palm Beach area. However, this area is already congested because of narrow streets and inadequate off-street parking spaces. Major problems already confront the officials and property owners, in providing improved access and enough parking spaces to maintain the center's present value and usefulness. Additional commercial growth is expected and should be encouraged in this older district but it can not be expected to attract all the future commercial development within the Palm Beach area. Previous discussion indicated that outlying shopping centers are already developing at a rapid rate.

The major shopping district in the new project should be located within the area immediately west of the interconnecting canal between the two lakes and between the proposed 7th and 15th Street major thoroughfares. This area is conveniently related to the entire project. Further, it is immediately adjacent to important major thoroughfares that extend not only to the project area but to the entire Palm Beach region. This should attract customers other than those that will live in the new development.

The major district contains an area of 58 acres and can be improved in accordance with the most modern standards and practices. It is recommended that the stores be located near the center of the tract and that the area between them and the boundary streets be utilized for vehicular parking. This will enable practically all customers to park within 400 feet or less of the stores, and further, there would be no conflict between vehicular movement and customers walking

between the many stores. It is recommended that this center be so developed that there will be at least three times as much parking space as there is commercial floor space in the stores and shops.

This major business district will naturally afford competition with the present business district in West Palm Beach, yet if proper improvements are made in the latter area, the adverse results will be minor rather than major. Further, and of particular importance, is the fact that the proposed major district in the Westward Expansion Area would be located within the corporate limits of West Palm Beach and thus the city would receive the taxable income therefrom. In many communities, these large, modern, regional shopping centers have developed beyond the corporate limits and the city obtains no revenue from them.

A total of six neighborhood shopping districts are proposed in the balance of the project. These are much smaller than the major business district and are primarily intended to serve nearby residential developments. They are spaced approximately one mile apart and the majority of them would contain grocery and drug stores, personal service shops, service stations and the like. These six neighborhood centers range in area from 4.75 acres to 14.75 acres and contain a total area of 56.53 acres.

Two of the neighborhood centers, namely the one on the south side of 45th Street Extension and the one on the north side of Okeechobee Road, in the extreme southwestern part of the project, are somewhat larger than the others since they would also serve residential areas lying north or south of the project. A neighborhood shopping center is proposed east of 15th Street and West of the Seaboard Railroad to serve the colored residential districts. This is very conveniently related to both the rental and single-family districts and could also serve the existing and future colored homes between the two railroads. It should be intensively used and serve a large number of customers.

These neighborhood shopping centers should also be improved with off-street parking facilities but since they would primarily serve the immediately adjacent neighborhoods, it is not essential that the ratio of three times as much parking space as commercial floor area be adhered to in their development. However, it is recommended that there be at least twice as much parking space as there is commercial floor area.

Hotel Areas

Preceding data has revealed that the Palm Beach communities should attract additional tourist trade in the future. While there are now extensive rental facilities within the City of West Palm Beach and the Town of Palm Beach, additional facilities will be required during the next thirty years. Of particular importance is the fact that many tourists are interested in newer and more modern types of living facilities.

An area containing 21.63 acres for the development of hotels and apartment hotels is proposed between the main access road and the northwestern portion of Clear Lake. These large lots have unusually fine settings and views

along this large body of water. They are also very conveniently related to the municipal recreation center lying immediately east of the canal and to the regional business district. Their location along the main access route is very important from the standpoint of the travelling public and affords very excellent accessibility to the entire Palm Beach area. It is not expected that hotels similar to the Breakers or the Biltmore will be erected in this general location, but it is not unreasonable to expect that a substantial hotel development will occur. Large lots are proposed so that there will be much open space around the buildings as well as ample area for vehicular parking.

Recognizing the trend toward, and popularity of, the modern motel type of rental facility, a substantial area has been provided for this use at the intersection of the express highway and the main access road between the expressway and the City of West Palm Beach. Since the area borders the expressway, it would be readily seen by passing motorists. This development also has frontage on Clear Lake which together with the small park, should be a very attractive and desirable location for tourists. There are many fine examples of good motel developments in Florida and a high standard of improvements should be maintained in the proposed district. It should prove to be one of the most desirable and financially profitable features of the entire project.

It is further recommended that the portion of the project lying south of the express highway on both sides of Okeechobee Road be utilized for trailer courts. These would be so separated from the balance of the area that there should be no adverse influence and it is further proposed that these would be under strict control so as not to prove unsightly and would insure a good standard of living conditions.

Schools, Parks, Public and Semi-Public Areas

The analysis of existing community facilities revealed that with the possible exception of a senior high school, it would be necessary to provide new school facilities to serve the entire project area. Past experiences in modern urban development has also revealed that an adequate system of school playgrounds and neighborhood parks are one of the most effective means of insuring desirable residential areas and of maintaining their value over a long period. It will thus be sound economy to provide an adequate system of school and recreational areas in the Westward Expansion Area, even at the loss of some property that otherwise might be used for residential development.

The plan proposes a combined system of schools and neighborhood parks. This assures an adequate playground for the use of children during school and non-school periods and also provides recreational area that can be used by all persons living in the neighborhood. Further, the schools can be so designed that they contain facilities for indoor community activities and thus a complete year round community center will be available.

A total of eight elementary school sites are proposed within the project area. These range in area from 9.0 acres to 29.5 acres and contain a total of 127.0 acres. Practically all of the sites are located within the interior of neighborhoods rather than on major streets and the maximum walking distance

between the homes and the school grounds seldom exceeds 3,000 feet or slightly more than one-half mile. Thus, there is a maximum of convenience and safety for the school children. The school sites will primarily serve residential development in the Westward Expansion Area rather than surrounding neighborhoods, but the elementary school site at the northeast corner of Lake Mangonia will also serve a large number of residents living between the two railroads in the general vicinity of 36th Street. Two of the elementary schools are located in the non-white residential districts and here it is possible that the larger school site may also have to provide some junior high school facilities. This need can be finally determined only after a complete study of the entire school system in the West Palm Beach area.

Two junior high schools are proposed and they are so located that they would be reasonably convenient to all children in the project. The junior high school just west of the major business district contains a large area and it may be possible that a senior high school will also have to be developed here to serve many of the pupils living in the project area. This improvement will depend upon the final decision of the County School Board regarding its tentative plans to construct two new senior high schools within West Palm Beach. If these two high schools are constructed, there should be little need for a third high school in the new area.

The junior high school sites contain 17.89 and 25.7 acres, respectively. It is also recommended that these grounds and school buildings be used for neighborhood recreation and other community purposes.

Elementary school enrollment now approximates about 9 percent of the West Palm Beach population so that the number of proposed schools is entirely adequate. The enrollment would probably average about 400 per school and there need never be more than 500 at any individual site. Thus the plan for schools conforms to modern standards and to the probable ultimate growth requirements in the Westward Expansion Area.

Currently, there is much local interest in securing a new site for a junior college. Several offers of land have already been made for the development of this new campus and the Westward Expansion Area was studied to select a potential site. The plan shows a proposed location at the northwest corner of Clear Lake immediately south of the area proposed for hotel development. It is doubted that a more desirable site could be found in the entire Palm Beach area. The tract would overlook Clear Lake which would provide an unusually fine setting for the building or buildings. It would have frontage upon the main access route and thus would be seen by a large number of persons. Further, it would be very convenient to future possible transportation and would have the added advantage of proximity to the large recreational areas along the north shore of Clear Lake, thus eliminating the need for constructing expensive recreational areas upon the campus. A site of 26.3 acres has been reserved for this use which should be entirely adequate for future needs. If, for any reason, the school should be located elsewhere, this site would still be a most logical location for some other institution.

Parks

In addition to the park areas that are combined with the several school sites, the plan proposes three additional types of park development. The first are the park areas that are distributed around the shores of the two lakes. These are primarily intended for access to the water but they would also contain some facilities for active recreation as well as facilities for picnicing, walking and other forms of passive recreation that can be enjoyed by the entire family. Related to these areas is the strip of land more than 100 feet in width between the urban development and the waters' edge which encircles both lakes. This is to be owned and controlled by the West Palm Beach Water Company, for maintenance purposes and for protection of the water in the terminal storage. However, this strip should be planted and landscaped so that there will be an attractive strip of park around both lakes.

The second type of park area is the large park and recreational area lying between the main access highway and the north shore of Clear Lake. One of the first improvements in this area should be an auditorium which would not only serve local requirements, but would also provide excellent facilities for the winter tourists. A large swimming pool is proposed near the auditorium. The western part of the tract should be improved with a new baseball diamond which could be used for the spring training of major league ball teams and a football field and stadium accommodating the major contests in the entire Palm Beach area should also be erected. There is ample area to develop facilities that could meet all local recreational needs and construction could take place as conditions warrant it. Adequate vehicular parking space is provided which is seldom found in other similar projects. This tract is ideally located to serve both the new area and the existing city and can be one of the most valuable and desirable features of the entire project.

The third type of recreational park area is the small playgrounds that are distributed through the residential districts. Each of these contain about 1.5 to 2 acres and are primarily intended for the use of younger children. They will supplement the school play areas and are so located that practically no child would have to walk more than one-fourth of a mile to reach either a playground or a schoolground.

There are also some triangular open park areas at the intersections of three main highways at the southeast corner of the major business district. These will have little use for recreational purposes but they should be attractively planted and landscaped. They will be important factors in insuring an unusually attractive and spacious character in the entire development.

Public and Semi-public Areas

The largest public and semi-public area is the golf course at the extreme western portion of the area. While it may be many years before this is improved, it can be a very important portion of the entire development. It would not only provide an important service to people living within the new area, but because of its convenient location, it should be intensively used by the winter tourist. It utilizes an area which contains a considerable number of trees.

