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Report Number 1133

Improved Food Distribution Facilities for Northeastern New Jersey

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This study was conducted under the general supervision of Kenneth H. Brasfield, Leader, Food Distribution Facilities Group, Market Research and Development Division, Agricultural Marketing Service (MRD, AMS), (now retired). Larz F. Kremer, Visual Information Specialist, MRD, AMS, prepared the illustrations.

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Summary

This study was initiated in the spring of 1975 at the request of the Governor's Interdepartmental Committee on a New Jersey Food Distribution Center to determine the requirements for planning improved distribution facilities for food wholesalers, processors, and distributors in northeastern New Jersey.

The 8-county study area included a total of 1,600 firms in Passaic, Bergen, Morris, Essex, Hudson, Union, Somerset, and Middlesex Counties of New Jersey. Only those firms which were principally wholesale operations were included in the study.

A total of 643 wholesale firms in 12 food commodity groups had one or more warehouse facilities in northeastern New Jersey. These firms consisted of both independents and chains.

Independent wholesalers are defined as firms that have warehousing facilities and sell directly to outlets that they do not own or control. Chains are defined as firms that have warehousing facilities to sell to 11 or more stores that they own or control. For purposes of this report, cooperative wholesalers (individual firms that have contractual ownership relationship between their warehouse and retail outlets) are included under chains.

The products handled by the firms and the number of firms handling each type of product are as follows: meat and related products, 141; groceries, 99 (includes 14 chainstore warehouses); bakery products, 77; fresh fruits and vegetables, 69; candy and confectionery, 64; other foods, 58; manufactured dairy products, 52; beverages, 22; frozen foods, 20; shell eggs, 16; fish and shellfish, 14; and poultry, 11.

The total volume of food handled by the 643 firms in 1974 was more than 11 million tons, with a total estimated wholesale value of $6.5 billion. About 84 percent of the total volume of direct receipts arrived by truck, 14 percent by rail, and 2 percent by boat and air. The major receivers of rail shipments were bakery, fresh fruit and vegetable, and grocery firms.

The study of all present facilities indicate that 176 of the 643 wholesale food firms need new facilities now to improve operations and remain competitive. Although most firms have adequate facilities, they eventually will need new ones. Based on trends of the recent past, the volume of food to be handled by northeastern New Jersey wholesalers needing new facilities will increase by over 71 percent in the next 30 years. Improved facilities will be needed if such an increase in volume is to be handled efficiently.

A master plan has been prepared that provides the types and number of food distribution facilities needed by the food industry now and in the forseeable future.

The total annual volume of food products to be handled initially is estimated at 1.4 million tons. This annual volume may increase to about 2.4 million tons in the next 30 years.

Total floorspace of the 74 initial buildings in the master plan is about 3 million square feet. This space should increase to about 5 million square feet in the next 30 years.

A site of about 400 acres would be required to provide the appropriate facilities and space for the 176 firms included in the master plan.

Many sites in northeastern New Jersey may be acceptable for the proposed food distribution center. For purposes of illustration, therefore, eight were selected as being representative of others in the area. The total investment costs for land and facilities ranged from $130.7 to $164 million depending on the site selected.

Based on the representative sites, the annual revenue required to amortize the cost of the proposed center, including operating costs, would range from $14.7 million to $28.5 million, depending upon whether private or public financing is used.

Implementation of the proposed wholesale food distribution center would provide the opportunity to solve many of the problems in present wholesale food marketing facilities. Problems such as the lack of expansion space, traffic congestion, inadequate parking, and poor accessibility to transportation arteries would not exist in the new center. In addition, a new food center would help wholesalers, processors, and distributors comply with regulations concerning sanitation, quality standards, safety, and the environment--all of which are of vital concern to the region.

The Governor's Interdepartmental Committee on a New Jersey Food Distribution Center, the New Jersey Food Council, along with food industry representatives, requested assistance in 1975 from the Science and Education Administration, U.S. Department of Agriculture (USDA) in determining the requirements for planning improved distribution facilities for food wholesalers, processors, and distributors in northeastern New Jersey. This request was prompted by a general concern for encouraging the modernization of the New Jersey wholesale food industry. In March 1979, responsibility for this research was transferred to the Agricultural Marketing Service, USDA.

This study of the New Jersey wholesale food industry covers the northeastern counties of Passaic, Bergen, Morris, Essex, Hudson, Union, Somerset, and Middlesex (see fig. 1). Eleven types of food firms are included in the study: fresh fruits and vegetables, meat and related products, groceries, manufactured dairy products, poultry and eggs, frozen foods, fish and shellfish, bakery products, beverages, candy and confectionery, and a general category--other foods. In appropriate portions of the report, chain stores are examined separately from independent grocery firms.

The objectives of this study were to:

(1) describe present facilities used for food wholesaling and processing;

(2) analyze the present pattern of food movement into, through, and out of the study area;

(3) examine certain aspects of the economic impact of the food industry on northeastern New Jersey;

(4) identify facilities needing replacement;

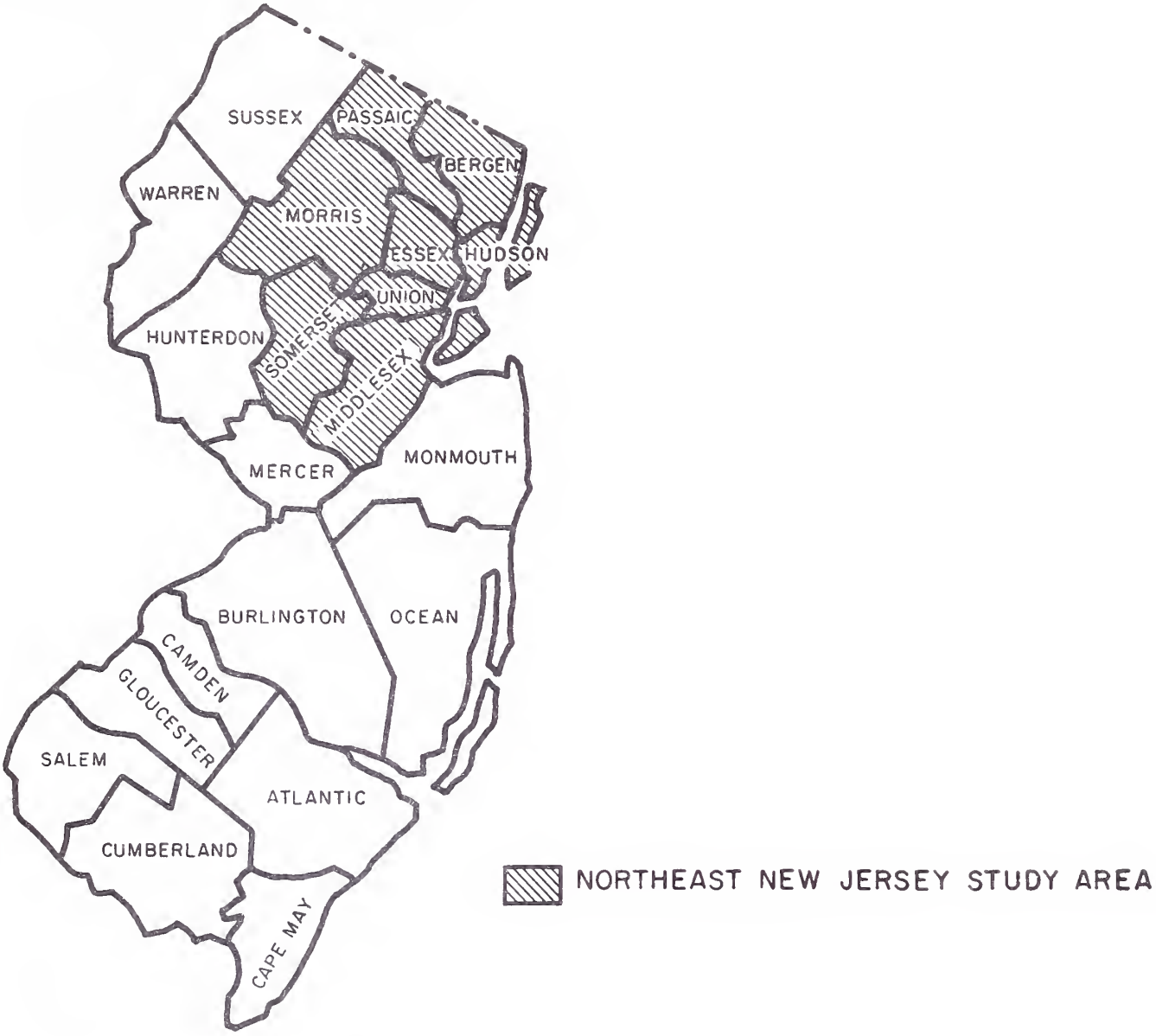
(5) develop recommendations for the types and kinds of new facilities needed as part of a program to modernize the New Jersey food industry;

(6) estimate costs associated with the new facilities; and

(7) outline benefits from modernizing appropriate portions of the food industry through construction of a new food distribution center for northeastern New Jersey.

Much of the information in this report is based on material provided by over 600 firms located in the study area. Additional data and support material were obtained from the New Jersey Department of Agriculture, New Jersey Department of Labor and Industry, New Jersey Department of Transportation, New Jersey Department of Consumer Affairs, the Treasury Department of New Jersey, and officials of city and county governments in the study area.

Figure 1.--Wholesale food study area, northeastern New Jersey.



Existing Facilities

Existing wholesale facilities in the study area are both concentrated into organized markets and located on scattered individual sites throughout northeastern New Jersey. Most of the 629 independent wholesalers and 14 food chains conducting business in the study area maintain separate facilities; however, organized markets still play a significant role in the marketing of some food commodities.

Organized Markets

There are three major concentrations of independent wholesalers in the northeastern New Jersey area: the Newark Farmers' Market, the Miller Street Market, and the Paterson Farmers' Market. Other less important concentrations are represented by the Orange Street area in Newark where several meat wholesalers are located, an old market area in Jersey City-Hoboken, and a concentration of frozen food wholesalers in Secaucus. About 70 percent of the independent wholesale fruit and vegetable volume moves through these three markets.

Newark Farmers' Market Area

The Newark Farmers' Market area is bounded by Lister Avenue to the north; the railroad tracks that bound the property south of Euclid Avenue; Lockwood Street to the east; and the railroad tracks that bound the property west of Cornelia Street (fig. 2), with a few firms on the fringe of this area. This market is the major independent wholesale market in the eight-county area of northeastern New Jersey. However, only two firms have direct rail connections to their individual facilities so that all incoming rail shipments are unloaded at team track or railroad yards away from the warehouse, then either moved to the warehouse for distribution or delivered directly to the customer. The Newark Farmers' Market is adjacent to Raymond Boulevard, a major thoroughfare to Newark with access to the New Jersey Turnpike, Route 1, and other highways. It has been at this location since the late 1920's.

Within the Newark Farmers' Market area there are 27 food facilities used as the major place of business by wholesale firms. One poultry firm operating in the market conducts live slaughtering, a type of processing function outside the scope of the study. Nineteen facilities were used by fresh fruit and vegetable firms, utilizing over 116,000 square feet of floorspace; six grocery firms utilizing about 30,000 square feet of floorspace; and one dairy and one meat firm utilizing 27,000 square feet of floorspace. Most firms maintain offices in their wholesale buildings.

Average floorspace requirements differed by type of firm. The fruit and vegetable buildings differed in size but use an average of 6,100 square feet of space each. The grocery facilities average about 5,000 square feet in size. The remaining firms maintain facilities averaging about 13,500 square feet.

The two major access streets to the market are Chapel Street on the west and Lockwood Street on the east. Albert Street is the major street through the market connecting Chapel and Lockwood. The backs of most of the original produce facilities face Joseph, Euclid, or Cornelia Streets, and do not have rear entrances or loading platforms. Floors are at street level. Since they were not designed for the efficient handling of food products, the stores are rows of structures fronting on narrow streets and the farmers' sheds in the center of the "U" shaped market (see fig. 2).

Some of the buildings are not equipped with refrigeration. Almost all the buildings in the original market are one story. Buildings being used by fresh fruit and vegetable dealers and other types of wholesalers were not designed or built for accommodating large over-the-road trucks. These dealers simply "make do" with facilities not designed for the efficient distribution of food products.

Most of the fruit and vegetable stores are located between Cornelia and Joseph Streets and other cross streets between Lister and Euclid Avenues. The area included in the Newark Farmers' Market has a combined total of almost 27 acres, including street area.

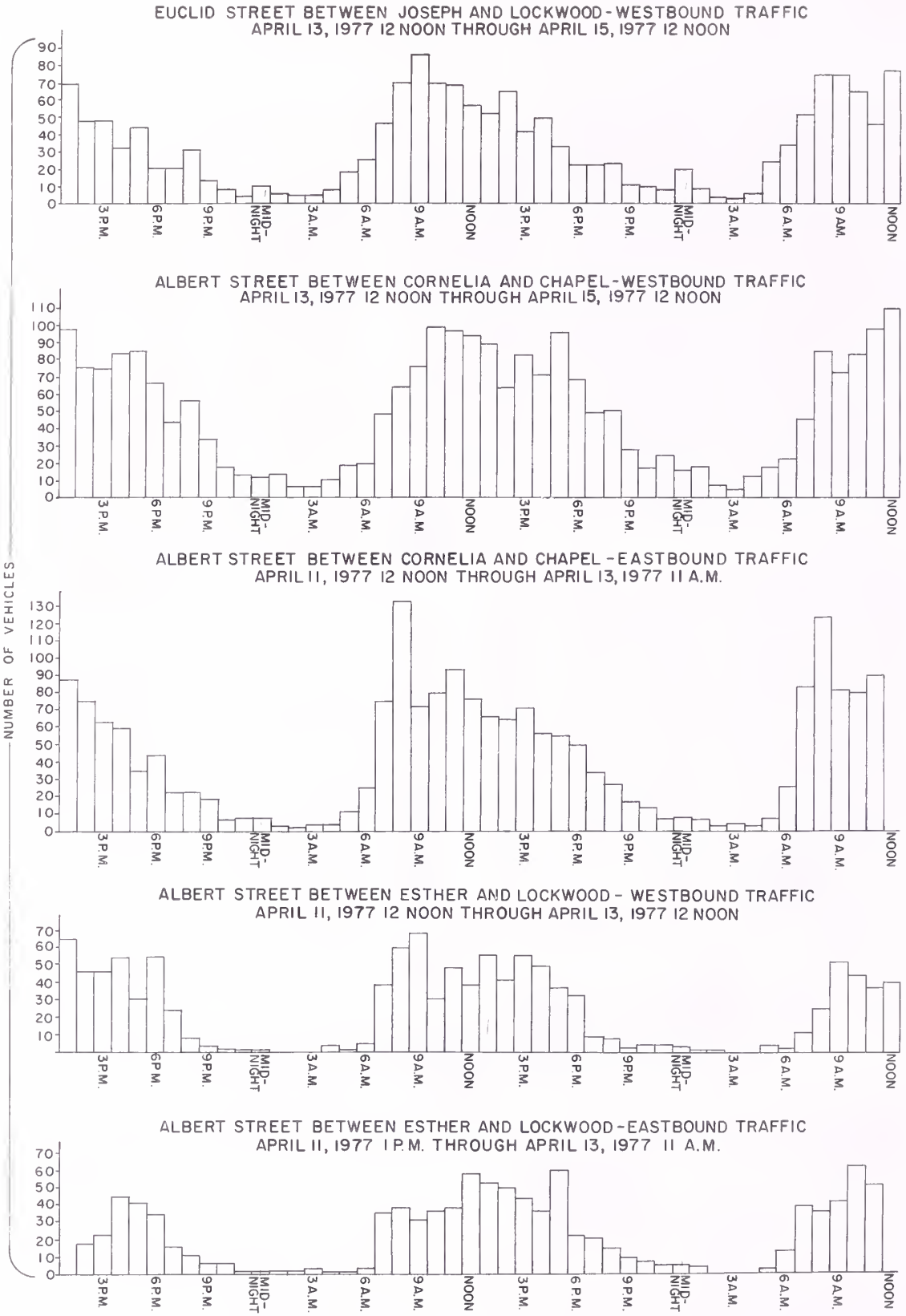
Of the total area, 16 percent is utilized by fresh fruit and vegetable firms; 5 percent by grocery firms; 2 percent by dairy firms; 1.2 percent by meat firms; 1 percent by poultry firms; 8 percent residential; 21.4 percent parking, vacant lots or buildings; 0.4 percent by restaurants; and 45 percent by nonfood-related businesses (see fig. 2).

The Newark Farmers' Market area encompasses the largest number of independent wholesalers in the city of Newark. Raymond Boulevard, which runs parallel to the market, is a major access street.

Due to the nature of the activities in the Newark Farmers' Market, efficient traffic flow is often a major concern. Figure 3 illustrates typical traffic flow through the immediate market area. Traffic between midnight and 6 a.m. was the lightest recorded; the lowest counts were around 3 a.m. The highest traffic counts recorded were at 8 and 9 a.m., reflecting the peak of the morning rush hour. The number of

Figure 2.--Land-use map of the Newark Farmers' Market area.

Figure 3.--Newark Farmers' Market traffic study.



passenger cars in the area increased sharply between 7 and 9 a.m.

Paterson Farmers' Market Area

The Paterson Farmers' Market area is bounded by Michigan Street to the north, Crooks Avenue to the south, West Railway Avenue to the west, and Wabash Avenue to the east (fig. 4). The actual market is principally retail, with wholesalers located in the remaining portions of the area. None of the wholesale firms east of West Railway Avenue have direct rail connections to their individual facilities. All incoming rail shipments are unloaded at team tracks or railroad yards.

There are 11 wholesale food distribution facilities located in the Paterson Farmers' Market area. Ten individual facilities are used in whole or part by wholesale fresh fruit and vegetable firms using about 5,000 square feet per firm. The remaining space is used for grocery, soft drink bottling operations, and other food wholesale activities. East Railway Avenue is the main access route through the market. Streets are often used for temporary storage of incoming loads.

The overall area is quite active both with retail and wholesale trade. Parking is available around the old farmers' sheds so customers have relatively easy access to shop at the market (see fig. 4).

The total Paterson Farmers' Market area contains about 15 acres including streets. Of the total area, about 38 percent (of the land) is occupied by nonfood users; 20 percent is residential; fresh fruits and vegetables utilize 16 percent; parking, 13 percent; 6 percent is vacant; grocery wholesalers use 5 percent; meat wholesalers, 1 percent; and seafood and other users occupy the remaining 1 percent. The land-use map illustrated in figure 4 shows the location of the various land users.

Miller Street Market Area

The Miller Street Market area is bounded by Emmett Street to the north, Poinier Street to the south, Avenue B to the east, and Avenue A to the west (fig. 5). A few additional wholesale food firms are located near the Miller Street Market.

This market area was principally a wholesale produce center at the time it was constructed in the late 1920's. In subsequent years other types of wholesale food firms have occupied many of the former produce facilities. None of the buildings have direct rail connections, requiring incoming rail shipments to be unloaded at team tracks or railroad yards.

Within the Miller Street Market area are 20 food distribution facilities occupying 125,000 square feet. Seven facilities, or about 61,000 square feet, are used by wholesale meat firms. Five buildings or 38,000 square feet are used for fresh fruit and vegetable wholesaling. Two grocery firms and one seafood wholesaler occupy about 18,000 square feet of space. The remaining five firms, two dairy, two poultry, and one egg company, occupy 8,000 square feet of space.

The wholesale meat buildings averaged about 8,700 square feet of floorspace per firm. The fresh fruit and vegetable facilities averaged about 7,600 square feet per firm. The remaining firms averaged about 1,600 square feet per firm.

McCarter Highway is the main access route to the market. Miller Street is the main street through the market.

The overall area is blighted. Many of the buildings are vacant, or there are vacant lots where buildings have been demolished (fig. 5).

The Miller Street Market area contains about 13 acres including streets. Of the total area, the land is utilized as follows: nonfood, 35 percent; parking, 18 percent; vacant lots, 14 percent; residential, 8 percent; vacant building, 6 percent; fresh fruit and vegetable wholesaling, 6 percent; meat wholesaling, 5 percent; poultry and egg wholesaling, 3 percent; grocery wholesaling, 2 percent; seafood wholesaling, 2 percent; and dairy wholesaling, 1 percent.

Individual Facilities

Wholesale facilities serving fresh fruit and vegetable, meat and meat-related product, grocery, dairy product, poultry, shell egg, frozen food, fish and shellfish, bakery product, beverage, candy and confectionery, and other food firms are scattered throughout the eight-county study area. Individual facilities range from old buildings unsuitable for modern storage, handling, and processing operations to newly opened facilities incorporating advanced technology and designs. A majority of these facilities are located in areas where internal expansion and highway accessibility is virtually impossible. Many wholesalers operate out of converted residential houses or amid congested residential areas.

Corporate chains and similar firms often handle a wide range of food and food-related products, requiring special design characteristics for their wholesale facilities.

Figure 4.--Land-use map of the Paterson Farmers' Market area.

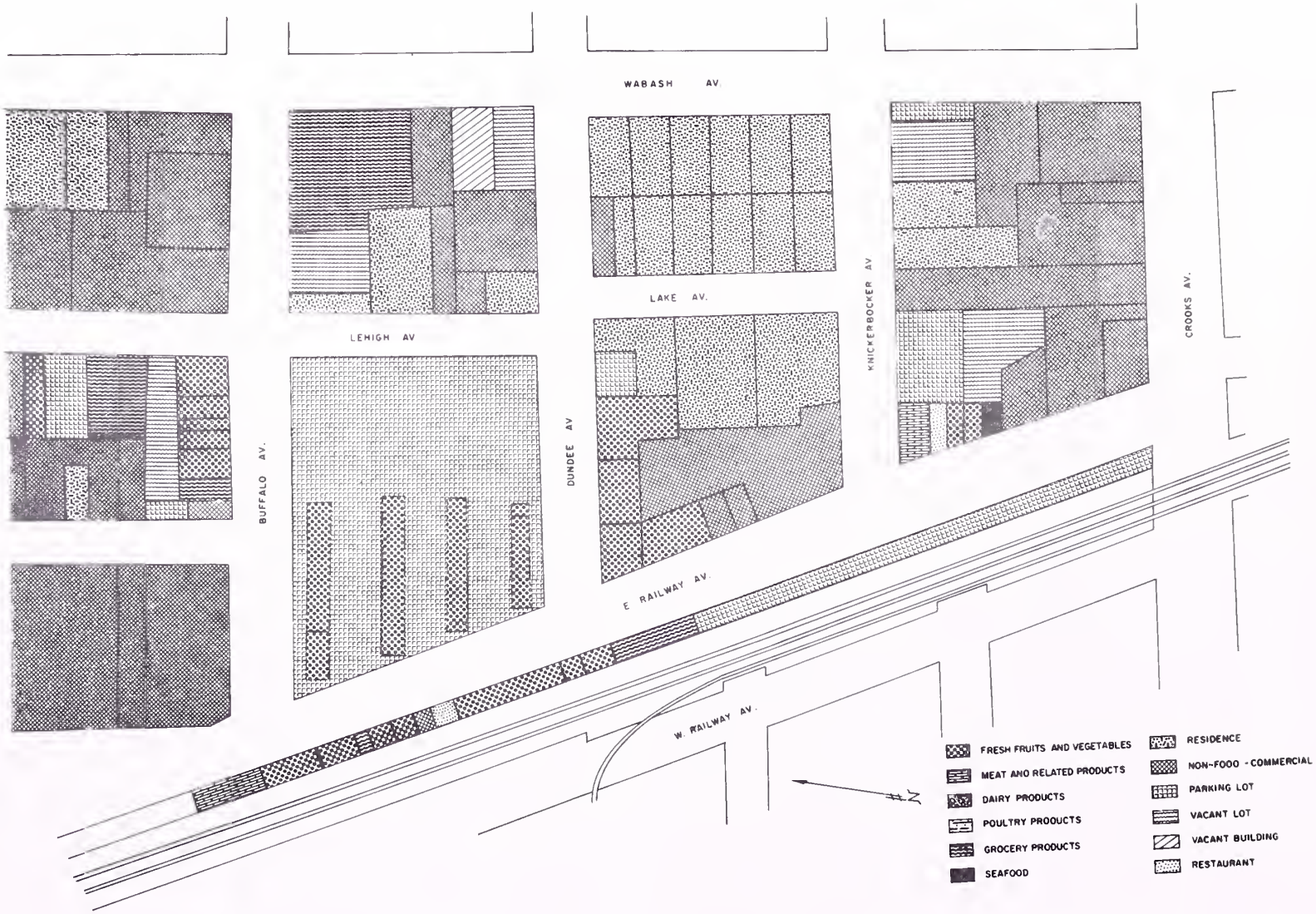
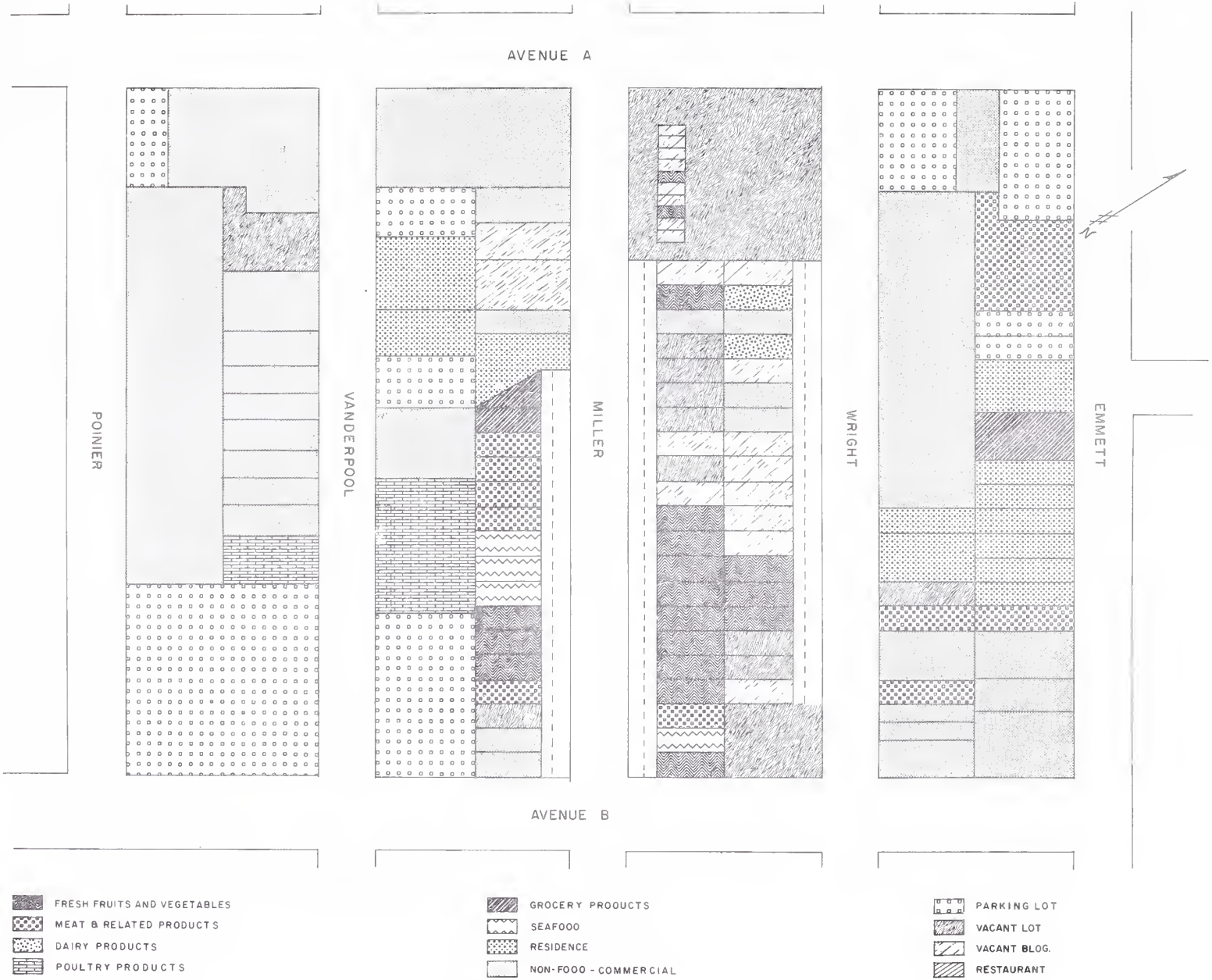


Figure 5.--Land-use map of the Miller Street Market area.