Sites for churches and other semi-public buildings are distributed throughout the project. These are usually located near the shopping centers so that the off-street parking facilities in the commercial district would be available for the persons attending church services or other activities. They thus insure maximum use of the parking areas and will also act as a buffer between the shopping districts and the residential developments. As extensive development occurs, additional sites for churches and other semi-public uses may be necessary, but ample area should be available for such improvements. Normally, they should be provided at the intersection of major thoroughfares.

Minor Street System

The minor street system has been designed in accordance with modern standards and practices. While careful consideration was given to the design of the minor streets so as to facilitate the disposal of storm water, the major objective was to provide a street system that would discourage large vehicular movements through the residential areas. Efforts were also made to have a minimum of minor streets intersecting the major thoroughfares so as to reduce the conflict with the faster moving traffic along the major streets.

Only a few of the minor streets extend continuously through more than one neighborhood. In these instances, such continuous streets are primarily needed to give direct and convenient access between the residential areas and the school grounds.

Practically all of the minor streets are proposed to have a 50 foot right-of-way which will be entirely adequate for the requirements of local traffic. The few minor streets that are extended through more than one neighborhood to provide access to school grounds, will have a right-of-way of 70 feet.

Even though the minor street system has been designed to discourage through traffic, there is a minimum number of dead-end or cul-de-sac streets and thus the system will facilitate the development of a water system that will have very few dead-ended water mains.

Lakes and Canals

The extensive and important terminal storage for the water supply system that will result from the dredging and improvement of the lakes, is discussed elsewhere in this report. Further, the recreational potentialities of the lakes were discussed in connection with the park system. The value of these two

large bodies of water to the entire project and not be overemphasized. They are one of the major features in assuring a desirable residential character throughout the entire Westward Expansion Area. The lots along the lake shores and near thereto, are unusually desirable and should command a high value.

The ponds that are proposed just west of Lake Mangonia are exceedingly important elements in the dredging and storm water disposal programs, but they are also important from the standpoint of improving the character and desirability of the residential development.

The canals are the basic means of disposing of the storm water. While they will involve some maintenance problems, they are an indispensable portion of the entire project. The cost of disposing of all storm water in underground pipes would be prohibitive. Adequate easements have been placed along all canals and drainage ditches so as to provide access for maintenance purposes.

The city should be responsible for the maintenance of these canals and it will be necessary to impose strict regulations against the disposal of trash or other debris within or along them. Some danger is always inherent along bodies of water but the potential danger is undoubtedly less than the possibilities of accidents resulting from the large number of fast moving vehicles along the major streets. Further, canals and waterways are very common in urban developments along Florida's east coast. The important requirement is that the canals in the Westward Expansion Area be better maintained and policed than many of the existing canals in the Palm Beach area.

PUBLIC SERVICES AND PROTECTIVE PROVISIONS

Throughout this report, it is emphasized that the plans for the Westward Expansion Area envision a high standard of development for residential and commercial areas and for the various public areas such as schools and parks. In order to protect this development, it is essential that the public services furnished to the Westward Expansion Area be of an equally high standard. Further, there should be adequate protective measures such as zoning regulations and deed restrictions to insure that the development will maintain its value and character over a long period of time.

The public services necessary to maintain desirable communities include mass transportation facilities, collection of garbage and trash, and fire and police protection. The first two of these may be provided either by public or private companies, but the city should exercise adequate control to assure that desirable standards will be maintained.

Mass Transportation

Plate 8 contains data regarding the location of existing bus routes in the West Palm Beach Area. The majority of these bus routes operate in a north-south direction. As the Westward Expansion Area is developed, it will be necessary to provide bus routes within the improved sections. This will require some east and west routes, but will impose no unusual conditions. Following are some of the major requirements that should be observed in providing the new bus routes:

1. All new routes should operate over the major thoroughfares.
2. The routes must be planned to provide adequate service between the residential areas and the present business district of West Palm Beach. Many of the routes should also pass the proposed major business district in the new area. Thus, 7th and 15th Streets should accommodate the majority of the new routes.
3. Several of the new routes should extend beyond the business district in West Palm Beach to serve existing developed sections both to the north and south and especially, the Town of Palm Beach.
4. Bus service should also be provided through the Westward Expansion Area to the Palm Beach International Airport and to more outlying residential sections.

Garbage and Trash Collection

The collection of garbage and trash has a very important bearing on the public health standards of a community. It is essential that garbage be stored in tight containers, properly located and collected at frequent intervals. At the present time, garbage collection in West Palm Beach is maintained as a

public service provided by the city. Garbage from residential areas is collected twice a week; garbage from commercial areas is collected daily, and the city makes a charge to the individual commercial establishment for this service. Similar arrangements should be extended to the Westward Expansion Area as it is developed.

Fire and Police Protection

Plate 9 showed the location of the three existing fire stations within West Palm Beach. The tentative program for the expansion of the fire protection facilities has included the construction of a new fire station somewhere in the vicinity of 23rd and Tamarind and a second new station somewhere near Lake Avenue and Newark Street. This tentative program has been held in abeyance pending the completion of plans for the development of the Westward Expansion Area, since the city realizes that adequate fire protection must be provided to this new section of West Palm Beach.

It may be found desirable to choose other locations for the proposed new stations to provide adequate service to portions of the Westward Expansion Area and, at the same time, serve the districts mentioned above as contemplated. The sequence of construction of fire stations within the Westward Expansion Area will naturally depend upon the development program within the area. It is most important, however, that a fire station eventually be constructed within or near the major business district. This would also serve the nearby multiple dwelling as well as other proposed uses that have the maximum need for fire protection. This central station, together with the others now being considered for the existing development, would probably give adequate fire service for the entire Westward Expansion Area - especially since a service radius of three miles is not excessive for single-family districts.

It will be necessary, of course, for the city to provide adequate police protection for the Westward Expansion Area. Patrol schedules and other operating methods should be planned consistent with the high standard of development envisioned within the expansion area. This will merely require gradual expansion of the existing police department, but it may be necessary to establish a new police sub-station within the new area, preferably near the major business center.

Administration and Maintenance

As mentioned previously, the city should be responsible for the maintenance of parks - including the civic center - and landscaping along the boulevards, etc. The administration of these improvements and their maintenance should be allocated to the city departments now handling such matters. Since the Westward Expansion Area will be developed to a high standard of construction, and property owners will be expected to maintain their premises to a high standard, the city should carefully maintain pavements and landscaping within the Westward Expansion Area.

Zoning Regulations

Much of the project is now under the zoning regulations of West Palm Beach. However, little of the present zoning has any reasonable relationship to the proposed development of the area. None of the area is now in an "A" Single-family District, yet much of the project should be used for this purpose. Few of the existing commercial districts conform to the location of the proposed shopping centers, and there is far too much industrial zoning near the Seaboard Railroad.

If the current zoning regulations are still in effect when development of the Westward Expansion Area is initiated, it will be necessary to adjust the zoning on the areas first improved as closely as the present regulations can be related to the proposed use. However, as long as the area remains under a single ownership, there would be little advantage in immediately changing the zoning for areas other than those where urban development is started.

The major need from the standpoint of zoning is a comprehensive revision of the present West Palm Beach Ordinance. This is desirable not only for the new area, but also to provide better protection for the existing development.

Several single-family districts should be provided in a revised ordinance, so that they could be related to the different sized lots proposed in the comprehensive plan. The major difference between these districts would be in the minimum lot area and yard regulations rather than in the use provisions. A need for more than one single-family district undoubtedly exists in the presently developed portions of the city. Different types of multiple dwelling districts will also be desirable, and it is particularly essential that provisions be required for off-street parking - generally similar to those in the present ordinance. Modern regulations should also be provided for both neighborhood and major shopping districts, particularly to assure ample off-street parking and adequate loading and unloading facilities.

Whenever a revised zoning ordinance is prepared, the several districts can be closely adjusted to the proposed development plan of the Westward Expansion Area. However, since actual development will occur over a long period, it should be understood that the early zoning, other than for areas where actual urban improvements are started, may be subject to some changes when the time for development arrives. An alternate method (which not require detailed comprehensive zoning in the near future) would be to include much of the area in a "semi-rural zone", where minimum lot areas of one acre or more would be required, and then to re-zone various parts of this section as they become ready for development.

There is one matter that is only indirectly related to zoning, but has a major influence upon the entire development. This is the matter of assessed valuation, particularly of the unimproved land. If the city should place a high valuation upon such land, it would require substantial tax payments by the holding company and this would undoubtedly restrict its future potentialities.

Even after the area is filled, it will require few or no public expenditures for services or maintenance until it is improved for urban use. Consequently, until the improvement is actually initiated in the individual neighborhoods, the vacant property should have a very low assessment - preferably no higher than at present.

Deed Restrictions

The imposition of deed restrictions upon the land and lots within new subdivisions has proven to be a most desirable and effective method of protecting urban development, especially residential property. Such restrictions are needed to supplement even the most modern zoning regulations, for since zoning is a public regulatory measure, it should not be as detailed in its controls as an agreement between seller and purchaser.

Court decisions have upheld the use of deed restrictions in principle, but they have indicated some limitations that should be observed in preparing new restrictions. For example, the courts have held that, because of changing conditions, deed restrictions cannot continue indefinitely. However, this can be overcome by providing a normal period of duration in the original instrument and automatic continuation for shorter periods. A further limitation imposed by court decisions is that legal measures cannot be utilized to enforce racial restrictions. The potential advantages that can be obtained from the many other provisions of deed restrictions far outweigh the few limitations.

Sound deed restrictions should be imposed upon much, if not all, of the property within the Westward Expansion Area. Even proper restrictions within the industrial area are not unreasonable, and certain restrictions are most desirable in shopping centers. It is not, however, practicable or sound to draft deed restrictions now that apply to the entire project. Many years will be required to complete the development, and some adjustments and variations may prove desirable in the proposed comprehensive plan. Also, the development of the entire area will be neither encouraged nor facilitated if the present owners impose detailed restrictions upon the area. Instead, it is the company that assumes financial responsibility for dredging and filling the area that should impose the restrictions, and such restrictions should be imposed by neighborhoods or major use areas only as they are ready for development.