Some facilities used by these firms consist of groups of buildings, each structure designed to handle a particular type of food product or operation. Individual buildings may be provided for offices, perishable products, dry groceries, and specialized processing. Other companies maintain a single facility on a site, with specialized areas within the building arranged so each portion can be separately expanded. Some firms are housed in buildings that have been expanded from a smaller facility, each expansion reflecting changes in warehousing technology. Other chains or similar firms in the study area maintained specialized facilities at separate locations. Many firms conduct all types of warehousing within a single building.

The wholesale, processing, and distribution firms comprising the food marketing industry in northeastern New Jersey were analyzed by type, number, location, floorspace, tenure status, and employment. An analysis also was made of product movement from production areas to retail outlets.

Number and Locations of Firms

A total of 643 independent wholesalers and chainstore distribution warehouses comprises the wholesale food marketing system serving northeastern New Jersey. The locations, by counties, of the food firms included in this study are illustrated in table 1. Essex County led the study area with 183 companies or 28 percent of the total. A little over 1 percent of the total number of wholesalers was located in Somerset and Morris Counties.

Firms are listed by type in 12 major categories with a further breakdown into subgroups. Each subgroup within major categories differs in patterns of product movement and facilities, requiring separate identification. Table 2 lists the various subgroups. Each subgroup is defined in appendix I, table 1.

Table 1.--Locations of wholesale food firms in northeastern New Jersey

Type of firm	Total	County							
		Passaic	Bergen	Morris	Essex	Hudson	Union	Somerset	Middlesex
		Number							
Fresh fruits and vegetables-	69	17	4	1	28	8	2	0	9
Meat and related products---	141	12	15	1	58	32	14	2	7
Groceries 1/----------	99	10	21	0	24	14	16	2	12
Dairy products----------	52	6	8	0	8	12	8	0	10
Poultry ----------	11	2	0	0	6	1	1	1	0
Shell eggs----------	16	0	5	0	4	2	3	0	2
Frozen foods----------	20	2	3	0	6	4	2	0	3
Fish and shellfish----------	14	3	1	0	5	3	0	0	2
Bakery products----------	77	8	15	1	14	20	8	1	10
Beverages----------	22	4	3	0	7	3	1	0	4
Candy and confectionery-----	64	12	9	3	12	13	9	1	5
Other foods----------	58	4	12	1	11	19	4	0	7
Total----------	643	80	96	7	183	131	68	7	71

1/ Includes 14 chainstore warehouses.

Table 2.--Breakdown of northeastern New Jersey wholesale food firms by type and subgroup

Type of firm and subgroup	Number
Fresh fruits and vegetables:	
Wholesale jobbers	43
Banana jobbers	8
Direct receivers	7
Repackers and prepackagers	7
Processors	4
Total	69
Meat and related products:	
Wholesalers	68
Processors	32
Hotel, restaurant, institutional purveyors	18
Sausage manufacturers	10
Full-line distributors	4
Carcass breakers	4
Boners	3
Portion-control manufacturers	2
Total	141
Groceries:	
Wholesalers	53
Distribution warehouses	11
Ethnic wholesalers	6
Ship chandlers or importers	7
Institutional	4
Cash and carry	4
Chains	14
Total	99
Dairy products:	
Processor-distributors	22
Wholesaler-distributors	30
Total	52
Poultry:	
Wholesalers	11
Total	11
Shell eggs:	
Processor-wholesalers	16
Total	16
Frozen foods:	
Processors	11
Wholesalers	8
Institutional purveyor	1
Total	20
Fish and shellfish:	
Wholesalers	13
Processor	1
Total	14
Bakery products:	
Processors	65
Wholesaler-distributors	12
Total	77
Beverages:	
Bottlers	12
Distribution warehouses	10
Total	22
Candy and confectionery:	
Wholesalers	48
Food product manufacturers	9
Importers	7
Total	64
Other foods:	
Wholesalers	26
Processors	13
Importers	6
Packers	5
Manufacturers	4
Ethnic wholesaler	1
Distribution warehouse	1
Institutional	1
Portion-control manufacturer	1
Total	58
Total	643

Total Floorspace Available

A total of 13.9 million square feet of space (about 319 acres) was occupied by independent wholesalers in 12 food commodity groups. An additional 4.9 million square feet of floorspace were used by the chainstore warehouses operating in the study area. Further breakout of warehouse space for chainstores is not included in this report to avoid revealing confidential material. Further detailed discussions of space will relate only to independents.

Total floorspace as defined in this study is comprised of primary and secondary space. Primary space is all floorspace located at the principal warehouse or processing facility; it comprised 94 percent of the total space used by independent firms. Secondary space is defined as all wholesale or processing space not located at the principal place of business; it accounts for the remaining 6 percent of the total space used by independent wholesalers.

Space in primary facilities varied considerably among the different types of firms. The bakery product firms occupied the largest

amount of primary facility space--more than 3 million square feet, or 26 percent of the total; grocery firms, about 2.9 million square feet or 23 percent of the total; and meat and related product firms, about 1.6 million square feet or 13 percent of the total. The remaining types of firms each utilized 9 percent or less of the total.

Space usage also varied in secondary facilities. There were four food groups which occupied 100,000 square feet or more space in secondary facilities. Dairy product firms occupied over 232,000 square feet each in secondary facilities, or 16 percent of their total space. Candy and confectionery firms maintained about 20 percent of their total space away from their primary facilities, as did beverage firms. Meat and related product firms had over 132,000 square feet, or 7 percent of their total space, in secondary facilities. Primary and secondary space for the various kinds of independent firms are summarized in table 3. A more detailed description of this material is presented in appendix I, tables 2, 3, and 4.

Total floorspace usage amounted to approximately 2 million square feet or more in five of the eight counties in the study area (table 4). Essex County accounted for 19 percent of the total space, with Union County having 14 percent of the total independent wholesale floorspace. Morris and Somerset Counties had less than 1 percent each of the total space. Primary and secondary space by county are summarized in table 4 and shown in more detail in appendix I, tables 5, 6, and 7.

A summary of the manner in which northeastern New Jersey wholesalers utilize their space is presented in table 5. Over 52 percent of this space was nonrefrigerated; 15 percent was refrigerated; 5 percent was used for offices; and 28 percent was utilized for other uses such as processing functions.

An important measure of the differences between firm type, as well as an indication of potential materials-handling efficiency is the amount of space available on the first floor (tables 6 and 7). First-floor space is often more suitable for extensive use of pallet racks and advanced materials-handling equipment than upper floors that must be served by elevators and inclined conveyor belts.

Approximately 86 percent of the total floorspace used by the independents is on the first floor of their buildings. Beverage firms have almost 100 percent of such space, while bakery product firms have almost 30 percent of their space on other floors. This difference reflects the unique layout requirements and the age of the facilities used by these firms. Both fresh fruit and vegetable firms and grocery firms, engaging in extensive warehousing, have much of their space on one floor, 91 and 95 percent, respectively.

Approximately 98 percent of the total chainstore warehouse space is located on the first floor. The remaining 2 percent of the total space for this type of firm mainly reflects space used for offices and light storage involved in processing operations. Chainstore warehouse space is not broken out by county and floor type to avoid revealing confidential material.

Tenure Status

More independents owned, rather than rented, their facilities. The division by firm type between companies owning their primary facilities and renting these buildings is illustrated in figure 6. The percentage of firms owning as opposed to renting ranged from a high of 77 percent for beverage firms, to a low of 36 percent for fresh fruit and vegetable wholesalers. Chainstore warehouses are not included in this comparison due to specialized real estate leasing or ownership arrangements typical of this segment of the food industry.

Ownership of existing facilities is an important factor in food marketing in northeastern New Jersey. The high percentage of ownership is both evidence of the stability of the area food industry and a potential supply of equity to finance improvements.

Receipts

Northeastern New Jersey annually receives over 11 million tons of food products directly from producing areas throughout the United States and overseas. This type of receipt is defined as a "direct receipt" for the purpose of this report. The amount of direct receipts received annually by type of firm and method of transport is summarized in table 8. Some additional food products were shipped directly to local processors, retail establishments, or to public warehouses for redistribution to firms located in and outside of the study area. This particular volume was not included within the scope of this study as it does not move through the 629 independent and 14 chain wholesale food facilities in northeastern New Jersey. The volume of direct receipts is based on the wholesale weights of products and includes the weight of packaging materials and containers as well as the weight of nonfood items handled by the wholesale firms included in this study. Nonfood receipts, such as health and beauty aids, are significantly

Table 3.--Primary and secondary space used by northeastern New Jersey independent wholesale food firms, by firm type

Type of firm	Primary space	Secondary space	Total
		Sq ft	
Fresh fruits and vegetables---	501,000	19,890	520,890
Meat and related products-----	1,642,534	132,050	1,774,584
Groceries----------	2,940,798	16,000	2,956,798
Dairy products----------	1,200,514	232,341	1,432,855
Poultry----------	54,900	21,100	76,000
Shell eggs----------	137,907	1/ 0	137,907
Frozen foods----------	321,613	23,600	345,213
Fish and shellfish----------	139,816	12,806	152,622
Bakery products----------	3,327,826	12,250	3,340,076
Beverages----------	658,557	168,814	827,371
Candy and confectionery-------	879,276	217,575	1,096,851
Other foods----------	1,217,798	12,500	1,230,298
Total----------	13,022,539	868,926	2/ 13,891,465

1/ None reported.
2/ Does not include 4,963,500 sq ft of space in chainstore warehouses.

Table 4.--Primary and secondary space used by northeastern New Jersey independent wholesale food firms, by county 1/

County	Primary space	Secondary space	Total
		Sq ft	
Bergen-------	2,181,325	285,250	2,466,575
Essex--------	2,428,207	166,391	2,594,598
Hudson-------	2,356,994	131,650	2,488,644
Middlesex----	2,077,588	19,400	2,096,988
Morris-------	67,575	2/ 0	67,575
Passaic------	1,963,947	190,785	2,154,732
Somerset-----	60,380	2/ 0	60,380
Union--------	1,886,523	75,450	1,961,973
Total---	13,022,539	868,926	13,891,465

1/ Does not include 4,963,500 sq ft of space in chainstore warehouses.
2/ None reported.

Table 5.--Primary and secondary facility space usage by commodity for northeastern New Jersey wholesale food firms

Type of firm	Nonrefrigerated storage	Refrigerated		Office	Other	Total
		Cooler	Freezer			
				Sq ft		
Independent wholesalers:						
Fresh fruits and vegetables--	253,143	101,489	11,049	24,673	130,536	520,890
Meat and related products----	248,610	648,327	125,445	142,915	609,287	1,774,584
Groceries----------	2,580,191	115,373	83,601	135,646	41,987	2,956,798
Dairy products----------	534,056	241,278	54,648	107,458	495,415	1,432,855
Poultry----------	20,450	31,350	12,770	8,225	3,205	76,000
Shell eggs----------	14,600	41,910	19,740	11,882	49,775	137,907
Frozen foods----------	108,875	15,094	89,536	25,275	106,433	345,213
Fish and shellfish----------	20,061	5,585	87,367	12,546	27,063	152,622
Bakery products----------	545,892	23,184	9,814	135,003	2,626,183	3,340,076
Beverages----------	613,431	100	0	18,150	195,690	827,371
Candy and confectionery------	637,650	34,600	18,000	63,526	343,075	1,096,851
Other foods----------	704,287	43,679	32,390	69,749	380,193	1,230,298
Total----------	6,281,246	1,301,969	544,360	755,048	5,008,842	13,891,465
Chainstore warehouses----------	3,523,850	873,500	151,550	221,000	193,600	4,963,500
Total----------	9,805,096	2,175,469	695,910	976,048	5,202,442	18,854,965

Table 6.--Total space used by wholesale food firms, by floor and type of firm

Type of firm	Basement	First floor	Second floor	Other	Total
			Sq ft		
Independent wholesalers:					
Fresh fruits and vegetables-	19,340	472,475	24,575	4,500	520,890
Meat and related products---	146,669	1,365,630	245,927	16,358	1,774,584
Groceries----------	2,800	2,815,959	110,372	27,667	2,956,798
Dairy products----------	18,960	1,286,312	110,708	16,875	1,432,855
Poultry----------	4,750	63,000	8,250	1/ 0	76,000
Shell eggs----------	1/ 0	137,907	1/ 0	1/ 0	137,907
Frozen foods----------	2,000	319,813	15,400	8,000	345,213
Fish and shellfish----------	1/ 0	151,498	1,124	1/ 0	152,622
Bakery products----------	88,372	2,370,882	613,382	267,440	3,340,076
Beverages----------	1/ 0	826,871	500	1/ 0	827,371
Candy and confectionery-----	66,081	1,007,770	13,375	9,625	1,096,851
Other foods----------	1/ 0	1,152,763	62,095	15,440	1,230,298
Total----------	348,972	11,970,880	1,205,708	365,905	13,891,465
Chainstore warehouses--------	8,000	4,864,500	56,000	35,000	4,963,500
Total----------	356,972	16,835,380	1,261,708	400,905	18,854,965

1/ None reported.