It is expected that the entire Westward Expansion Area will eventually be within the corporate limits of West Palm Beach, and thus its development will be controlled and protected by municipal regulations. However, it is only reasonable that the present owners of the area, particularly the West Palm Beach Water Company, should desire assurance that any holding or improvement company will impose proper restrictions upon each neighborhood or section as it becomes ready for development. It is recommended, therefore, that the title be transferred by the present owners with a minimum of restriction but with thorough safeguards and an understanding that the basic principles of the proposed plans will be followed, and that modern deed restrictions will be imposed as actual urban development occurs. Since unexpected conditions and

trends may arise before the area is entirely developed, it is recommended that the present Committee of Engineers be designated as the responsible agency for approving any variations from the general plan or the proposed standards, as well as for approving the type and details of deed restrictions.

Basic Type of Restrictions

The following is a brief discussion of some of the more important types of regulations that should be included in the restrictions.

Uses. In residential areas, the future use of lots can be restricted to appropriate purposes and even certain semi-public uses can be prevented in some of the more valuable residential areas. A limiting of uses is also possible in shopping and industrial districts, especially to prevent or control uses that might be objectionable in areas reserved strictly for shopping centers.

Intensity of Uses. These include provisions to prevent future resubdivision of lots, requirements for adequate open yard spaces around each structure, and maximum building heights. They can contain more detail than the zoning regulations. Of particular importance is the possibility of requiring a minimum size (usually floor area) for residential buildings, which size should vary in the different neighborhoods.

Neighborhood Associations. Active participation by all property owners in a strong neighborhood organization has long been recognized as the most effective means of protecting the character and value of residential development - especially of single-family residences. The restrictions should create such property owners' organizations in each major neighborhood, describe their powers and responsibilities, and provide for their administration. They can be extremely useful in encouraging proper repair and maintenance of individual homes and in abating nuisances.

Administration and Duration. The officers of the neighborhood association are the logical ones to enforce the deed restrictions. However, the developer of the neighborhood may wish to retain some or all of such control until a substantial amount of the property has been sold.

The normal practice is for the restrictions to be initially imposed for a period of about 20 years, with provision that they will be automatically extended for additional periods of 10 years each unless a majority of the property owners decide to vary or abandon them at the end of any period.

SUGGESTED TYPE AND STANDARDS OF IMPROVEMENTS

Grading, Dredging and Storm Drainage

The proposed plan for the development of the Westward Expansion Area provides for sound locations and relationships of the many types of land uses needed in the project. The other major factors that will affect the desirability and continued value of this large area are the types and standards of the many improvements that are needed to establish and maintain fine, modern development. The area must first be dredged, filled and graded so that it is satisfactory for urban use and then a water system, sewers, streets, and other essential facilities must be designed and constructed in accordance with good modern standards. The following is a discussion of the principles and standards recommended for the development of these necessary improvements and facilities.

General Character of the Area

The area to be developed is typical of the coastal fringe of the Everglades, consisting of alternating fine sand and muck areas, overlying the Pamlico formation. The sand is generally fine (approximately 0.25 millimeters and less grain size) and is stabilized by vegetation. Muck deposits are generally in low areas and are from zero to ten feet deep. A long narrow strip lying between the Seaboard Railway and the lakes is typical coastal ridge and sand dune. At the present time, practically all storm water falling within the tract drains into the lakes, outletting to the north from the upper tip of Mangonia through a swamp and thence under 45th Street extended. An emergency outlet at the south end of Clear Lake discharges through a culvert in Okeechobee Road and into the canal system of the Lake Worth Drainage District, ultimately reaching the West Palm Beach Canal. The area has very flat slopes and averages approximately 14 feet above sea level.

General Criteria

In the designing of this area for sub-division and future urban development, certain basic factors must be recognized. A satisfactory plan of development depends on a solution which meets, within the limits of economy, the following basic considerations:

The lakes are now, and will be in the final development, terminal storage for the water supply system serving West Palm Beach and Palm Beach. Therefore, it is essential to protect the lakes from surface water contamination originating in developed areas adjacent thereto. Contamination can be prevented by keeping storm water, running over the land, from entering the lakes by construction of a perimeter levee completely surrounding each of the lakes and the interconnecting canal between them. Protection from contamination will be further assured by an adequate surface water drainage system with rapid conveyance of surplus water to outlets of sufficient capacity to carry away the runoff. The most logical course for storm runoff from this area is to the north, discharging through Canal 17, to be constructed under the Central and Southern Florida Flood Control Program, into the Earman River.

A small amount of storm drainage will have to be conveyed from areas east and south of Clear Lake through the existing culvert under Ckeecho-bee Road.

Since the lakes are to be water supply reservoirs, it is desirable to provide maximum terminal storage consistent with filling and grading requirements of the area. It is also essential that structures for control and conveyance of fresh water from Loxahatchee Marsh into the lake system be constructed in this program.

In the interest of attracting private capital for financing the development of this land, it is essential to create the greatest area of usable land and develop this land for each specific use at minimum cost.

Detailed Criteria and Plan for Muck Areas

In studying the development of this area, careful consideration was first given to the large amount of muck soil existing therein. The accompanying Plate 11 indicates the principle muck depths and locations. The total quantities of muck in the area are as follows:

0 to 2 ft. depth	1,042,000 cu. yd.
2 to 4 ft. depth	2,962,000 cu. yd.
deeper than 4 ft.	<u>3,341,000 cu. yd.</u>
Total	7,345,000 cu. yd.

If this entire quantity of muck were to be excavated and replaced by sand material, it is fairly evident that the cost of such an operation would be prohibitive, since 14,690,000 cubic yards of material would have to be moved to restore the ground even to present levels. A large portion of the 7,345,000 cubic yards of muck would have to be disposed of off the site. Accordingly, studies were made to reduce muck handling to a minimum quantity consistent with site conditions and land use in the program. After studying the relationship of land use to muck deposits and the cost of removal, the following criteria for foundations on muck were established:

1. Areas occupied by single family dwellings: 3 feet of muck or less on the surface, 2 feet of muck under a 4 foot covering sand fill and 3 feet of muck under a 5 foot sand fill need not be removed and requires no special foundation treatment after settlement of fill. (Sand fill to be made originally higher than the finished grade by 50% of the muck depth.) Muck deeper than 3 feet on the surface must be removed.

2. Areas occupied by multiple-family two story building: 3 feet of muck on the surface need not be removed. Any muck lenses 2 feet or more in thickness from 3 to 10 feet below the surface should be removed or piling foundations used.

3. Areas occupied by commercial buildings, schools and other large structures: 4 feet of muck on the surface need not be removed, since the

Table Number 3

SUMMARY OF QUANTITIES INVOLVED
IN DREDGING AND FILLING OPERATIONS

Westward Expansion Area

	<u>Muck Quantities</u>			<u>Total (Cu.Yds.)</u>
	<u>0-2' thick</u>	<u>2'-4' thick</u>	<u>Over 4' thick</u>	
Total muck in area	1,042,000	2,962,000	3,341,000	7,345,000
Required to be removed and replaced	423,000	1,144,000	1,635,000	3,202,000

Dredging and Filling Quantities

<u>Excavation</u>	<u>Cu.Yds.</u>
Muck removal	3,202,000
Muck overage (sand)	650,000
Material in lakes	11,597,000
Material in ponds	645,000
Material in canals	700,000
	<hr/>
	16,794,000
Less muck shrinkage and loss, 40% to 50%	1,428,000
	<hr/>
Net available excavation	15,366,000
 <u>Fill</u>	
Muck replacement	3,852,000
Levee fill	1,302,000
Land fill	10,212,000
	<hr/>
	15,366,000
 Total Dredging	 16,094,000
Total land excavation	700,000

foundations of these buildings would go that deep in any event. Muck deeper than 4 feet should be removed. It is believed that the cost of constructing pier or piling foundations under commercial type buildings would be less than cost of removal of muck. Local engineers and contractors familiar with construction on muck and sand lands concur with the above criteria.

In preparing the general plan for the area, every opportunity was used to designate muck areas for drainage facilities, parks, playgrounds and school and semi-public areas, thus eliminating the necessity for removal of a large quantity of muck. The final quantities of muck to be removed principally by dredging are:

0 to 2 ft. depth	423,000 cu. yds.
2 to 4 ft. depth	1,144,000 cu. yds.
deeper than 4 ft.	<u>1,635,000 cu. yds.</u>
Total	3,202,000 cu. yds.

The quantity of muck recommended for removal is the minimum which will balance quantities and produce an area meeting drainage criteria and satisfactory for foundations. In those areas where muck is allowed to remain, removal will be necessary in conjunction with excavation of sewer, water and gas line trenches and preparation of pavement sub-grades. Such operations are customary in this area and construction costs of these operations will not be unduly increased.

Much study was given to determining the most inexpensive method of disposing of excavated muck. There is a limited market for muck and muck-sand mixtures for spreading on land, lawns and landscaped areas. However, it is believed that the quantities involved in this project are too large to warrant consideration of these commercial outlets. When muck is redeposited in depths of 3 or 4 feet above ground water line, it dries out, reduces in volume by 40% to 50%, becomes combustible and subject to reduction to ash by burning. Studies have revealed, however, that muck from the dredge discharge may be placed on top of sand areas to a depth (when wet) of 12 inches, and there be allowed to drain, dry out and work itself into the sand soil, thus improving the soil for later grassing or planting. Areas selected for spoiling of muck in this manner will be those areas scheduled for last development and use. A muck cover of 6 inches or less over sand-filled areas or a mixture of sand and muck will produce a desirable soil which may be developed and used as soon as dredge water drains away.