Table 7.--Total space used by independent wholesale food firms, by floor and county

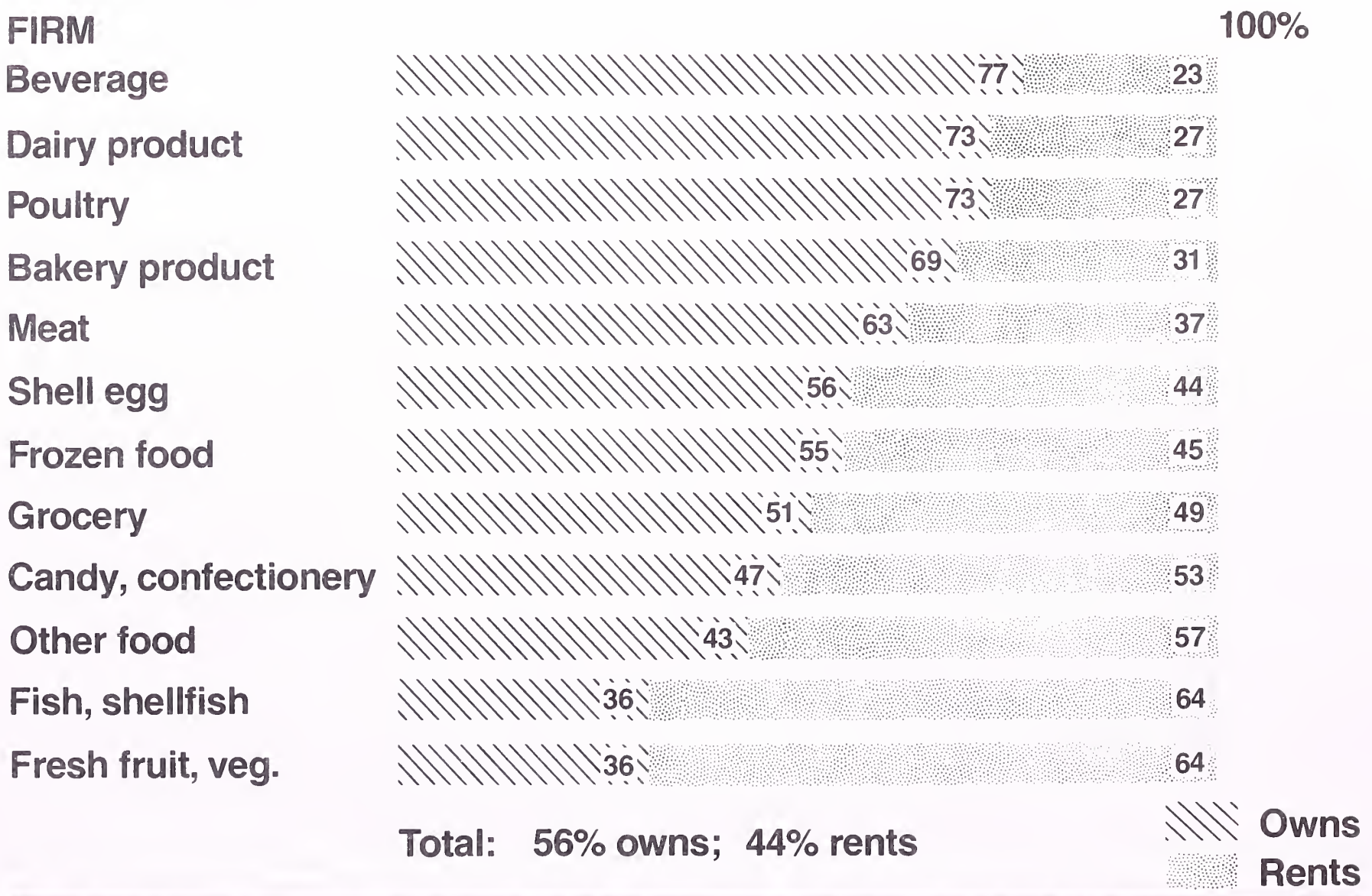
County	Basement	First floor	Second floor	Other	Total
			Sq ft		
Bergen--------	4,650	2,370,411	68,117	23,397	2,466,575
Essex---------	168,690	2,033,370	264,598	127,940	2,594,598
Hudson--------	64,702	1,954,338	420,449	49,155	2,488,644
Middlesex-----	17,700	2,043,000	31,500	4,788	2,096,988
Morris--------	22,000	45,575	1/ 0	1/ 0	67,575
Passaic-------	63,980	1,995,516	84,611	10,625	2,154,732
Somerset------	1/ 0	60,380	1/ 0	1/ 0	60,380
Union---------	7,250	1,468,290	336,433	150,000	1,961,973
Total 2/-	348,972	11,970,880	1,205,708	365,905	13,891,465

1/ None reported.
2/ Does not include 4,963,500 sq ft of space in chainstore warehouses.

Table 8.--Volume of direct receipts by firm type and method of transportation for northeastern New Jersey independent food wholesalers and food chain warehouses

Type of firm	Volume of direct receipts by method of transportation				
	Rail	Truck	Boat	Air	Total
			Tons		
Independent wholesalers:					
Fresh fruits and vegetables-	132,214	405,865	3,089	4,750	545,918
Meat and related products---	21,594	421,739	23,996	233	467,562
Groceries----------	200,285	709,477	133,065	0	1,042,827
Dairy products----------	8,548	597,280	12,314	0	618,142
Poultry----------	0	70,258	0	0	70,258
Shell eggs----------	0	57,559	0	0	57,559
Frozen foods----------	5,995	145,832	47,679	0	199,506
Fish and shellfish----------	0	11,630	25,675	0	37,305
Bakery products----------	172,974	228,056	0	0	401,030
Beverages----------	0	603,298	0	0	603,298
Candy and confectionery-----	15,008	88,068	22,519	22	125,617
Other foods----------	20,595	241,543	7,078	0	269,216
Total----------	577,213	3,580,605	275,415	5,005	4,438,238
Chainstore warehouses--------	913,828	5,654,921	18,558	2,334	6,589,641
Total----------	1,491,041	9,235,526	293,973	7,339	11,027,879

Figure 6.--Tenure status for primary facilities by type of firm, northeastern New Jersey.



represented in the total annual volumes received by grocery firms and chainstore warehouses.

The northeastern New Jersey area is served by an effective and varied transportation system. Many trucking firms are located in the area and utilize the major highway network. All rail traffic within the study area is served by Con-Rail. The Kearny yards handle all containerized shipments. Other major rail receiving points in the area include the Manhattan and Jersey City yards.

Railroad companies provided team track and holding yards for firms that did not receive by direct rail. Area airports serve the presently limited demand for foods shipped by air.

Truck receipts represent the largest volume of direct receipts. Meat and related product firms, dairy product companies, poultry and egg wholesalers, beverage, and other food firms received 90 percent of the total volume in direct receipts by truck. All food wholesalers received the majority of incoming receipts by this method.

Rail receipts accounted for only 13 percent of total direct receipts of the independent wholesalers. The largest rail receivers in terms of tonnage among the independent wholesalers were grocery firms, followed by bakery products and fresh fruit and vegetable dealers.

Approximately 6 percent of the direct receipts of independent dealers arrived by boat. Grocery firms represented the largest single group of imports; about 13 percent of their volume was received by boat. Other products which were imported were frozen foods, fish and shellfish, meat and related products, candy and confectionery, dairy products, fresh fruits and vegetables, and other food products.

Wholesalers within the study area sold products to each other. The movement of this volume of food and food-related products is defined for the purpose of this report as interdealer transfer. Interdealer transfers by independent wholesaler averaged about 2 percent of the total volume handled (direct receipts plus interdealer transfer) and less then 1 percent of the food chain warehouse volume (table 9). Among independent wholesalers, meat and related product firms handled the largest percentage of interdealer transfer--11 percent. Fish and shellfish firms received over 4 percent of their total volume from other area wholesalers. Most of the other types of food wholesalers included in this study received 1 percent or less of their total annual volume from other firms in the area. The total volume handled by all wholesalers within zip code area boundaries in each county is illustrated in figure 7. As there is a limited number of wholesalers in Morris and Somerset Counties, these portions of the study area are not included in figure 7 to avoid revealing confidential data.

Wholesalers in northeastern New Jersey receive their products by many different methods. In some instances the method by which the product was received reflected the unique characteristics of that particular product. In other instances the ability to adapt modern materials-handling technology to a specific food commodity dictated the manner in which the product was received. Over 50 percent of total volume handled was received on pallets or slipsheets reflecting the adoption of unitized-handling systems in the distribution of food products (table 10). The trend toward unitized handling was particularly strong among food chain warehouses but was also evident among independent wholesalers. Bulk receipts were more predominant among processing firms.

Source of Supply

Products warehoused or processed by food firms operating in northeastern New Jersey came from within the study area, other locations in New Jersey, adjoining States, other locations in the country, or from foreign sources. The source of supplies of food and related products moving to wholesale outlets in the study area is summarized in tables 11 and 12. This movement is shown both on the basis of county and type of firm.

Over half of the total direct receipts originate outside the study area. This movement of products into the area from outside suppliers reflected the magnitude of the food industry serving consumers in the region. Approximately 21 percent of the total volume of direct receipts originates within the study area; 6 percent is outside the study area but within the State; 12 percent from New York; and 5 percent from Pennsylvania. Some of the incoming products were imported, some processed and shipped to area wholesalers, and the remainder produced locally.

The source of receipts reflected the particular mix of wholesale firms located within specific counties of the study area. Morris and Union Counties, with a significant number of meat and grocery firms, obtained more than 85 percent of their incoming food products from outside the State. Bergen and Middlesex Counties, with dairy firms comprising a significant percent of the counties' wholesale firms, received almost 35 percent of their food products from within the State. Bergen, Essex, and Passaic Counties received more than 25 percent of their total volume from within the study area.

Table 9.--Direct receipts, interdealer transfers, and total volume handled by type of firm, northeastern New Jersey

Type of firm	Direct receipts	Interdealer transfer	Total
		Tons	
Independent wholesalers:			
Fresh fruits and vegetables--	545,918	11,326	557,244
Meat and related products----	467,562	57,173	524,735
Groceries----------	1,042,827	10,372	1,053,199
Dairy products----------	618,142	208	618,350
Poultry----------	70,258	122	70,380
Shell eggs----------	57,559	361	57,920
Frozen foods----------	199,506	2,127	201,633
Fish and shellfish----------	37,305	1,636	38,941
Bakery products----------	401,030	0	401,030
Beverages----------	603,298	480	603,778
Candy and confectionery------	125,617	529	126,146
Other foods----------	269,216	3,377	272,593
Total----------	4,438,238	87,711	4,525,949
Chainstore warehouses---------	6,589,641	24,393	6,614,034
Total----------	11,027,879	112,104	11,139,983

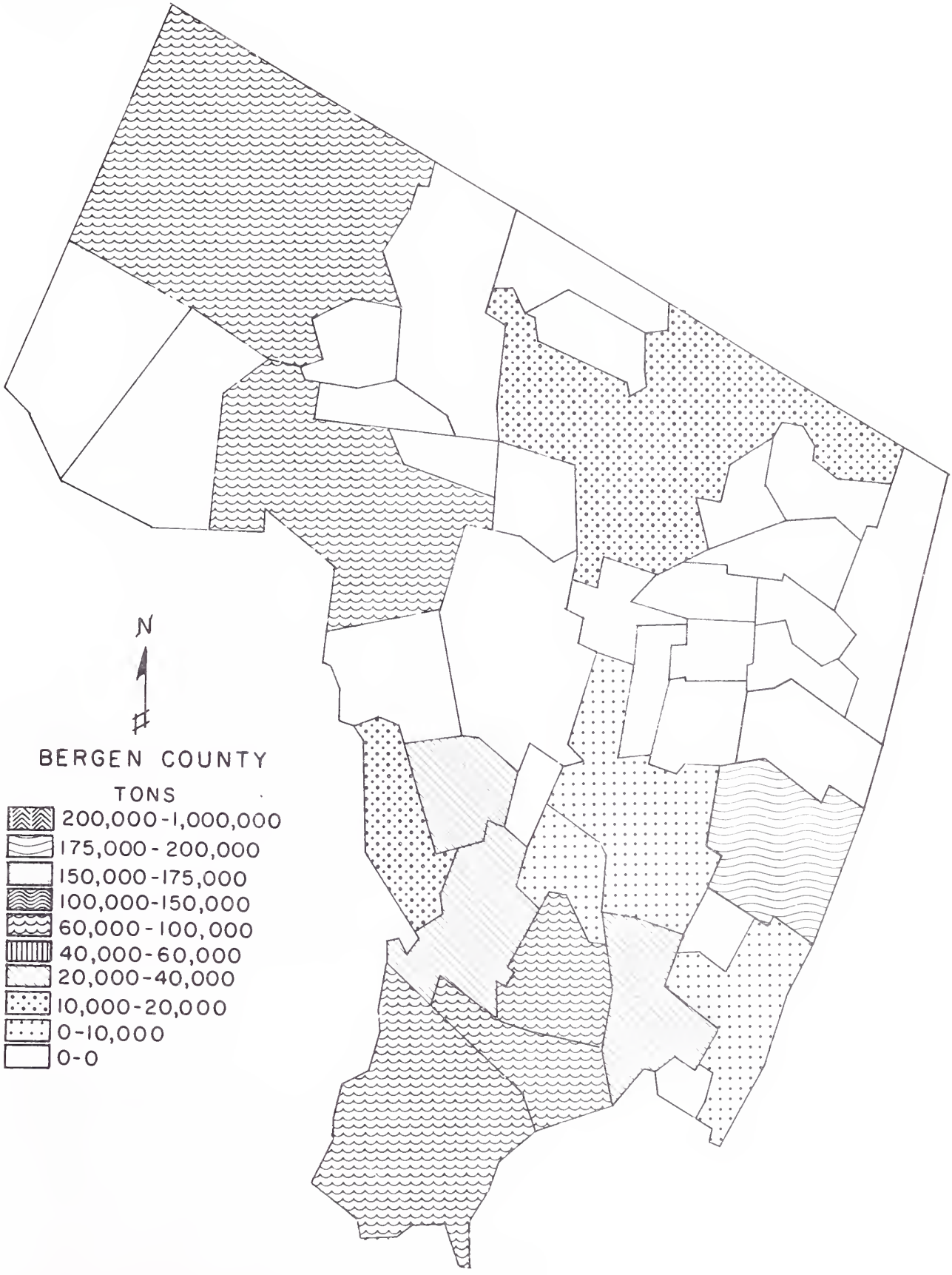
Table 10.--Form in which commodity is received by firm type, northeastern New Jersey 1/