The accompanying table No. 3 shows the quantities of dredging and filling according to type proposed for the Westward Expansion Area. Principal elevations, slopes and dimensions established are:

Top elevations of lake levees - 18.0 ft. above mean sea level
Normal operating level of lake - 14.5 ft. above mean sea level
Limit of bottom dredging - 2.0 ft. below mean sea level.
Freeboard - 3.5 ft.

Lake depth - 16.5 ft.

Crown width of levees - 20 ft.

Slope of levee - (lake side) 1 on 25

Slope of levee - (shore side) As required to meet finished grades

Minimum finished grade - 15.0 ft. above mean sea level

Maximum finished grade for filled ground - 17.5 ft. above mean sea level

Minimum controlled level in ponds and canals - 13.5 ft. above mean sea level

The accompanying Plate 12 graphically shows the amount of muck that will be removed from the major areas, the general locations where it will be deposited and the total quantities of fill required in major sections to assure the necessary elevations.

Equipment Required for Earthwork and Dredging Program

All of the land operations required to be performed during the program can be accomplished with conventional draglines, bulldozers and similar equipment now in extensive use throughout the area. The dredge, because of the nature of the operation, must be special equipment which is not normally available along the coastal area but is of the type frequently used for large scale inland earthmoving projects. The hull is sectional to facilitate dismantling and moving overland for re-erection. The dredge must have a capacity of between 500,000 and 750,000 cubic yards of material per 22 day month pumping against discharge distances from 2,000 to a maximum of 10,000 feet without appreciable loss of efficiency. The discharge line should be 27 inches or larger to permit this quantity to be pumped the required distance. Since it is expected that no rock will be encountered in the dredging operations, sand type cutters may be used. A dredge meeting the above requirements can operate in a 60 foot cut width, dredging to a minimum depth of 9 feet below water level with reduced efficiency and operate with maximum efficiency between a 12 and 20 foot depth. Hull dimensions should not exceed 42 feet beam by 122 feet long.

Dredging and Filling Procedure

The principal operations involved in the dredging and filling program are listed below without reference to the sequence of starting since a number of the operations are overlapping. The time schedule on the dredging operation is covered in a following section of this report.

1. Using land equipment, cut a temporary water feed canal from the northwest corner of the site to the west shore line of Clear Lake, utilizing the approximate ditch alignment of the proposed super-highway. Connect this temporary feed canal to the present feed canal from Loxahatchee Marsh to Lake Mangonia. Block the flow of fresh water into Lake Mangonia.
2. Using land equipment, cut a new water feed canal on the quarter section line of Section 6 extending from the Lake Mangonia shore to the existing feed canal at a point approximately $3/4$ of a mile west of Military Trail. This

canal should have sufficient cross section to deliver ample water for future requirements. Canal will be provided with levees on both sides to protect the water flowing therein from surface contamination, and with temporary structures to permit raising the level of Lake Mangonia to elevation 16.0 feet during dredging operations as outline in 4 below.

3. Using land equipment, dig the main drainage canal throughout the north-south length of the tract through the ponds, digging a pilot canal to permit flotation of the dredge into the ponds and the main section of the canal. Connect this canal with the culvert under 45th Street extended, for removal of surplus storm water during construction and later connection to Canal 17 of the Flood Control District Program. A temporary control structure should be provided in this canal at its nearest point to the shore of Lake Mangonia to create a sump for pumping water from dredging operations back to Lake Mangonia.

4. Erect the dredge in Clear Lake, float it to the inter-connecting channel, commence dredging and provide a temporary levee along the north shore of Clear Lake extending northward on the west side of Lake Mangonia to 45th Street, said levee outlining the area from which muck is to be removed. This temporary levee will retain enough water so that Lake Mangonia can be raised to elevation 16.0 feet during muck dredging operations, thus permitting the 27-inch dredge to remove thin lenses of muck with a minimum overage of sand cutting.

5. Upon completion of the temporary levee and the raising of Lake Mangonia to elevation 16.0 feet, the dredge should proceed to remove the muck east of the interconnecting channel and Lake Mangonia and west of the Seaboard Railroad. This muck will be pumped to Section 7 and 18 in the westerly portion of the development tract in approximately 12-inch layers over the sand. A considerable quantity of muck can be disposed of by spoiling it to a depth of not over one foot on the sand ridge lying between the muck area and Lake Mangonia extending north to 45th Street.

6. Following removal of muck in the eastern area, the dredge should return to Lake Mangonia, replace the volume formerly occupied by muck with sand, fill the area to finished grades and construct the levee along the east shore of Lake Mangonia, thus making available approximately 600 acres for development early in the program. The dredge should then proceed to the west side of Mangonia, pump out the remaining muck adjacent to the shores and extending to the north limit of the tract, disposing of it on the sand areas in the northwest corner of the tract.

7. Following removal of all the muck, the dredge can return to Lake Mangonia. With the lake level lowered to 14½ feet above mean sea level, sand will be pumped from Lake Mangonia to complete the levee and the filling of all lands north and west of Lake Mangonia including the area between the lakes.

8. The dredge can then proceed through the interconnecting channel and complete the dredging of Clear Lake and the filling of lands around the lake

including the Clear Lake levee.

9. The dredge can then cut into the main drainage canal and complete the ponds and the principal canal, following which operation, it may be dismantled and removed from the site.

It should be noted here that a considerable portion of the land fill must be laid out in very thin layers, the fill over most of the western area averaging less than 2 feet thick. It is not essential that the dredging operations level the entire area to exact finished grades, since the final leveling can be accomplished by developers of small individual tracts of land. The fill area resulting from the dredging will be a series of low ridges and shallow valleys so arranged as to permit storm waters to drain into the main canal system. Adequate material will be provided in each portion of the tract of land for later completion of the finished grading when the areas are developed. Stockpiles will be provided at convenient locations to eliminate the need for later hauling of fill material when the land is brought to final grade.

Site Grading

Final site grades for the purpose of this report were established to convey water overland in accordance with the criteria developed for the storm drainage system. Grades were further related to the existing topography and the levels established for lake operation and water control. Lake operating levels were established at $14\frac{1}{2}$ feet above mean sea level, since this elevation is well related to the operation of the present water treatment plant. The top of levee was established at elevation 18.0 feet in order to conform to existing grades of the present water treatment plant site and to minimize the total quantity of fill required. Establishment of these levels creates a freeboard of $3\frac{1}{2}$ feet. This freeboard is adequate for the conditions which will exist. An inquiry concerning the adequacy of freeboard for wind-tide and wave action resulted in the following comments by the Corps of Engineers.

"The maximum wind tide will be along the north-south axis of Lake Mangonia (2.5 mile fetch) and will be 1.6 feet for a wind velocity of 150 miles per hour, with a corresponding lowering of the lake level at the opposite end of the lake. The fetch of two and one-half miles, in view of its proportion to the depth of the lake, will undoubtedly be the limiting factor and wave action will not be serious. The duration of winds along the principal axis should be small enough to dispel any worries of danger from waves with the available levee mass. Erosion may occur but not enough to breach such a massive levee."

It was necessary to establish the lake bottom at 2 feet below mean sea level in order to obtain sufficient fill material to complete the site grading without appreciably encroaching on the existing land area. The two lakes, thus created, will provide terminal storage (at an operating level of $14\frac{1}{2}$ feet above mean sea level) of 4 billion gallons, representing 333 days of water use at the average daily 1950 demand and 160 days water use at the estimated daily average 1975 demand. This is considerably in excess of normal storage requirements for communities of this size.

Minimum finished grade in the fill area is to be 15 feet above mean sea level, and the maximum grade to which filling extends will be $17\frac{1}{2}$ feet above mean sea level, except for the crown of the levees around the lakes which was established at 18 feet above mean sea level.

Storm Water Drainage

The storm drainage system is designed for rapid removal of runoff accumulated within the area. Surplus water originating within the area will be removed to the north through Canal 17 to the Central and Southern Florida Flood Control Project. The only exception is that area south of First Street around the eastern and southern shores of Clear Lake to a point on the west shore approximately in line with Ckeechobee Road. This will drain southward into existing drainage canals leading to the West Palm Beach Canal. Surplus storm water originating in the developed area of the City of West Palm Beach between the Seaboard Railroad and the crest of the coastal ridge will also be handled in the storm drainage system. At the request of the County Engineer of Palm Beach County, surplus waters along Military Trail will be conveyed northward to approximately the south line of Section 6 on both sides of the Trail and will then be removed through the storm drainage system.

The storm drainage system permits water levels to be controlled at a minimum of 13.5 feet above mean sea level throughout most of the area. Control of water will be accomplished by the construction of spillways at proper locations in the canal and pond system. Such controls will prevent over-drainage of the land and will minimize seepage losses from the inlet canal and the two lakes comprising the untreated water storage. Controls are also designed to permit rapid lowering of water levels in the ponds to provide steeper grades for removal of storm water during maximum runoff. This control of the water level will probably be by manual, rather than automatic, means and can be adjusted to the rainy and dry seasons.

The system contains a number of sub-canals providing adequate discharge capacity into the main canal and pond system, resulting in a reduction of the quantity of underground storm drainage pipe and a reduction in the pipe sizes required. The sub-canals will be laid out not only with regard to economy and pipe requirements, but also with the object of obtaining the maximum number of lots within the developed area. Underground pipe will be used in commercial, civic, rental, hotel and motor court areas. In residential areas, a system combining underground pipe and canals with minimum ponding in gutter may be utilized.

Intensity of rainfall was extrapolated from the Yarnall curves developed in Department of Agriculture Miscellaneous Publication No. 204. In view of the fact that the time required for development of the entire area is expected to exceed 25 years, during which time the coefficients of runoff will be increased from 0.15 to 0.45 as construction progresses, it is considered feasible to design the drainage system for a storm of 5-year frequency in subordinate areas. The major canal works are, however, designed for a storm of 25-year frequency, since the expenditure in construction will not be

materially greater than that required for a storm of 5-year frequency. Accordingly, the main canal system will be of adequate size to prevent general flooding of the area or of individual large tracts of land. When the detailed design of the storm drainage system is completed at some time in the future, maximum use should be made of the paved streets for removal of runoff resulting from a 25-year frequency. The detailed design will involve careful analysis of street grades and pavements with full use being made of drop inlets wherever streets cross intersecting canals and at points adjacent to the ponds.

Coefficients of runoff used in design were 90% for imperivous areas, 10% for grassed areas and 15% for undeveloped, open or sandy areas. Runoff coefficients for the residential areas have been computed for the various lot sizes as follows: 50' X 125' lots, 0.54; 75' X 125' lots, 0.46; 100' X 140' lots, 0.45; 100' X 200' lots, 0.24.

The design capacities required in the major drainage canal were based upon reductions in maximum storm intensity made in accordance with the standard time intensity curves for the selected design storm. Allowance was also made for computed concentration times within the system.

Consideration was given in the planning for improved methods of operating lake and marsh levels by constructing new feed channels and control works. The layout finally adopted provides a practical method of providing uninterrupted water supply during dredging and earth moving operations. Water in the lake being dredged will be returned to the lake wherever possible.

The accompanying plates, Numbers 13 and 14, graphically show the application of basic principles of storm water disposal in the Westward Expansion Area, Plate 13 shows the general control elevations proposed for the entire site, the general location and extent of the canals and ponds, and typical cross sections of canals. A sketch of a typical control structure is also shown.

Plate 14 shows the proposed detailed grading and the plan for disposal of storm water in a typical residential neighborhood. This shows the length and size of underground pipe, and culverts, the location of drain inlets and the surface elevations in each block.

Water Supply and Distribution

History and Description of Existing Water System

The first water supply system in the area of the Palm Beaches was constructed in 1893, when the first section of the Royal Poinciana Hotel was build west of the site of the present Breakers Hotel at Palm Beach. During the first season of occupancy of the Royal Poincianna Hotel, the shallow wells proved inadequate as a source of supply, and the water drawn from this well field became highly saline. A new source of water supply was located in Clear Lake, and in 1894, a steam pump with an 8-inch discharge line across

Lake Worth was constructed to supply the hotel. From 1894 to 1909, the area developed slowly, and consumers along the line were supplied with water from this system at a nominal rate. The West Palm Beach Water Company was incorporated in 1909 and immediately took over the operation of this existing water system. The growth of this water system is indicated by the data tabulated below, showing water consumption in millions of gallons per day, number of customers connected and miles of water mains in the system:

<u>Year</u>	<u>Daily Water Consumption (million gals.)</u>	<u>Customer Connections</u>	<u>Miles of Water Main</u>
1920	1.05	2,456	47.47
1930	3.85	6,798	176.92
1940	4.05	7,703	191.47
1950	7.80	12,440	221.21

In view of the unsatisfactory experience with water supply based on shallow wells along the Southeast Coast of Florida, the West Palm Beach Water Company has continued to rely upon a supply of water from surface runoff. A progressively increasing land acquisition program was carried on by the Water Company during the period from 1909 to 1949. This land acquisition was necessary in order that the water sheds of Clear Lake and Lake Mangonia might be protected against contamination. Later, with the rapid growth of population in the area of the Palm Beaches, the acquisition of Loxahatchee Marsh Basin was found to be necessary in order that the system might be expanded to meet the ever increasing demands made upon it.

Since the raw water in this system is obtained from surface catchment areas, the treatment problem is one of color and taste removal without softening. Even in extremely dry periods, the hardness of the finished water rarely exceeds 5 grains per gallon or 80 parts per million and can be classified as a soft water suitable for normal domestic use. The present method of treatment includes aeration, coagulation with alum, chlorination before and after filtration, and stabilization of the filtered water with lime to create a residual alkalinity. The treated water has a color of about 7 parts per million, hardness of $2\frac{1}{2}$ to 3 grains per gallon, is normally non-corrosive and does not create excessive scale formation in pipe lines. The bacterial quality is excellent, the finished water having a coliform index considerably below the minimum requirements of the State Board of Health and the American Public Health Association.

The Water System of the Future for the Palm Beaches

It is the intention of the West Palm Beach Water Company to continue to serve the area of the Palm Beaches with a system based upon surface catchment areas for water supply. The soundness of this decision is emphasized by the relatively trouble-free experience of this system during the last 30 years. During that period, the cities of the lower East Coast of Florida

whose water supply is based upon wells located along the coastal ridge, have had recurring difficulties with gradually falling water tables and increasing contamination by salt water intrusion. Even today, numerous communities along the east coast are combatting the problem of salt water contamination of their water supply. The Central and Southern Florida Flood Control Project promises great benefit in the field of water conservation for all of Central and Southern Florida. The construction of the works under this program will produce important benefits to the water supply for the area of the Palm Beaches. For example, Canal C-18 will deliver water from a considerable area on the sand ridge west of the Seaboard Railroad into the Loxahatchee Marsh Basin. In addition, the construction of Levee 8, followed by the construction of a feeder canal running eastward from Levee 8 and about 4 miles north of Highway 80, can be made to provide a connecting canal from Lake Okeechobee to the Loxahatchee Marsh Basin, through which lake water will flow into the Loxahatchee Marsh Basin when lake stages are high. During periods of low lake stages, it will be necessary to resort to the use of pumps to move water from Lake Okeechobee to the east coast. With these improvements in the water supply for the Palm Beaches, the adequacy of this supply for domestic and industrial purposes appears to be assured for many years to come. Certainly, with a direct connection to the second largest inland lake in the United States, the quantity of water available to the system will meet any demands which may arise in the foreseeable future.

When the improvements proposed under this program are completed, the quality of water delivered to the Palm Beaches will be materially improved, since the better terminal storage in Lake Mangonia and Clear Lake will result in early deposition of sediment and the elimination of a considerable amount of the color now acquired in these lakes. Dredging of these lakes to an average depth of about 16' will likewise eliminate large evaporation and transpiration losses which now occur in the terminal storage reservoirs.

Planned Improvements to the Water System for the Immediate Future

The West Palm Beach Water Company proposes certain extensions and additions to its storage and distribution system in the near future. A one million gallon elevated stand-pipe is proposed to be constructed at a site on 48th Street and Terrace Drive. The extension of large water mains to connect this tank with the existing grid is also proposed. Four ground storage basins, each with a three million gallon capacity, will be located on a tract within the expansion area in the vicinity of 26th Street and the Seaboard Railroad. This ground storage will be provided with high pressure service pumps to deliver water into the distribution system, as well as a low pressure feed line from the existing water treatment plant. A site has been reserved in the layout plan for the installation of future ground storage. Design of the system for the expansion area has taken into consideration these proposed improvements to the storage and distribution system now planned by the Water Company.

Detailed Criteria for Westward Expansion Area

1. Population calculations based on land utilization within the area to be developed, indicate that a total population of 35,000 can be accommodated. This increase in population, if realized within the next 25 or 30 years, is

consistent with population forecasts and economic studies covered elsewhere in this report. Provision should be made in the design of the water system for an additional 5,000 population in those areas to the west and southwest of the area under consideration in this report. The basis for design of the water supply system is thus established at 40,000 persons in 1975 or 1980.

2. Studies of water use from the year 1920 to the present have established the average per capita daily use at 100 gallons exclusive of the sprinkling demand. In the future, per capita water use is not expected to increase materially even though water consuming devices such as automatic dishwashers, garbage disposal units and automatic washing machines are coming into greater use every year. This trend toward increased use of water-consuming household appliances is somewhat offset by the national trend toward smaller families with fewer persons per household.

3. Studies were made of figures on water consumption with relation to rainfall taken from the records of the West Palm Beach Water Company. The arithmetical difference between the daily average for high pumpage months and the daily average for low pumpage months when rainfall was adequate to minimize or eliminate lawn sprinkling, indicates an average sprinkling use of 1.9 million gallons daily for an average population of 36,000. It is reasonable to assume that the sprinkling allowance in the expansion area will be $2\frac{1}{2}$ million gallons daily. Design flows are tabulated below:

40,000 population at 100 gpcd	4,000,000 gpd
Sprinkling allowance	2,250,000 gpd
Average daily demand	6,250,000 gpd
Maximum day, 140% of average day	8,750,000 gpd
Minimum day, 60% of average day	3,750,000 gpd

4. The standard of the National Board of Fire Underwriters indicates that the following fire flow criteria must be utilized:

Residential areas - in single family and low density multiple areas, space hydrants 500' apart, design for 1,000 gallons per minute (500 gallons from each of 2 adjacent hydrants not more than 500' apart).

For $\frac{1}{2}$ acre tracts and areas assigned to large residences with spacious lots - space hydrants 500' apart, design for 500 gallons per minute (250 gallons per minute from each of two adjacent hydrants).

For average and high density multiples and 2-story construction, provide hydrants such that 3 adjacent hydrants can reach each building with not more than 500' of hose, design for 1,500 gallons per minute, (500 gallons per minute from each of the three hydrants).

For school areas and areas containing public buildings - design for 1,500 gallons per minute.

For commercial and industrial areas - provide 4 hydrants at such distance from the commercial area that 4 hoses not exceeding 500' in length can reach each building, design for 2,000 gallons per minute from the 4 hydrants.

For the civic area - design for 3,000 gallons per minute.