Type of firm	Form received						
	Bulk	Pallet load	Packages	Carcass	Primal cuts	Other	Total
				Tons			
Independent wholesalers:							
Fresh fruits and vegetables-----	20,188	185,070	351,986	0	0	0	557,244
Meat and related products----------	31,880	150,748	69,064	207,825	48,401	16,817	524,735
Groceries----------	9,446	638,819	404,220	0	0	714	1,053,199
Dairy products------	316,861	128,688	172,801	0	0	0	618,350
Poultry----------	18,623	44,351	7,406	0	0	0	70,380
Shell eggs----------	5,061	7,346	45,513	0	0	0	57,920
Frozen foods--------	0	42,973	144,035	0	0	14,625	201,633
Fish and shellfish--	7,801	27,231	3,909	0	0	0	38,941
Bakery products-----	291,702	36,482	56,726	0	0	16,120	401,030
Beverages----------	49,235	511,278	43,265	0	0	0	603,778
Candy and confectionery------	58,247	5,784	62,115	0	0	0	126,146
Other foods---------	18,303	148,557	55,660	0	0	50,073	272,593
Total----------	827,347	1,927,327	1,416,700	207,825	48,401	98,349	4,525,949
Chainstore warehouses-	0	3,899,495	2,604,635	43,801	66,103	0	6,614,034
Total----------	827,347	5,826,822	4,021,335	251,626	114,504	98,349	11,139,983

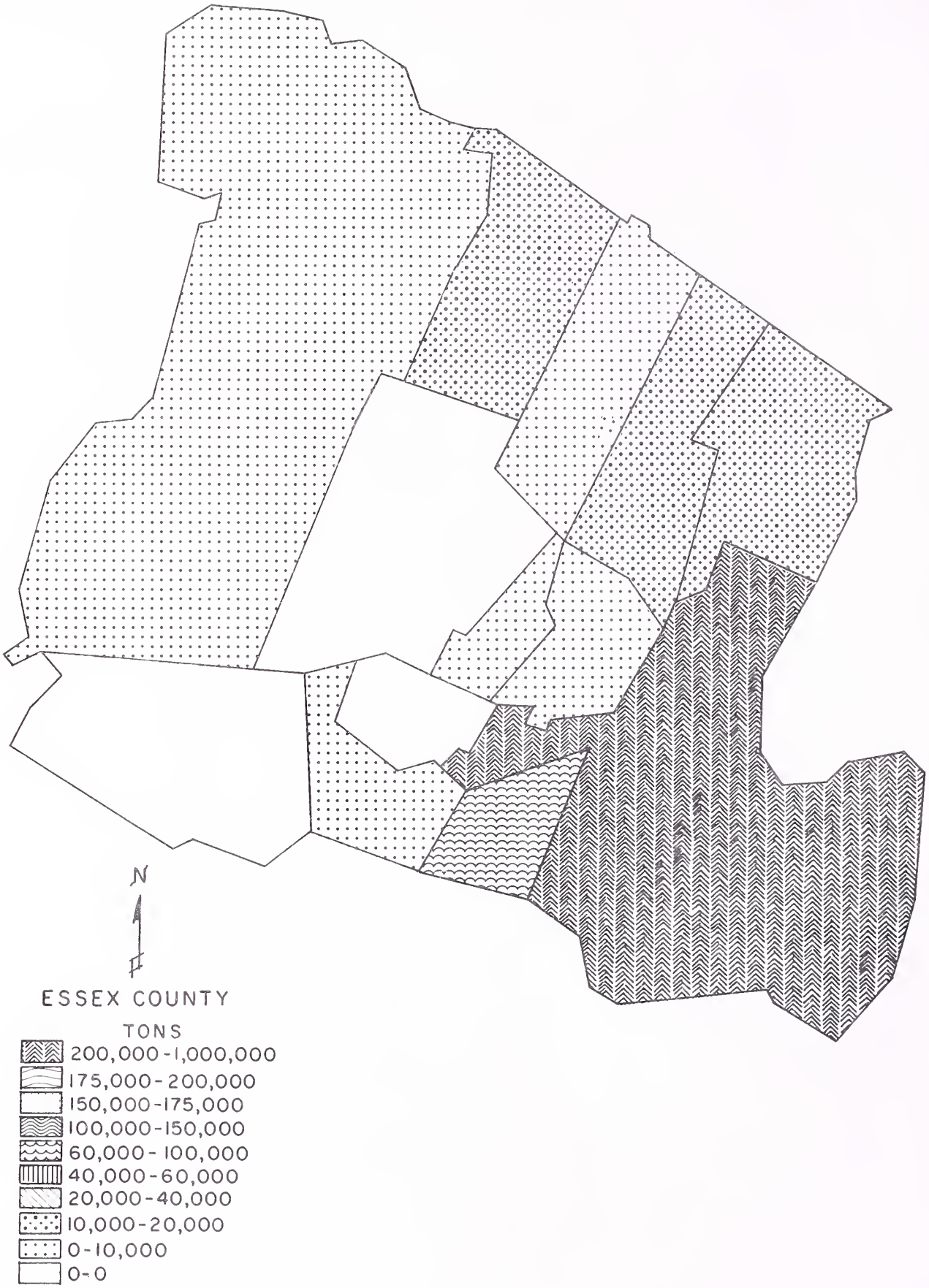
1/ Total volume handled; includes interdealer transfer.

Figure 7.--Total volume handled by location of wholesale facilities within zip codes.

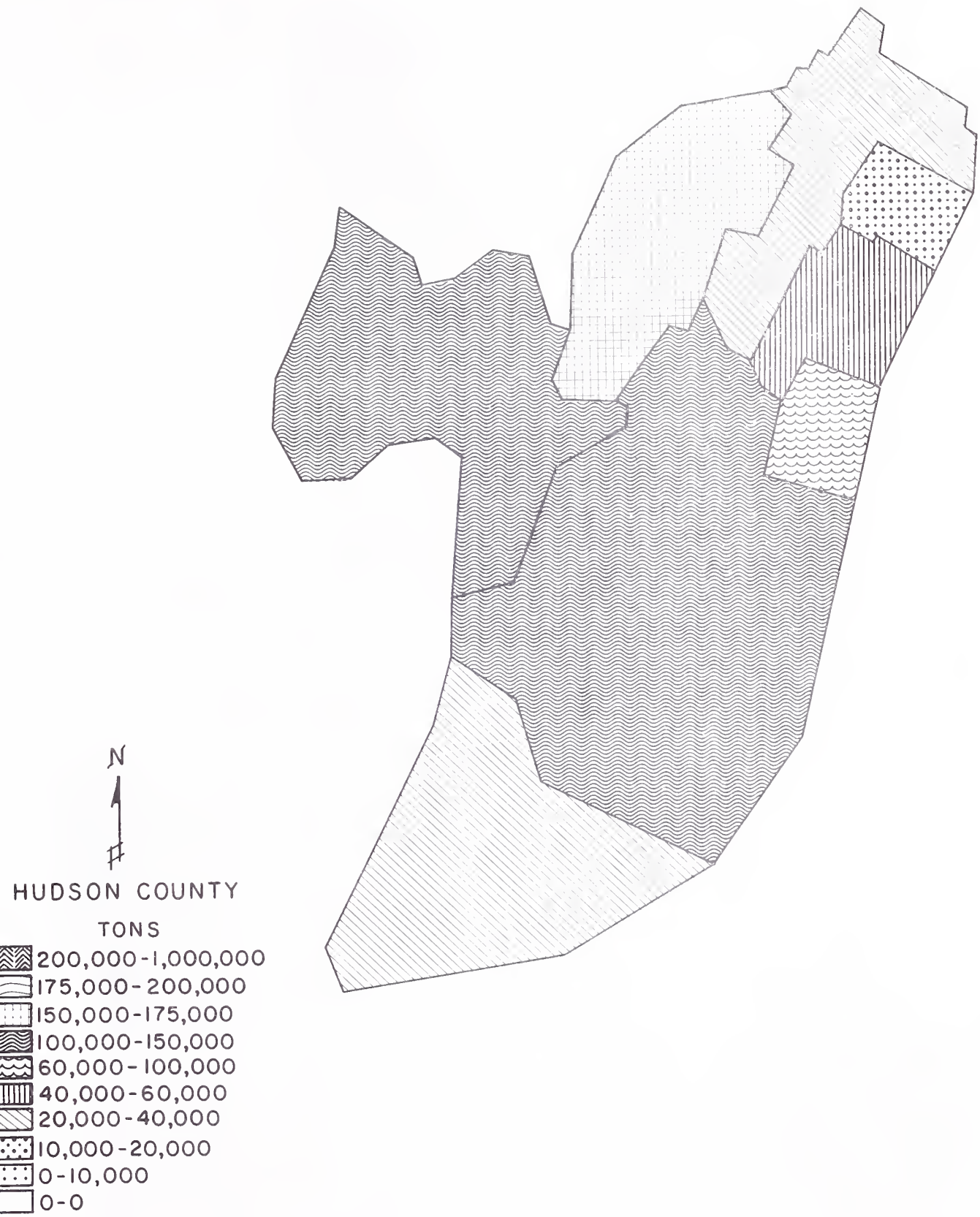
A. Bergen County.



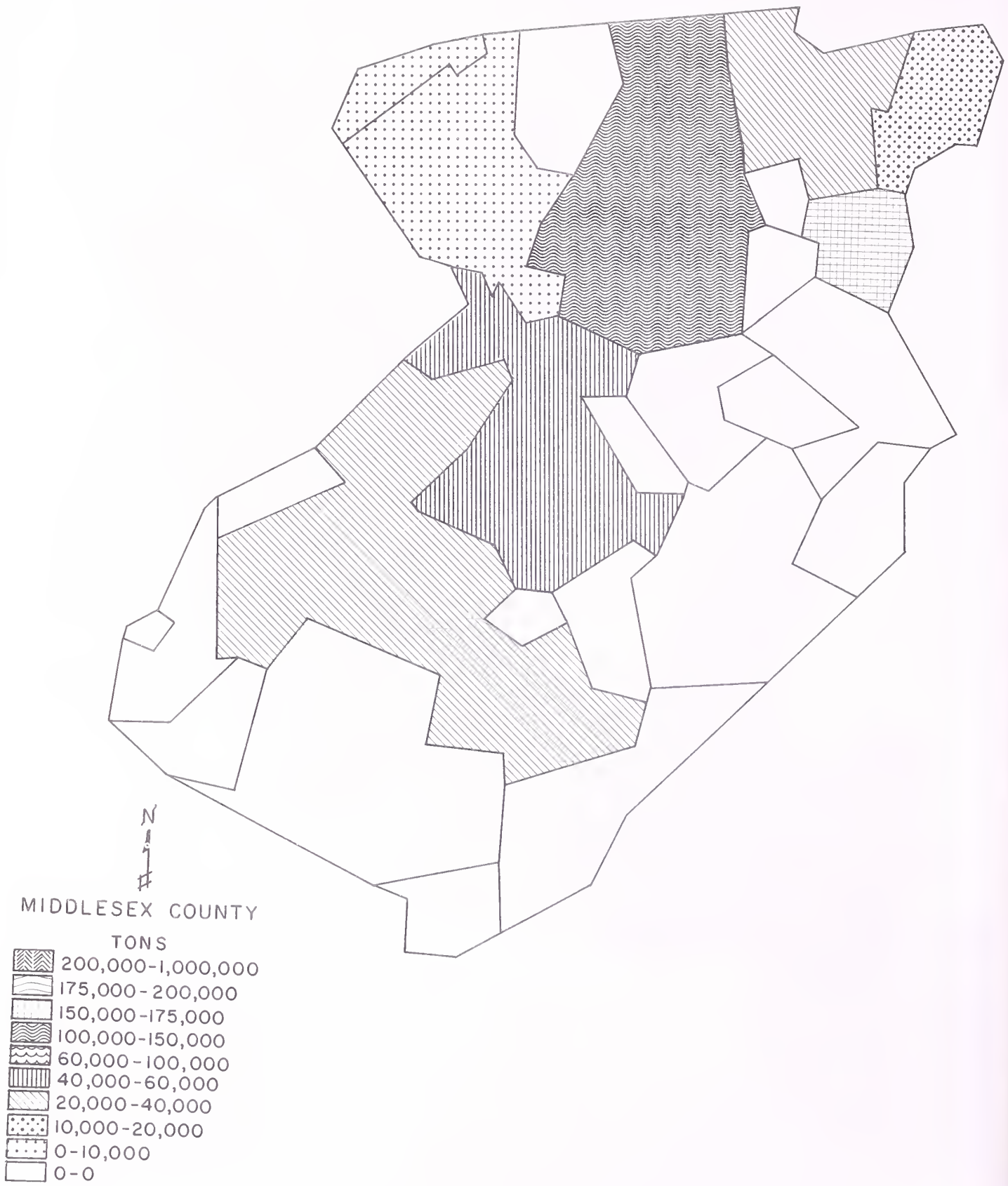
B. Essex County.



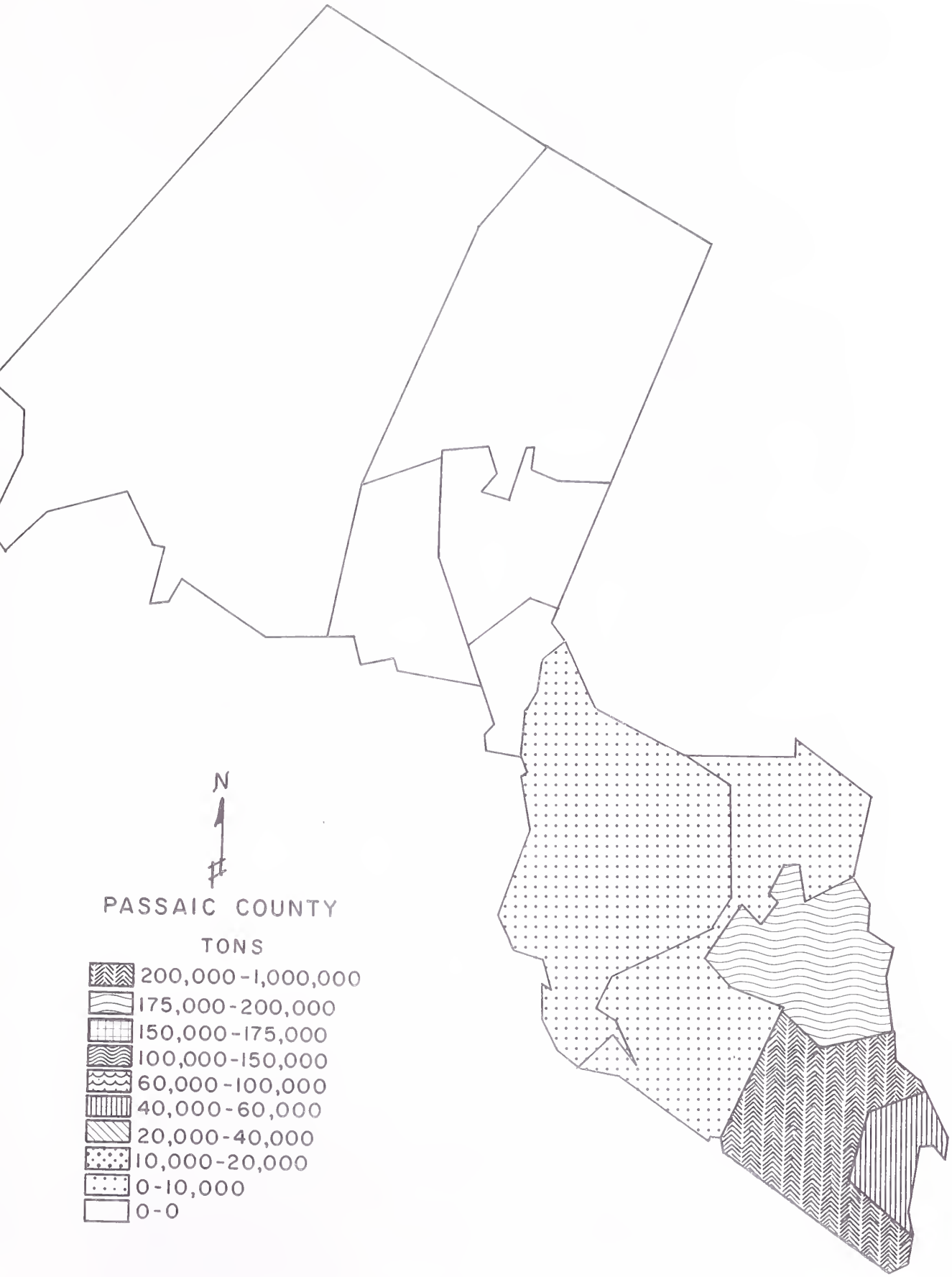
Hudson County.



D. Middlesex County.



E. Passaic County.



F. Union County.

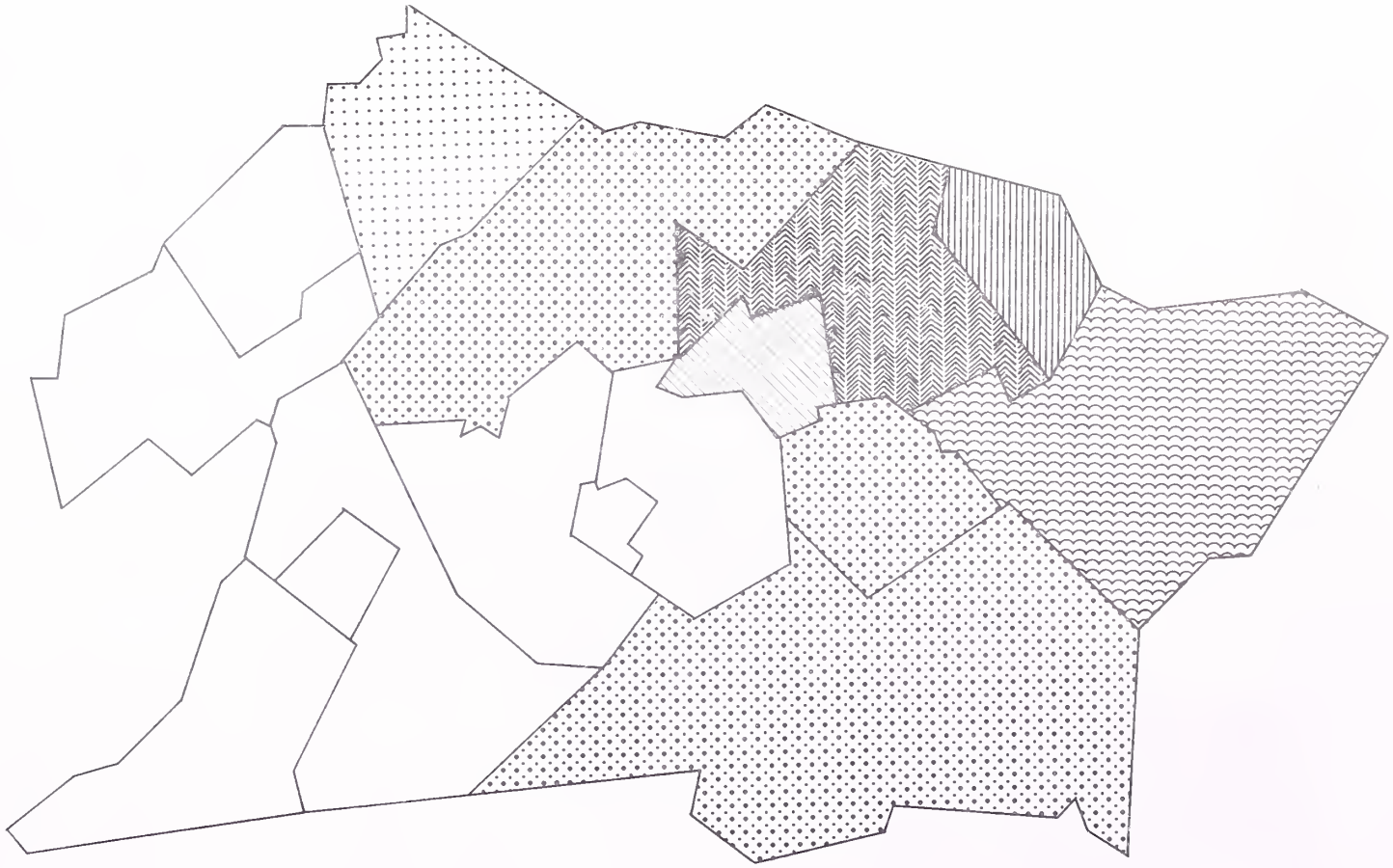


Table 11.--Source of food products handled by northeastern New Jersey independent wholesale food firms and food chain warehouses, by county 1/

County	Metropolitan northern New Jersey (8 counties)		Outside metropolitan area (within State)		Outside State						Total	
					New York		Pennsylvania		Other			
	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent 3/
Bergen----	600,036	31	68,676	3	317,825	16	29,344	2	919,721	48	1,935,602	18
Essex-----	264,464	27	34,733	4	189,037	19	28,906	3	969,101	47	451,961	9
Madison---	155,869	15	36,559	4	162,412	16	59,407	6	598,532	59	1,012,779	9
Middlesex-	660,260	20	479,492	15	389,652	12	173,800	5	1,563,253	48	3,266,457	29
Morris----	847	13	2/ 0	0	3,190	49	65	1	2,409	37	6,511	0
Passaic---	253,580	28	29,783	4	200,772	22	16,469	2	395,393	44	895,997	8
Somerset--	2,568	23	223	2	3,238	29	893	8	4,243	38	11,165	0
Union-----	367,283	13	29,261	1	64,577	2	219,965	7	2,245,053	77	2,926,139	27
Total--	2,304,907	21	678,727	6	1,330,703	12	528,849	5	6,180,565	56	11,023,751	100

1/ Direct receipts.
2/ Less than 1 percent.
3/ Percent of total volume.

Table 12.--Source of food products handled by northeastern New Jersey independent wholesale food firms and food chain warehouses, by firm type 1/

Type of firm	Metropolitan northern New Jersey (8 counties)		Outside metropolitan area (within State)		Outside State						Total
					New York		Pennsylvania		Other		
	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons
Independent wholesalers:											
Fresh fruits and vegetables--	49,133	9	21,837	4	169,235	31	16,377	3	289,336	53	545,918
Meat and related products----	88,837	19	18,702	4	74,810	16	23,378	5	261,835	56	467,562
Groceries----------	239,850	23	31,285	3	93,854	9	62,570	6	615,268	59	1,042,827
Dairy products----------	457,425	74	6,182	1	30,907	5	30,907	5	92,721	15	618,142
Poultry----------	351	2/	703	1	352	2/	4,215	6	64,637	92	70,258
Shell eggs----------	576	1	4,029	7	2,878	5	5,180	9	44,896	78	57,559
Frozen foods----------	35,911	18	1,995	1	47,881	24	17,956	9	95,763	48	199,506
Fish and shellfish----------	0	0	188	2/	9,138	25	0	0	27,979	75	37,305
Bakery products----------	56,144	14	4,010	1	96,247	24	40,103	10	204,526	51	401,030
Beverages----------	337,847	56	30,165	5	193,055	32	12,066	2	30,165	5	603,298
Candy and confectionery------	23,867	19	1,256	1	16,330	13	7,537	6	76,627	61	125,617
Other foods----------	56,535	21	8,076	3	26,922	10	43,075	16	134,608	50	269,216
Total----------	1,346,476	30	128,428	3	761,609	17	263,364	6	1,938,361	44	4,438,238
Chainstore warehouses---------	958,431	15	550,299	8	569,094	9	265,485	4	4,242,204	64	6,585,513
Total----------	2,304,907	21	678,727	6	1,330,703	12	528,849	5	6,180,565	56	11,023,751

1/ Direct receipts.
2/ Less than 1 percent.

The origin of products coming into independent wholesalers differs. Dairy product firms obtained almost 75 percent of their products from within the study area, while beverage firms received over 55 percent of their products locally. In contrast, produce, poultry, and shell egg firms obtained only limited amounts of products locally. Over 30 percent of the products handled by produce and beverage firms were obtained from New York suppliers.

Distribution

Distribution is defined as the movement of products from the wholesale and processing firms to their retail or wholesale customers. Data were gathered on destination, types of customers, and method of shipment as part of the analysis of distribution patterns in northeastern New Jersey. Certain chainstore warehouse data were combined and presented in limited detail to avoid revealing confidential information.

The destination of food products by all wholesale food firms in Northeastern New Jersey indicates that 43 percent went to the eight-county study area, 11 percent to other areas of the State, 30 percent to New York, 4 percent to Pennsylvania, and 12 percent to other areas throughout the country (fig. 8). However, a noticeable difference exists between the distribution patterns of independent wholesalers and food chain warehouses. Independent wholesalers distributed 54 percent of their food products within the study area, 7 percent to other areas within the State, and 22 percent to New York, while food chain warehouses distributed 36 percent of their food products within the study area, 14 percent to other areas within the State, and 35 percent to New York (table 13). These differences result from the magnitude of the market area of chain warehouses as compared to independent wholesalers. However, both food chain warehouses and independent wholesalers distributed approximately 85 percent of their total volume within the States of New Jersey and New York.

The destinations by county of the food products sold by independent firms, food chain warehouses, and the entire food industry included in this study, respectively, are summarized in table 14. Table 14 is based on total volume handled and includes, where appropriate, interdealer transfer.

Firms in each of the eight counties had different patterns of distribution. Over 74 percent of the volume distributed by food firms

Table 13.--Destination of food products handled for northeastern New Jersey independent wholesale food firms and chainstore warehouses, by firm type 1/

Type of firm	Metropolitan northern New Jersey (8 counties)	Outside metropolitan area (within State)	Outside State			Total
			New York	Pennsylvania	Other	
	Tons					
Independent wholesalers:						
Fresh fruits and vegetables--	443,368	4,586	107,507	3	1,780	557,244
Meat and related products----	216,115	69,845	114,826	43,101	80,848	524,735
Groceries----------	451,910	66,084	337,847	11,529	185,829	1,053,199
Dairy products----------	462,881	53,833	50,535	20,427	30,674	618,350
Poultry----------	49,489	4,358	13,761	0	2,772	70,380
Shell eggs----------	17,274	2,110	24,678	4,940	8,918	57,920
Frozen foods----------	52,142	21,343	91,140	25,293	11,715	201,633
Fish and shellfish----------	12,294	2,428	3,937	271	20,011	38,941
Bakery products----------	168,226	25,809	73,897	20,394	112,704	401,030
Beverages----------	468,235	36,191	70,352	4,600	24,400	603,778
Candy and confectionery------	32,401	6,996	19,149	8,555	59,045	126,146
Other foods----------	86,766	9,439	92,731	11,448	72,209	272,593
Total----------	2,461,101	303,022	1,000,360	150,561	610,905	4,525,949
Chainstore warehouses---------	2,350,648	933,548	2,289,869	294,294	745,675	6,614,034
Total----------	4,811,749	1,236,570	3,290,229	444,855	1,356,580	11,139,983

1/ Total volume handled.

warehouses.