The maximum flow for the entire area under simultaneous fire conditions should be designed for 6,000 gallons per minute. Residual pressures for any of the above conditions are to be not less than 20 pounds per square inch in the main at ground level. It can be seen that domestic flows will govern in the design of the distribution grid.

5. Elevated storage of 1,000,000 gallons with a high-water level of 140' above mean sea level, located somewhere near the center of the tract and close to the main shopping center, will provide adequate elevated storage for the next 25 years. This takes into account the additional storage planned by the Water Company described in an earlier paragraph.

6. In order to arrive at the cost estimates shown elsewhere in this report, the steps listed below were followed:

A principal water grid network on the major streets was analyzed by the Cross-Doland method of distributing flows in proportion to the resistance. Calculations were made for various critical conditions, and pipe sizes determined.

Detailed water-main layouts were made for typical neighborhoods and costs were estimated.

These costs on an acreage bases, were applied to other like sections within the area to be developed.

Sewage Collection and Treatment

Existing Sewage Collection and Treatment System

Currently, the large majority of the sewage originating within the Town of Palm Beach and the City of West Palm Beach is disposed of in Lake Worth. Located within the area are a number of septic tanks and an extensive collection and outfall sewer system. None of the wastes are treated by means other than septic tanks, and the effluent from these tanks is discharged into sanitary sewers, storm sewers or sub-surface tile fields. The discharge of septic and untreated wastes into Lake Worth has created sludge banks in the vicinity of sewer outlets which are now extensive in area. These cause unsightly conditions in the lakes and undesirable odors during periods of extremely low tide. As early as 1925, municipal authorities considered the possibility of constructing a comprehensive sewage collection and treatment system for the area of the Palm Beaches. Numerous reports have been

prepared by private engineering firms and by the State Board of Health concerning the pollution situation in Lake Worth and recommending various methods of abatement. However, no definite plan of action has been agreed upon until this year.

Late in 1950, the City of West Palm Beach and the Town of Palm Beach appointed a citizens committee to review past activities in connection with sewage collection and disposal problems and to recommend a program of action. The attorneys of both communities were authorized to prepare a bill for introduction into the 1951 Legislature, permitting the creation of a Sanitary District with authority to levy taxes for preliminary engineering work in connection with a comprehensive sewage collection and disposal plant. The Sanitary District became law during May, 1951. The Act requires that a general election be held in the two communities during January of 1952, with a majority vote required to authorize the formation of the proposed Sanitary District. Until the outcome of this election is known, no further action on this very important problem is foreseen.

Scope of Activities Included in this Report

With a potential increase in the population of West Palm Beach of some 35,000, it is imperative that positive action be taken toward construction of sewage collection, treatment and disposal facilities to serve the future community. It is not within the scope of this report to recommend an overall solution of the major sewage collection and treatment problem. Accordingly, it will be confined to (1) recommending a plan for sewage collection for the entire area which will conform to sound, modern standards and (2) recommending a definite plan to solve the problem of sewage collection and disposal for the immediate future in the Expansion Area now under consideration, so that the early development there may proceed.

The provision of sewage treatment facilities for an area of this size is a community responsibility, and the cost thereof should not burden the developers of the property. No provision has been made, in the estimates contained in this report, to cover the cost of sewage treatment and disposal for the entire area. However, there is presented a means of disposal of wastes originating in the area during early phases of the development program.

Design Criteria - Sewage Collection System

1. It is recommended that the sewage collection and pumping system be designed on the basis of 125 gallons per capita per day with an infiltration allowance of 50,000 gallons per mile of sewer per day.

2. Because of the very flat terrain in the expansion area and the high ground-water conditions which will be maintained throughout this area, it is recommended that the collection system be designed for minimum slopes approved by the Bureau of Sanitary Engineering, Florida State Board of Health. These grades are as follows:

<u>Size (inches)</u>	<u>Extreme Minimum Slope (%)</u>
8	0.30
10	0.22
12	0.18
15	0.14
18	0.11
21	0.096
24	0.08

3. Sewage lift stations should be located at strategic points to minimize depth of cut for intercepting sewers leading to the lift stations. It is recommended that cuts for sanitary sewers be limited to a maximum of 12 feet throughout the area to be developed. Peak capacity factors for design of wet wells and pumps should conform to Southern Florida criteria. Design criteria include a retention time of 5 minutes in wet wells, and peak design for pumping facilities of 3.75 times the average flow should be observed.

4. Past experience throughout the lower East Coast of Florida indicates that the system should be designed to utilize vitrified clay pipe with artificial jointing materials in order to assure a tightly jointed sewage collection system with minimum infiltration and minimum leakage of sewage.

Sewer Facilities Required During Early Stages of Development

In the section of this report outlining the recommended development program, it has been indicated that a small area, suitable for use as a public housing project, could be made available within 90 days after the start of full scale dredging operations and that an area lying between the two lakes and east of Lake Mangonia along the Seaboard Railroad, could be made available within 6 to 9 months. Assuming that the development progresses at the contemplated rate and that housing construction is undertaken as land becomes available, it is essential that sewage collection facilities and a treatment and outfall system be planned and constructed for use within 18 months of the start of dredging, in order that it be available at the time of occupancy of the first units. The initial sewerage program consists of the following:

1. Construction of collection facilities, i.e., service mains and interceptors, within the area proper, at the expense of the developers.

2. A primary treatment plant to be located on the city-owned tract at 25th and the Seaboard tracks just north of the old abattoir and incinerator. The plant should be designed for primary treatment with separate sludge digestion and should be of adequate capacity to accommodate a population of 3,000 persons.

3. An outfall sewer from the treatment plant to convey the treated plant effluent eastward, this would consist of a force main from the plant to the crest of the ridge and a new gravity sewer along 23rd Street to Lake Worth.

Existing sanitary sewers in this area are overloaded at the present time and will not accommodate the additional load imposed by the added population.

The collection system in the vicinity of 36th Street and the Seaboard tracks and contained within the expansion area, can be designed so as to eliminate the present 36th Street lift station, and will, at the same time, permit collection of sewage from the sewers on 25th, 26th, 27th and 28th Streets. These now terminate at the foot of 25th Street with no available outlet. This phase should not be initiated until use of the overall collection and treatment plan is definite.

The primary treatment plant, described in paragraph 2, can be designed so that it may easily be converted into a lift station in the permanent system. Otherwise, the plant may be expanded if it proves economically feasible to have more than one treatment plant in the overall system.

The estimated cost of the treatment plant and the 23rd Street outfall sewer is \$75,000, which cost should be borne by the City of West Palm Beach.

Overall Sewage Collection System

Plate 17 is a layout plan of the entire area showing principal sewers and lift stations. It should be noted that the layout selected provides for conveyance of the major portion of the sewage southward from the area, presuming that a treatment plant will be located somewhere in that general direction. Should detailed analysis in connection with the overall plan indicate that a location other than this is desirable, the collection system for a large part of the area could easily be redesigned providing for conveyance in another direction. This redesigning would involve the re-sizing of some trunk sewers, but the overall cost of the system would not be changed. Plate 17 also shows the collection system, the treatment plant and the outfall line recommended for early construction to permit use of the area within the time schedule outlined in the program.

Plate 18 shows the suggested detailed designs of collectors and lateral sanitary sewers for a typical neighborhood.

Electric Power and Distribution, Telephone and Gas Service

During the development of the overall plan, conferences were held with officials and engineers of the principal public utility companies now serving the area of the Palm Beaches. Each utility group was given a layout plan for study and was asked to comment concerning its ability to serve the Westward Expansion Area as shown on the plan. The following is a summary of the policies and plans of the various utilities for services to the expansion area.

Electric Power and Distribution

The Florida Power and Light Company advised that its policy, with respect to extension of service to future customers in an area of this magnitude, is to provide service as rapidly as is possible and to connect with new customers as the demand for service increases. This company further advised that the expense of electric distribution lines, sub-stations, transformers and other facilities including overhead street lighting, is borne by the Florida Power and Light Company in return for the revenue derived from the system. They indicated that no difficulty is anticipated in serving the area immediately west of the Seaboard Railway from facilities now existing in West Palm Beach. They recommend that the development program be undertaken progressively starting at the Seaboard right-of-way and progressing first westward, then to the northwest and southwest, as the growth of the community requires additional land area. The Power Company expressed some concern with regard to the availability of materials if the program should materialize during the present national emergency.

Telephone Service

The Southern Bell Telephone Company policy is to provide additional telephone service where needed, as rapidly as can be accomplished by them, subject to the availability of materials. They foresee no unusual difficulties in providing the necessary telephone service for the entire area throughout the life of the development project. They further foresee no difficulties other than those of allocation of critical materials in supplying telephone service for the immediate program. Joint use of poles, wherever practicable, by the electric company and the telephone company would be expected.

Gas Service

The Florida Public Utilities Company, distributor of manufactured gas in the area of the Palm Beaches, states that it is well equipped to provide service for the entire Westward Expansion Area. Its facilities can be extended as the project brings additional areas into development for sub-division purposes. Existing gas mains running north and south near the Seaboard Railroad right-of-way will facilitate rapid connection for those housing units developed during the early stages of the project.

The problems involving electric, gas and telephone service will undoubtedly be met by the respective utility companies when the need for this service arises. No unusual difficulties in providing utilities to serve adequately in the Westward Expansion Area are now foreseen. Since the facilities will be provided by the respective companies, no general plans, showing their location and extent, have been prepared. It has been previously indicated, however, that nearly all wires, except those placed underground, would be placed in easements along the rear of lots. Gas mains will normally be placed in the streets, where the right-of-way is entirely adequate to accommodate them.

Street Paving

Cross Sections

In any modern city, streets are among the most important facilities, and it is essential that they be properly designed and constructed to serve their purpose - that of furnishing trafficways for the circulation of people, goods and services. Within the expansion area, several different types of streets will be required, each to serve a particular purpose. Plate 19 shows proposed cross sections of the several types of streets, the treatment of which is related to the volume and types of traffic that should use them.