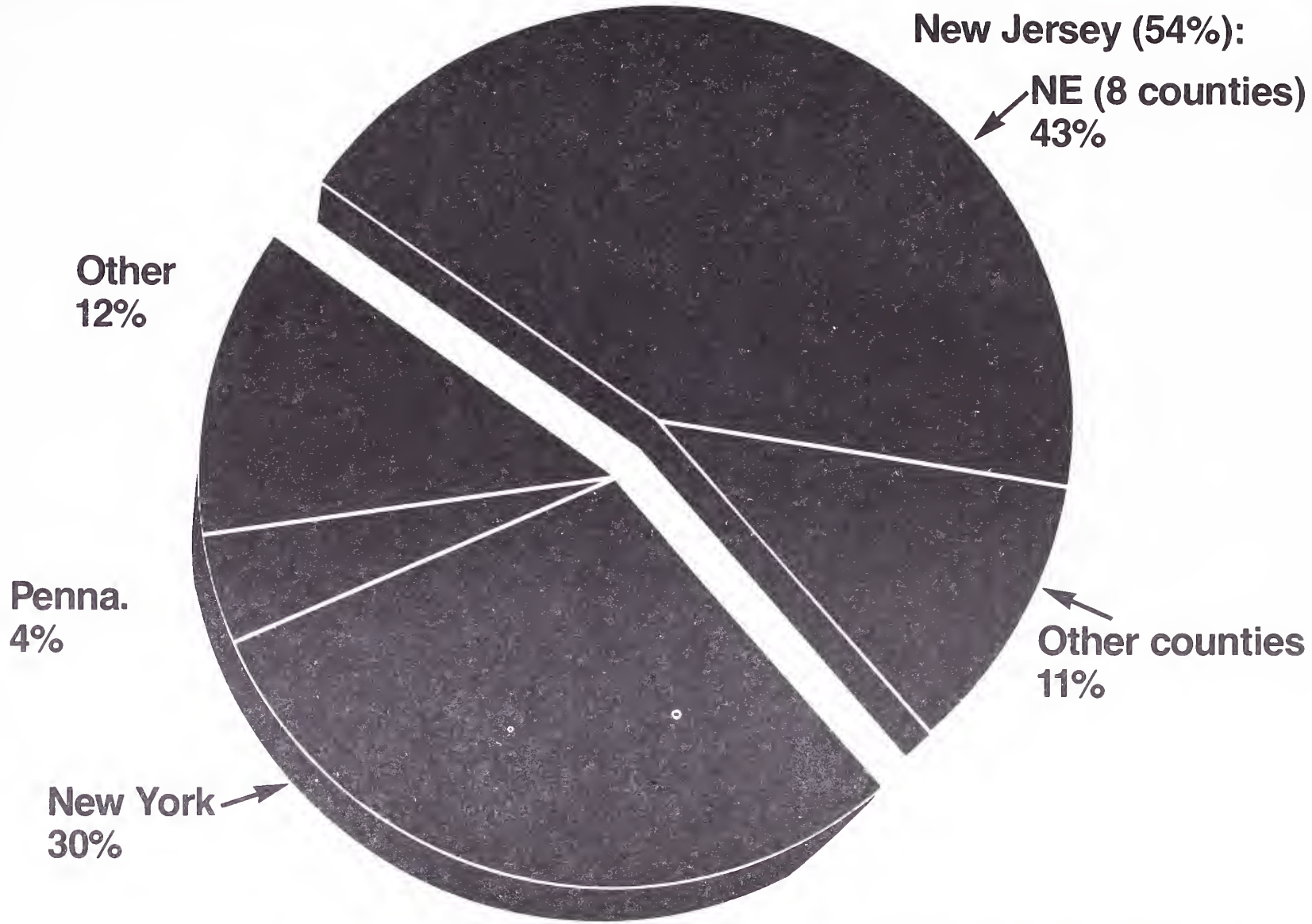

New Jersey (54%):
NE (8 counties)
43%
Other
12%
Penna.
4%
Other counties
11%
New York
30%

Table 14.--Destinations of food products handled by county for northeastern New Jersey independent wholesale food firms and chainstore warehouses 1/

Type of firm and county	Metropolitan northern New Jersey (8 counties)		Outside metropolitan area (within State)		Outside State						
					New York		Pennsylvania		Other		
	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Total
Independent wholesalers:											
Bergen------	438,507	47	60,461	6	306,058	32	17,553	2	121,277	13	943,856
Essex-------	719,580	73	42,988	4	140,775	14	24,803	3	53,431	6	981,577
Hudson------	185,887	25	64,669	9	208,806	29	19,690	3	250,729	34	729,781
Middlesex---	295,806	50	71,566	12	119,259	20	49,615	9	50,515	9	586,761
Morris------	2,610	38	110	2	1,197	17	1,173	17	1,767	26	6,857
Passaic-----	481,002	64	23,388	3	158,727	21	14,880	2	75,816	10	753,813
Somerset----	8,753	78	282	3	1,844	16	0	0	338	3	11,217
Union-------	328,956	64	39,558	8	63,694	12	22,847	5	57,032	11	512,087
Total--	2,461,101	54	303,022	7	1,000,360	22	150,561	3	610,905	14	4,525,949
Chainstore warehouses:											
Bergen------	207,027	21	70,206	7	662,443	66	4,411	2/	58,391	6	1,002,478
Essex-------	27,792	100	0	0	0	0	0	0	0	0	27,792
Hudson------	282,755	90	0	0	31,418	10	0	0	0	0	314,173
Middlesex---	886,931	33	437,041	16	989,881	37	190,420	7	189,021	7	2,693,294
Passaic-----	39,341	27	10,200	7	90,339	62	0	0	5,828	4	145,708
Union-------	906,802	38	416,101	17	515,788	21	99,463	4	492,435	20	2,430,589
Total--	2,350,648	38	933,548	14	2,289,869	35	294,294	4	745,675	11	6,614,034
Total volume handled:											
Bergen------	645,534	33	130,667	7	968,501	50	21,964	1	179,668	9	1,946,334
Essex-------	747,372	74	42,988	4	140,775	14	24,803	3	53,431	5	1,009,369
Hudson------	468,642	45	64,669	6	240,224	23	19,690	2	250,729	24	1,043,954
Middlesex---	1,182,737	36	508,607	16	1,109,140	34	240,035	7	239,536	7	3,280,055
Morris------	2,610	38	110	2	1,197	17	1,173	17	1,767	26	6,857
Passaic-----	520,343	58	33,588	4	249,066	27	14,880	2	81,644	9	899,521
Somerset----	8,753	78	282	3	1,844	16	0	0	338	3	11,217
Union-------	1,235,758	42	455,659	15	579,482	20	122,310	4	549,467	19	2,942,676
Total--	4,811,749	43	1,236,570	11	3,290,229	30	444,855	4	1,356,580	12	11,139,983

1/ Total volume handled.
2/ Less than 1 percent.

in Essex County remained in the study area, but less than 41 percent of the volume distributed from Union County remained within northeastern New Jersey. All of the counties served as major supply points for New York, with approximately 50 percent of the total volume sold from Bergen County distributed to that State. Bergen, Essex, Middlesex, Passaic, and Somerset Counties each distributed more than 85 percent of their total food volume within New Jersey and New York. About a quarter of the total volumes from Morris and Hudson Counties was distributed outside New Jersey, New York, and Pennsylvania.

Products were distributed from northeastern New Jersey in three basic ways: (1) delivered directly to customers on company trucks, (2) picked up by the customer at the wholesale or processing facility, and (3) delivered to a customer by a commercial or "for-hire" firm. The first method accounted for 78 percent of the total volume handled in the study area. Four percent of the total volume handled was picked up at the primary place of business, and 18 percent was delivered by "for-hire" trucking firms (table 15).

Independent and chainstore warehouses differed in delivery methods. Chainstore warehouses delivered a greater percentage of their volume to retail stores than did independent wholesalers to their customers--85 to 66 percent respectively. Less than 1 percent of the chainstore warehouse volume was picked up at the company warehouse, compared to 10 percent picked up at independent facilities. Both types of companies made extensive use of "for hire" trucking firms.

Independent wholesalers made extensive use of their own trucks for delivery, ranging from a low of just over 50 percent of total volume handled for bakery and other food firms, to a high of over 90 percent for poultry, shell egg, and frozen food firms. Only fresh fruit and vegetable firms had a significant amount of their total volume picked up by customers at the wholesale warehouse.

Several of the independent firms made extensive use of "for-hire" trucking firms to possibly avoid investing in delivery vehicles. Grocery, fish and shellfish, and candy and confectionery firms distributed over 50 percent of their total volume through commercial "for-hire" carriers.

Table 16 shows how products were distributed by independent wholesalers located in each of the eight counties of the study area. Chainstore warehouse distribution methods are not shown in this table to avoid revealing confidential data.

Distribution methods are affected by the particular firms located in individual counties. Percentages of the total volume handled in particular counties and delivered directly to customers ranged from a low of 51 percent in Hudson County, to a high of 97 percent in Somerset. Only 2 percent of the total volume distributed from Middlesex was picked up at the wholesale facility. Over 36 percent of the total volume distributed from Hudson and Bergen Counties was delivered by "for-hire" firms. The distribution methods by type of firm are shown for each county in appendix I, tables 4 through 11.

The customers of the firms included in this study were divided into four main groups: (1) institutions, restaurants, and retailers, (2) full-line distributors, (3) wholesalers, and (4) other.

Types of customers differed significantly between independent wholesalers and chainstore warehouses. Distribution from independent wholesalers moved to a full range of customers. Less than half, 47 percent, of the total volume of food products handled by independent wholesalers moved to institutions, restaurants, and retail outlets (table 17). An additional 30 percent of the independents' volume was distributed to chainstores or other full-line distributors. Independent wholesalers also served as important suppliers to other wholesalers, both within and outside the study area. In contrast, nearly 99 percent of the total chainstore warehouses supplied retail stores. The remaining 1 percent of the chain volume supplied other full-line distributors.

A noticeable difference in type of customers also existed among the independent wholesalers. Frozen food firms sold almost 70 percent of their total volume to institutions, restaurants, and retail outlets. In contrast, a little more than one-third of the total volume of fresh fruit and vegetable firms went to these types of customers. Fresh fruit and vegetable, grocery, bakery products, and beverage firms considered both full-line distributors and other wholesalers as major customers. Less than 1 percent of the total volume of fish and shellfish firms went to other independent wholesalers. In contrast, candy and confectionery and dairy product firms were important suppliers for other independent wholesalers.

A summary of the volume moving to different kinds of customers from firms located in each of the eight counties in the study area is given in table 18. The volume of food products moving from different types of firms by county is presented in appendix I, tables 12 through 19.

Table 15.--Total volume handled by northeastern New Jersey independent wholesalers and chainstore warehouses, by firm type and delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by "for-hire" firms	Total volume handled
		Tons		
Independent wholesalers:				
Fresh fruits and vegetables-	453,644	96,659	6,941	557,244
Meat and related products---	429,879	41,252	53,604	524,735
Groceries----------	387,650	87,762	577,787	1,053,199
Dairy products----------	492,914	64,840	60,596	618,350
Poultry----------	66,935	2,405	1,040	70,380
Shell eggs----------	56,459	141	1,320	57,920
Frozen foods----------	188,184	3,004	10,445	201,633
Fish and shellfish----------	12,678	1,263	25,000	38,941
Bakery products----------	202,532	24,954	173,544	401,030
Beverages----------	519,366	76,194	8,218	603,778
Candy and confectionery-----	32,575	15,449	78,122	126,146
Other foods----------	138,747	23,899	109,947	272,593
Total----------	2,981,563	437,822	1,106,564	4,525,949
Chainstore warehouses--------	5,621,078	39,706	953,250	6,614,034
Total----------	8,602,641	477,528	2,059,814	11,139,983

Table 16.--Total volume handled by northeastern New Jersey independent wholesalers, by delivery methods for eight counties

County	Delivered by wholesaler	Picked up by customer	Delivered by "for-hire" firms	Total volume handled
		Tons		
Bergen-----	496,308	108,273	339,275	943,856
Essex------	807,131	113,816	60,630	981,577
Hudson-----	375,177	88,234	266,370	729,781
Middlesex--	467,504	12,059	107,198	586,761
Morris-----	5,672	0	1,185	6,857
Passaic----	462,700	63,318	227,795	753,813
Somerset---	10,917	40	260	11,217
Union------	356,154	52,082	103,851	512,087
Total---	2,981,563	437,822	1,106,564	4,525,949

Table 17.--Total volume distributed by type of customer for northeastern New Jersey independent wholesaler and chainstore warehouses

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Others	Total
			Tons		
Independent wholesalers:					
Fresh fruits and vegetables	192,997	192,070	163,793	8,384	557,244
Meat and related products	251,928	142,369	102,903	27,535	524,735
Groceries	559,772	357,155	128,244	8,028	1,053,199
Dairy products	303,550	67,485	180,136	67,179	618,350
Poultry	35,272	31,778	3,330	1/ 0	70,380
Shell eggs	39,141	7,540	11,239	1/ 0	57,920
Frozen foods	139,511	51,537	7,719	2,866	201,633
Fish and shellfish	29,985	8,273	450	233	38,941
Bakery products	165,258	143,679	86,217	5,876	401,030
Beverages	236,160	263,446	69,377	34,795	603,778
Candy and confectionery	24,789	34,219	59,055	8,083	126,146
Other foods	145,251	57,549	41,750	28,043	272,593
Total	2,123,614	1,357,100	854,213	191,022	4,525,949
Chainstore warehouses	6,525,146	88,888	1/ 0	1/ 0	6,614,034
Total	8,648,760	1,445,988	854,213	191,022	11,139,983

1/ None reported.

Table 18.--Total volume distributed by type of customer for northeastern New Jersey independent wholesale firms

County	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Bergen	360,183	228,113	288,863	66,697	943,856
Essex	513,783	275,895	168,980	22,919	981,577
Hudson	348,926	238,972	119,300	22,583	729,781
Middlesex	366,455	163,439	37,781	19,086	586,761
Morris	1,621	0	1,125	4,111	6,857
Passaic	285,283	357,776	61,204	49,550	753,813
Somerset	4,847	6,292	0	78	11,217
Union	242,516	86,613	176,960	5,998	512,087
Total	2,123,614	1,357,100	854,213	191,022	4,525,949

Chainstore warehouse volume is not presented by county to avoid revealing confidential data.

Independent wholesalers in Middlesex County distributed 62 percent of their total volume to institutions, restaurants, and retailers. In contrast, approximately 31 and 8 percent, respectively, of the volumes of independents in Bergen and Passaic Counties moved to such customers. Firms in Somerset and Passaic depended on chainstore and full-line distributors as customers for their products. Companies in Bergen and Union Counties each sent over one-third of the total volume to other wholesalers.

Employment

The food industry is a major employer in northeastern New Jersey. Independent and chainstore warehouses provided employment to almost 27,000 local residents during the period of this study (table 19).