In keeping with the development standards established for this new area, each major street should be improved with an eight inch base, two-course asphaltic concrete surfacing, and a concrete curb and gutter. The wide local streets (secondary major streets) and the minor streets will carry lighter traffic and the surfacing can be placed on a six inch base. About one-third of the wide local streets and all of the minor streets can be improved with a "doubleseal" surface treatment instead of asphaltic concrete surfacing. Street gradients will be comparatively flat; hence, special attention must be paid to the design and construction of curb and gutter in order to provide maximum storm drainage capacity. Rolled curbs are proposed to eliminate the need for cutting of curbs when private driveways are constructed. A pavement width of 26 feet is entirely adequate to accommodate vehicular movement and parking along minor streets. Furthermore, it will discourage through movement and result in substantial economies.

During the initial stages of the development, the boulevards and the wide north-south major street between Lake Mangonia and the Seaboard should be improved to the full standard widths. In the interest of economy, however, other arterial streets can be paved to a width of 40 feet initially, and pavements can later be extended to their full widths as the area develops and traffic conditions warrant this widening. Wide local streets and minor streets should be fully improved as the various neighborhoods are developed.

Sidewalks should be provided along all streets, except where the streets bound the large parks or the golf course. Boulevard sections include an eight-foot sidewalk along each side. Elsewhere a four foot width should be sufficient except in the commercial districts. Wider walks will be required there, but in some cases they may be within the commercial development rather than along the bordering streets.

Street Connection to West Palm Beach

Plate 20 shows the suggested treatment of the two important east-west connections between the Westward Expansion Area and the Palm Beaches.

The 7th Street-Flagler Bridge connection would follow Loftin Street westward from the Flagler Bridge to North Poinsetta. In order to provide adequate pavement widths and minimize traffic congestion at North Poinsetta,

Loftin Street should be widened near North Poinsettia and the existing FEC house track removed along the north side of Loftin Street. The intersection at Loftin and North Poinsettia should be channelized. Probably traffic light control will also be necessary. West of North Poinsettia, traffic would be carried over the Florida East Coast wye track as well as the main line and several sidings. The viaduct structure should provide for three traffic lanes and a sidewalk in each direction. West of the FEC the viaduct would carry traffic over Rosemary Avenue, thus leaving this important industrial street open for north and south movements of traffic. The overhead structure would end between Henrietta and Sapodilla Avenues. Henrietta Avenue would be closed between 7th and 8th Streets.

Westward from the end of the viaduct, an alignment midway between 7th and 8th Streets would be followed. Existing buildings between 7th and 8th would be removed. The boulevard type street shown on Plate 19 would be adapted to this location to provide a trafficway through this area in keeping with the high standard followed eastward from the superhighway through the Westward Expansion Area. Seventh Street and Eighth Street would be retained for local traffic circulation. Sapodilla and Douglas Streets would afford access to the boulevard. Division Street would not cross the boulevard but would end at 7th Street on the south and 8th Street on the north.

There would be a grade separation structure carrying the boulevard roadways over Tamarind Avenue and the Seaboard Airline Railway. This structure would be of the same design as the viaduct over the Florida East Coast Railroad.

Also shown on Plate 20 is the proposed structure to carry 15th Street over the Seaboard Airline Railway. This viaduct would have two traffic lanes and a sidewalk in each direction. To avoid encroaching on the Roosevelt School grounds, it will be necessary to widen 15th Street on the south side, between Tamarind Avenue and the Seaboard Airline Railway.

Where the 7th Street and 15th Street boulevards cross the relocated fresh water and between Clear Lake and Lake Mangonia, it will be necessary to elevate the roadways to about elevation 22.0 to provide sufficient clearance under the bridges for the operation of canal maintenance equipment.

Improvement of Schools, Parks and Public Areas

The proposed plan for the development of the Westward Expansion Area makes adequate provisions for a modern system of schools, parks and public areas. These sites and tracts should be improved to a high standard, as they are needed to serve residential development. The appropriate public agencies, rather than the developers of the Westward Expansion Area, should be responsible for the actual improvement of these public areas. For example, the City of West Palm Beach should be responsible for proper development of all public parks, playgrounds and recreational areas proposed in the project. Whether the city should pay for the vacant land when it takes title to these sites is a matter that can be decided at a later date, but it is not an unusual practice for developers to dedicate a park site to the proper public

agency, in this instance, the City of West Palm Beach. The increased value of the residential property around a well developed and maintained park and playground area more than offsets the cost of the vacant land that is dedicated to the city.

The important requirement in the development of both the parks and the schoolgrounds is that a careful plan first be prepared for each site. Then development can be gradually carried out as demand warrants. The preparation of detailed improvement plans is particularly essential for the large recreation areas along the northern shore of Clear Lake.

The Palm Beach County School Board should be responsible for construction of the necessary public schools and improvement of the school sites. However, since the school sites serve both as school and park grounds, the School Board and the City of West Palm Beach should share in financing the improvement of these recreational facilities. Whether the School Board will pay the developers for the land needed for school projects, can also be determined at a later date, but it is a normal practice for school boards to pay for the school property.

It is not practical at this time to determine definitely whether the golf course should be developed as a public course or a private club. However, the acquisition and improvement of this areas as a private, rather than as a public, golf course should be encouraged, but with the understanding that it would be available for tourist use during the winter season.

The semi-public areas such as church sites would logically be improved by their respective owners, and it is only logical that the land within these sites should be purchased from the developer.

Landscaping

Extensive plantings of trees, shrubs and lawns should be provided throughout the project, especially since the Palm Beach area is conducive to the rapid growth of many attractive tropical varieties of plant life. The landscaping of the public areas is the responsibility of the appropriate public agency, but the developers and private citizens should demand a high standard of landscape treatment in these areas. It has also been recommended that the West Palm Beach Water Company be responsible for the planting and maintenance of the narrow strips around Lake Mangonia and Clear Lake. This treatment alone will have an important influence upon the appearance of the entire project.

It is proposed that the developers plant street trees and shrubs along all of the streets in the Westward Expansion Area. The cost estimates for the entire project have included an adequate amount for this purpose. Once the trees are planted, however, their protection and maintenance should be the responsibility of the city. The proposed location of electric and telephone wires, along the rear of the lots and underground in the more intensively developed areas of the project, will result in a minimum of interference with the street trees.

The major business district and neighborhood shopping centers should also be attractively landscaped. In this warm climate, particularly during the summer months, trees and palms in the parking lots will afford needed shade and provide a very attractive appearance. The landscaping of these areas should be the responsibility of the developers of the centers. It is very desirable that each shopping center be developed as a coordinated unit and that the stores and shops be leased, rather than sold to individual owners. In this way, the developer of the project can maintain a high standard of planting and of proper maintenance and replacement.

The grounds of individual homes should also be well planted and landscaped but this should be the responsibility of the home owners, rather than the developer. Active neighborhood associations can be particularly useful in assuring that the homes in individual neighborhoods will be attractively planted and maintained.

Interrelationship of the Westward Expansion Area and

Construction Programs of the Federal, State and Local Governments

In the average American city, one would expect a development of this size and character to involve only the normal problems of extending streets and other public areas and utility services in accordance with the plans and accommodations heretofore described. However, the future growth and character of the project area will be vitally affected by improvement programs of other governmental agencies. Among the more important of these are: First, the area is located within the Central and Southern Florida Flood Control District and is directly effected by at least three major projects contemplated by that agency. Second, the area will be traversed from north to south by the proposed express or superhighway which will be of major importance to it as well as to the entire Palm Beach area. This is the responsibility of the State and Federal Highway Agencies. Finally, a new local district is necessary to provide for the collection and treatment of sanitary sewage.

The Central and Southern Florida Flood Control Projects include the construction of two new canals which directly affect this development. One of these, designated C-17, will serve as the improved drainage outlet for Lake Mangonia and will receive all storm runoff from the area to be developed under this program. Without Canal C-17, Lake Mangonia will have no adequate outlet for high stage regulation. Without Canal C-17, the storm drainage system required for this development will not function properly.

The other new canal, C-18, will provide for diversion of surplus water from the east slope of the sand ridge west of Loxahatchee Marsh Basin into that basin. The effect of this canal on the West Palm Beach Water Company's system will be equivalent to adding many square miles to the tributary drainage area. This increase in quantity of water available to the system must be made at the same time that the westward development is getting underway. Only in this manner can the loss of 3,700 acres tributary to Clear Lake and Lake Mangonia be offset to assure the adequacy of the water supply for the Palm Beaches during construction and for the immediate future.

The Central and Southern Florida Flood Control Project also includes a long levee, designated L-8, extending from the east shore of Lake Okeechobee generally southeastward to 20 Mile Bend on the West Palm Beach Canal. This levee and its accompanying borrow canal will divert flood waters from Hungryland Slough southward into the Palm Beach County Conservation area. When L-8 levee and canal are complete, it will be possible to divert water from Lake Okeechobee to 20 Mile Bend on the West Palm Beach Canal. By the construction of an east-west canal about 4 miles north of State Highway 80, the L-8 canal can be connected to the Loxahatchee Marsh Basin thus creating a means of delivering water from Lake Okeechobee into the Marsh Basin for use in augmenting the supply already available to the water system serving the area of the Palm Beaches.

The road construction problems involve coordination with Palm Beach County, the State Road Department and the Public Roads Administration. Not only must the superhighway be constructed on an alignment provided by the County and approved by other interested agencies, but adequate traffic interchange facilities must also be included in the plan of development in order that direct access to the superhighway will be made available to the residents of the entire area. Further, the more important connecting highways between the expressway and existing urban development should be financed by the three agencies and should be constructed at an early date.

The need for coordinated community action in providing an adequate system for collecting and treating sanitary sewage in both the existing urban development and the project area was discussed in this section. The existence of all of these interrelated problems serves to further emphasize the need for continuing the guidance furnished by the Committee of Engineers representing Palm Beach County, the Town of Palm Beach, the City of West Palm Beach, the Central and Southern Florida Flood Control District, and the West Palm Beach Water Company. This Committee should continue to function in an advisory capacity throughout the life of this development program for the necessary coordination can best be achieved only through such an agency.

COST ESTIMATES AND PROPOSED PROGRAM

Cost Estimates

Estimates of cost for a project of this magnitude must be considered as preliminary only. While the unit prices have been carefully assembled from a number of independent and reliable sources and represent the best current data, the actual unit prices pertaining during different stages of the development may vary considerably. Every effort was made, however, to assure that the overall total costs as tabulated herein would be conservative and reasonable. While the type of design was selected that would assure maximum economies, there was no lowering of desirable modern standards.

The indicated construction cost for developing the Westward Expansion Area to the point where the area will be ready for the construction of homes, commercial buildings, schools, public and semi-public structures, etc.; is \$13,275,000, divided as follows:

Dredging and earthwork	\$ 2,115,000
Storm drainage system & structures	970,000
Water Distribution system within neighborhood areas	983,000
Sanitary sewers & lift stations	1,678,000
Street lighting	112,000
Street paving, curbing & walks	4,980,000
Bridges	505,000
Landscaping	182,000
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Sub Total	\$11,525,000
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Contingencies & engineering	1,750,000
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Total	\$13,275,000

The above estimates do not include the cost of the land within the Westward Expansion Area. The area to be developed contains a total of 5,300 acres of which 1,190.43 acres are in the lakes, ponds and canals. Of this amount, the West Palm Beach Water Company and the City of West Palm Beach own or control 5,003 acres. The balance is held under various ownerships. In order to provide the necessary streets, drainage facilities, sewerage collection system and other utility services, properties not now owned or controlled by the sponsors should be acquired or definite agreements obtained from the owners to assure complete and unified development.

The development of the area will provide increased and well protected water storage facilities for the West Palm Beach Water Company. This will also be of great benefit to the City of West Palm Beach, the Town of Palm

Beach and any other communities served by the Water Company. The development of the area will also benefit the City of West Palm Beach through increased tax revenues derived from the improved areas and in helping to solve some of its current problems.

Because of these many benefits, the lands currently owned by the city and the Water Company could be made available to the developers at a low price or at no cost whatsoever. The present assessed valuation of the Water Company's holdings is \$82,362.

Following are brief comments on each of the items in the preceding list of construction costs.

Dredging and Earthwork includes the movement of 16,144,000 cubic yards of material by dredging and 700,000 cubic yards by land equipment. The quantities of muck and sand are shown in Table 3. The dredging and earthwork program is shown graphically on Plate 12. The proposed sequence of operation is discussed earlier in this report. Costs are based on average current prices of twelve cents per cubic yard for dredging and twenty-five cents per cubic yard for land excavation.

Storm Drainage includes all underground pipe drains, inlets and catch basins, pipe culverts and the necessary structures along canals for control of the water levels in the canal system. Bridges carrying streets across the canals are included elsewhere in the estimate. Maximum advantage is taken of curb and gutter capacities for carrying storm water flows. Pipe culverts are used to carry many of the smaller canals under the streets.

Water Distribution System within Neighborhood Areas. This item includes only the local service mains within the neighborhood areas. While this item is shown as a development charge, it is expected that the Water Company will refund all or portions of this cost as development occurs and the Water Company receives revenue therefrom.

It is contemplated that the West Palm Beach Water Company will provide the major water distribution system as shown on Plate 15. This would include all mains larger than 6-inch diameter, the elevated storage tank to be located in the vicinity of the major shopping center in the Westward Expansion Area and all fire hydrants irrespective of their location. The cost of these items to the Water Company is estimated at \$1,002,000. An additional cost to the Water Company would be the ground storage in the vicinity of 26th Street and the Seaboard, and larger water main extensions east of the Seaboard Railway.

Sanitary Sewers and Lift Stations. This estimate includes the sanitary sewage collection system within the Westward Expansion Area and the necessary lift stations. The estimate does not include the cost of the sewage treatment plant proposed just north of 23rd Street nor the proposed outfall sewer to the east. This small treatment plant and the outfall should be constructed by the City of West Palm Beach. The estimated cost would be approximately \$75,000.

Street Lighting. This includes only the cost to the developers for the installation of underground lighting service cable and lighting standards along the major streets, and within the rental area, civic center and the major commercial area. All other street lighting would be an overhead system and the utility would install this at no cost to the developers.

Street Paving, Curbing and Walks. This estimate includes paving, curb and gutter, and sidewalks on all minor and wide local streets; the north-south arterial street between Lake Mangonia and the Seaboard Railway; the initial paving to a width of 40 feet on other arterials; and the full improvement of the boulevard streets, except the boulevard extended between the superhighway and 7th Street in West Palm Beach. The improvement of this important street should be the responsibility of public agencies including the state and federal governments. Likewise, the cost of grade separation structures over the superhighway and the Seaboard Railway is not included.

Bridges. This item includes the estimated costs of the bridges necessary to carry streets across the water supply and storm drainage canals.

Landscaping includes street trees and planting along all streets within the Westward Expansion Area.

Since the Westward Expansion Area contains 4,109 acres of land, the preceding estimates indicate a development cost of \$3,230 per gross acre and \$6,220 per acre of land which is to be used for private and semi-public development. However, in a project of this magnitude, per acre development costs can be somewhat misleading since there will be many different uses of the land after its improvement.

Under present market conditions, fully improved commercial property would have a minimum sale value of \$10,000 per acre; hotel sites, \$7,500 per acre; industrial and semi-public tracts, \$3,500 to \$4,000 per acre; motel and trailer locations should average \$5,000 per acre, and the golf course tract probably \$1,000 per acre. The total revenue from sales of these properties would be approximately \$2,263,000, leaving a net development cost of some \$11,012,000, chargeable to residential areas.

Under existing market conditions, sections to be used for multi-family residential purposes should have a minimum sale value of \$6,000 per acre or a total value of \$2,748,000, leaving a development cost of \$8,264,000 for the single-family areas. The plan provides approximately 7,365 lots for single-family use and thus the estimated development cost would be \$1,120 per lot. There will naturally be considerable variation in the prices of the single-family lots depending upon size and location. This data reveals, however, that the project is financially sound and, even with the additional items of carrying and sales charges and profit, the lots should successfully compete with existing development.

Recommended Program of Improvements

The preceeding section revealed that the estimated improvement costs within the area would provide reasonably priced lots and land which would be served by a high, modern standard of urban improvements and utilities. Consequently, it is reasonable to assume that the project will attract adequate capital to assure that it will be carried out over a long period. It is further assumed that canals C-17 and C-18 will be under construction by the time that most of the land is available for urban development since these projects have been recommended by the Central and Southern Florida Flood Control District. The following program is recommended as the order in which the improvements should be prosecuted:

Step 1

As soon as the temporary water feed canal is in operation and the retaining levee around the muck areas completed, dredging of muck should be started in the area between the two lakes, from the Seaboard Railroad westward, and between Lake Mangonia and the railroad. When this muck is removed, the dredge should replace it with enough sand to provide for the proposed final elevations over this entire area. It is estimated that between five and six months of dredging will be required to make this tract, containing 497 acres, available for urban development. However, in the early part of this operation, the muck can be removed over a 20 to 30 acre tract immediately west of the railroad, and south of 15th Street extended, and sand from the ridge lying immediately west of this small tract can be used to replace this muck. Thus, within 90 days after dredging has started, this small but adequate area will be available for the construction of a housing project.

Step 2

When the dredge is operating in the area northwest of Clear Lake, begin construction of sewers, storm water drains, street paving and other facilities and utilities in the area that was dredged and filled in Step 1. These improvements should move westward from the railroad and thus permit a logical extension of the existing facilities. One of the early improvements in this phase will be the construction of the sanitary sewer from the initial housing project northward to an Imhoff tank to be east of the Seaboard Railway just north of 23rd Street. The storm water drains can be temporarily discharged into the area west of the connecting canal between the two lakes.

This 497 acre area contains residential sections that will be occupied by both races. It contains 249 single-family lots for white occupancy, 352 single-family lots for colored occupancy, and a net area of 154.2 acres for colored multiple dwellings. At a density of twelve dwelling units per acre, this multiple dwelling area would accommodate 1,850 families.

Step 3

As soon as sand fill can be placed along the right-of-way, the main highway should be constructed between 7th Street and Okeechobee Road at Congress. This should be done even if the express highway has not been completed through

the project. It would provide a needed and important entry to the city and also give access to the airport. Since it will become the main access road between the expressway and the Palm Beaches, this construction should be financed by the State and Federal highway funds. It should be possible to initiate this construction within one year after dredging operations begin.

Step 4

The area should then continue to be filled with sand and the ultimate dredging of the two lakes completed. This will make areas available for the installation of surface and sub-surface improvements and utilities at the rate of approximately 400 acres per month. The location and speed of extending these improvements will depend solely upon the demands of the local markets, but two major factors should be consistently adhered to. One is that the improvements be extended progressively outward, rather than to jump large intervening open areas, in order to secure maximum economies. The other is that the improvements should be extended by stages, through neighborhoods that will give a maximum variety in types of residential developments.

Step 5

The final phase of the improvement is to remove the material from the canals and ponds and to equip the canals with the necessary control facilities. The entire remaining area can then be developed as demand and conditions warrant. Under normal conditions, probably 25 to 30 years will elapse before the entire Westward Expansion Area is completely developed and occupied.