Independent wholesalers and chainstore warehouses had different mixes of employees. Labor requirements for processing operations accounted for much of the total food industry employment of independent wholesalers--37 percent of the total. In contrast, the number of handlers employed by both independent wholesalers and chainstore warehouses was roughly in proportion to the total volume handled by each type of food firm. Differences between the relative number of truck drivers employed by the two principle types of food wholesalers reflect the large vehicles used by chainstore warehouses in contrast with the moderate-size delivery trucks often used by independent wholesalers.

Different types of independent wholesalers also exhibited different employment patterns. Over 40 percent of the total employment by grocery firms was in administration and sales, while poultry and shell eggs maintained less than 30 percent of their total staff in this category. Firms handling a limited line of different products required little of their staff in warehousing operations--dairy products, fish and shellfish, and beverage firms maintained 7 percent of their total employment handling products. Processing firms require a considerable work force to manufacture products for their customers. Firms processing meat and related products, frozen food, and bakery products, as well as shell egg wholesalers maintained more than 40 percent of their total work force in their processing operations. Delivery requirements averaged approximately 17 percent of the total work force for all types of independent wholesalers. Only candy and confectionery wholesalers, making heavy use of "for-hire" delivery and selling considerable quantities of products at the wholesale facility, employed a limited number of drivers and helpers.

Employment by independent wholesalers varied in each county of the study area, reflecting the needs, activities, and numbers of individual companies. The employment by county of the independent wholesalers located in the study area is summarized in table 20. Data on chainstore warehouses are not presented in this table to avoid revealing material concerning individual companies.

Employment was not evenly distributed throughout the study area. Two counties, Essex and Hudson, each had over 20 percent of the total employment generated by independent wholesalers in the study area. In contrast, 1 percent or less of such employment was located in Morris and Somerset Counties.

Table 19.--Employee classification by type of firm, northeastern New Jersey

Type of firm	Administrative and sales	Handlers	Processors	Truck drivers	Truck helpers	Other	Total
			Number				
Independent wholesalers:							
Fresh fruits and vegetables	181	122	262	193	7	16	781
Meat and related products	871	534	1,679	596	3	188	3,871
Groceries	996	958	75	277	62	32	2,400
Dairy products	445	125	779	475	0	73	1,897
Poultry	63	40	56	72	2	11	244
Shell eggs	56	18	165	45	3	5	292
Frozen foods	180	185	478	145	3	0	991
Fish and shellfish	49	11	40	42	0	15	157
Bakery products	1,304	963	2,908	702	123	508	6,508
Beverages	139	65	287	422	3	11	927
Candy and confectionery	471	227	496	104	16	88	1,402
Other foods	514	231	557	185	1	37	1,525
Total	5,269	3,479	7,782	3,258	223	984	20,995
Chainstore warehouses	748	4,124	166	734	0	200	5,972
Total	6,017	7,603	7,948	3,992	223	1,184	26,967

Table 20.--Employment by northeastern New Jersey independent wholesale food firms, by county

County	Administration and sales	Handlers	Processors	Truck drivers	Truck helpers	Other	Total
			Number				
Bergen	884	479	990	518	16	54	2,941
Essex	865	558	1,640	751	20	282	4,116
Hudson	1,304	595	2,039	531	50	100	4,619
Middlesex	555	722	790	563	21	139	2,790
Morris	25	3	33	9	1/ 0	1	71
Passaic	854	566	1,001	481	110	243	3,255
Somerset	25	14	70	29	1/ 0	1/ 0	138
Union	757	542	1,219	376	6	165	3,065
Total	5,269	3,479	7,782	3,258	223	984	20,995

1/ None reported.

Firms Needing New Facilities

Twenty-seven percent, or 176, of the food firms included in this study need new facilities. Firms in each of the 13 categories are represented among those wholesalers and processors making up the 176 firms. This group of firms handles 13 percent of the total volume of food and food products sold by the northeastern New Jersey wholesale food industry, occupies 16 percent of the total warehousing and processing space, and employs 15 percent of the work force. Companies identified as needing new facilities occupy over 2.9 million square feet of floorspace in primary and secondary facilities, including over 400,000 square feet of refrigerated storage space. These same firms employ over 4,000 workers. Principal characteristics of the existing facilities in need of relocation are summarized in tables 21 and 22.

Several types of firms treated separately in discussions of the entire northeastern New Jersey food industry are combined in the discussions of firms needing new facilities. Information on grocery and chainstore warehouses is combined under the identification "groceries" to avoid revealing confidential information. Information on poultry and shell egg firms is combined under the category "poultry and egg" to reflect the similar nature of the specific firms identified as needing new facilities, and also to avoid revealing confidential information about these firms' categories.

Firms identified as needing new facilities expressed concern about deficiencies in buildings or sites at present locations. These deficiencies include poor design of existing building, lack of space for processing operations, poorly arranged storage areas, lack of receiving and shipping facilities, poor rail access, inadequate working conditions, security, lack of parking, and conflict with surrounding neighborhoods.

The structural design of certain facilities is such that the use of mechanized materials-handling equipment would require excessive remodeling costs with little potential for investment return. Firms with wooden floors cannot use such equipment as forklift trucks or pallet racks. Low ceilings in old warehouse buildings or converted residences prevent the use of high stacking equipment to store inventories or supplies. These restrictions lead to excessive use of manual labor and poor use of available space.

Processing operations are often conducted in crowded facilities with resulting difficulties in maintaining adequate sanitation. Some firms needing new facilities are forced to operate under less than desirable conditions, where it is difficult to maintain adequate health and safety conditions.

Additional firms have completely outgrown the limited portions of their facilities suitable for efficient operations. This situation results in the use of upper floors that have to be served by slow freight elevators. In response, firms are sometimes forced to use secondary facilities far distant from the primary place of business.

In some of the firms identified as needing to relocate, loading and receiving platforms are nonexistent, necessitating the use of sidewalks or adjacent narrow streets which cause delays and added expenses for handling operations. In addition, inadequate truck maneuvering areas often hamper vehicles at the facility for loading or unloading.

Most firms that are heavy rail users are served directly by rail, but some were forced to use team tracks for rail receipts. Railcars often arrive at a central point for unloading with subsequent distribution to individual wholesalers by freight forwarders. This practice adds to product damage and increases costs when compared with direct rail receiving.

Working conditions in some of the facilities needing replacement often are unsatisfactory. Most firms, however, try to make working conditions as adequate as possible in old and unsuitable buildings.

Poor design and congested sites frequently hamper adequate security in some buildings. These conditions are particularly serious for those firms located in high crime areas.

Parking for employees, visitors, delivery trucks, and incoming trucks is difficult during rush hours for firms located on major traffic arteries. Streets often are closed to parking during those periods, causing great difficulty for some wholesale firms.

Some firms needing new facilities are in conflict with owners of nearby residences. Processing operations, heavy truck traffic generated by wholesale operations, street parking, and facility appearance create concern. Changes are difficult without hampering necessary operations or schedules.

Each firm needing to relocate experiences one or more of these difficulties. In every case, those firms identified as needing new facilities cannot correct the problems they experienced without construction of a new wholesale or processing facility.

Table 21.--Number, volume, and space of northeastern New Jersey firms needing new facilities

Type of firm	Number of firms	Percentage of firms 1/	Volume 2/	Percentage of total volume 3/	Present space			Percentage of total space 4/	Refrigerated space		Total refrigerated space
					Primary	Secondary	Total		Cooler	Freezer	
	Number	Percent	Tons	Percent	Sq ft	Sq ft	Sq ft	Percent	Sq ft	Sq ft	Sq ft
Fresh fruits and vegetables--	47	68	459,499	84	363,395	19,890	383,285	74	78,522	5,343	83,865
Meat and related products----	44	31	113,254	24	394,025	46,300	440,325	25	121,041	33,264	154,305
Groceries 5/----------	18	18	386,368	5	864,562	61,600	926,162	12	16,520	48,592	65,112
Dairy products----------	9	17	98,303	16	52,875	20,000	72,875	5	18,400	150	18,550
Poultry and eggs 6/----------	10	37	67,508	53	96,950	21,100	118,050	55	50,000	10,125	60,125
Frozen foods----------	7	35	7,980	4	64,500	18,000	82,500	24	3,500	16,892	20,392
Fish and shellfish----------	4	29	6,792	18	16,524	11,306	27,830	18	1,784	3,584	5,368
Bakery products----------	12	16	41,558	10	398,808	7/ 0	398,808	12	1,150	1,850	3,000
Beverages----------	6	27	160,020	27	172,847	7/ 0	172,847	21	7/ 0	7/ 0	7/ 0
Candy and confectionery------	13	20	13,272	11	175,500	7/ 0	175,500	16	5,000	7/ 0	5,000
Other foods----------	6	10	64,133	24	132,401	6,000	138,401	11	519	450	969
Total----------	176	27	1,418,687	13	2,732,387	204,196	2,936,583	16	296,436	120,250	416,686

1/ Calculated by dividing the number of each type of firm needing new facilites by the total number of the firms of that type included in the study.
2/ Direct receipts.
3/ Calculated by dividing the total volume of firms needing new facilities, by type, by the total volume of each type of firm included in the study.
4/ Calculated by dividing the total space occupied by firms needing new facilities, by type, by the total space occupied by each type of firm included in the study.
5/ Grocery and chainstore warehouse categories combined to avoid revealing confidential data.
6/ Poultry and shell egg categories combined to reflect similar nature of specific firms needing new facilities.
7/ None reported.

Table 22.--Employee classification by type of firm needing new facilities, northeastern New Jersey

Type of firm	Administrative and sales	Handlers	Processors	Truck drivers	Truck helpers	Other	Total
			Number				
Fresh fruits and vegetables-	132	102	245	131	2	16	628
Meat and related products---	203	148	438	140	1	9	939
Groceries 1/----------	244	421	38	63	0	3/ 0	766
Dairy products----------	61	25	45	53	0	4	188
Poultry and eggs 2/---------	67	45	46	77	0	15	250
Frozen foods----------	20	5	111	16	3	0	155
Fish and shellfish----------	19	1	14	23	0	8	65
Bakery products----------	116	9	296	27	1	41	490
Beverages----------	37	23	79	121	0	0	260
Candy and confectionery-----	83	41	0	29	10	69	232
Other foods----------	51	20	80	21	0	0	172
Total----------	1,033	840	1,392	701	17	162	4,145

1/ Grocery and chainstore warehouse categories are combined to avoid revealing confidential data.

2/ Poultry and shell egg categories are combined to reflect similar nature of specific firms needing new facilities.

3/ None reported.

A food distribution center, as illustrated in figure 9, is designed to meet the requirements of northeastern New Jersey food firms needing to replace present buildings (fig. 9). This center is designed to be located on a site of approximately 380 acres. It includes 74 buildings totaling over 3 million square feet of first-floor space and 1.5 million square feet of potential expansion. The floorspace, land, and expansion potential of the new center is summarized in table 23. The methodology for determining initial space requirements and expansion is outlined in appendix II.

The methodology for estimating building expansion requirements is based on present consumption trends of the various food products handled by New Jersey food wholesalers needing new facilities. Estimates contained in this report are based on the most complete and reliable information available at the time of the study. Available information concerning some products was insufficient to develop fully credible estimates of future consumption over the entire life of the new center. Accordingly, projections of expansion space required for the various buildings shown on the proposed wholesale food distribution center are only for illustrative purposes. These projections should not be substituted for more accurate estimates that may be made possible by additional information available prior to the beginning of actual facility planning and construction.

Multiple- and Single-Occupancy Facilities

Two types of buildings are planned for the new center: multiple-occupancy buildings to serve a number of firms wishing to share a common facility, and single-occupancy buildings to house firms needing specially designed individual facilities. Choosing the building best suited for a particular firm will be based on individual business volume and operational requirements.

Multiple-Occupancy Buildings

Typical buildings of this type are 100 feet long by several hundred feet wide. The buildings are completely enclosed from front to rear and provide common rail facilities and truck-maneuvering areas along opposite sides of the facility. Rail-receiving areas are designed to allow trucks to be unloaded at doors normally used to service incoming railcars. A section view of a multiple-occupancy building is illustrated in figure 10.

The multiple-occupancy building is divided into 30-foot-wide units. Units are separated by temporary floor-to-ceiling partitions which may be removed to provide large open areas. Wholesalers can occupy any number of units. The multiple-occupancy building is designed to allow stacking to a height of 21 feet from the floor, through most of the facility. The interior arrangement of pallets, pallet racks, and material handling equipment of a produce wholesaler utilizing this type of building is diagrammed in figure 11.

Floor heights are compatible with those of railcars and trucks. Exterior door sills for truck receiving and shipping are 45 inches above ground level. Door sills for rail-receiving operations can be either 45 or 55 inches above ground level, depending on the use of nonrefrigerated or refrigerated railcars.

Other design features are incorporated in multiple-occupancy buildings to make the facilities compatible with their intended uses. Drains, where appropriate, are located in the floor to dispose of water and for cleaning. Doors intended for truck operations are protected from backing vehicles by vertical bumper strips. First floors are concrete and designed to bear anticipated loads. Freezer floors require additional subslabs to withstand the constant freezing temperature.

A 20-foot wide mezzanine extends across the front of the building for offices, restrooms, lunchrooms, lockers, and light storage. Some types of wholesale firms may require mezzanines extended to form complete or partial floors for extensive support facilities or light storage.

Single-Occupancy Buildings

These buildings may be used for various combinations and types of warehousing, processing, or packaging. Ceiling heights, floor design, drains, and relationship of offices, receiving and shipping areas, machinery, and operational equipment, as well as building shape, are determined by the layout most suitable for the tenant or owner of the facility. Figure 12 illustrates the exterior and portions of the interior of a single-occupancy building used for perishable-produce warehousing, with provision for limited processing incorporated in the facility design.

Firms choosing single-occupancy buildings to house their operations require individual sites with separate truck-maneuvering areas, rail receiving, and parking. Security considerations also prompt some users of this building type to fence the land around the building. With the exception of access streets, rail spurs, sewers, and utilities, users of single-occupancy facilities do not commonly share support facilities with other companies.

Figure 9.--Artist's conception of the proposed northeastern New Jersey wholesale food distribution center.

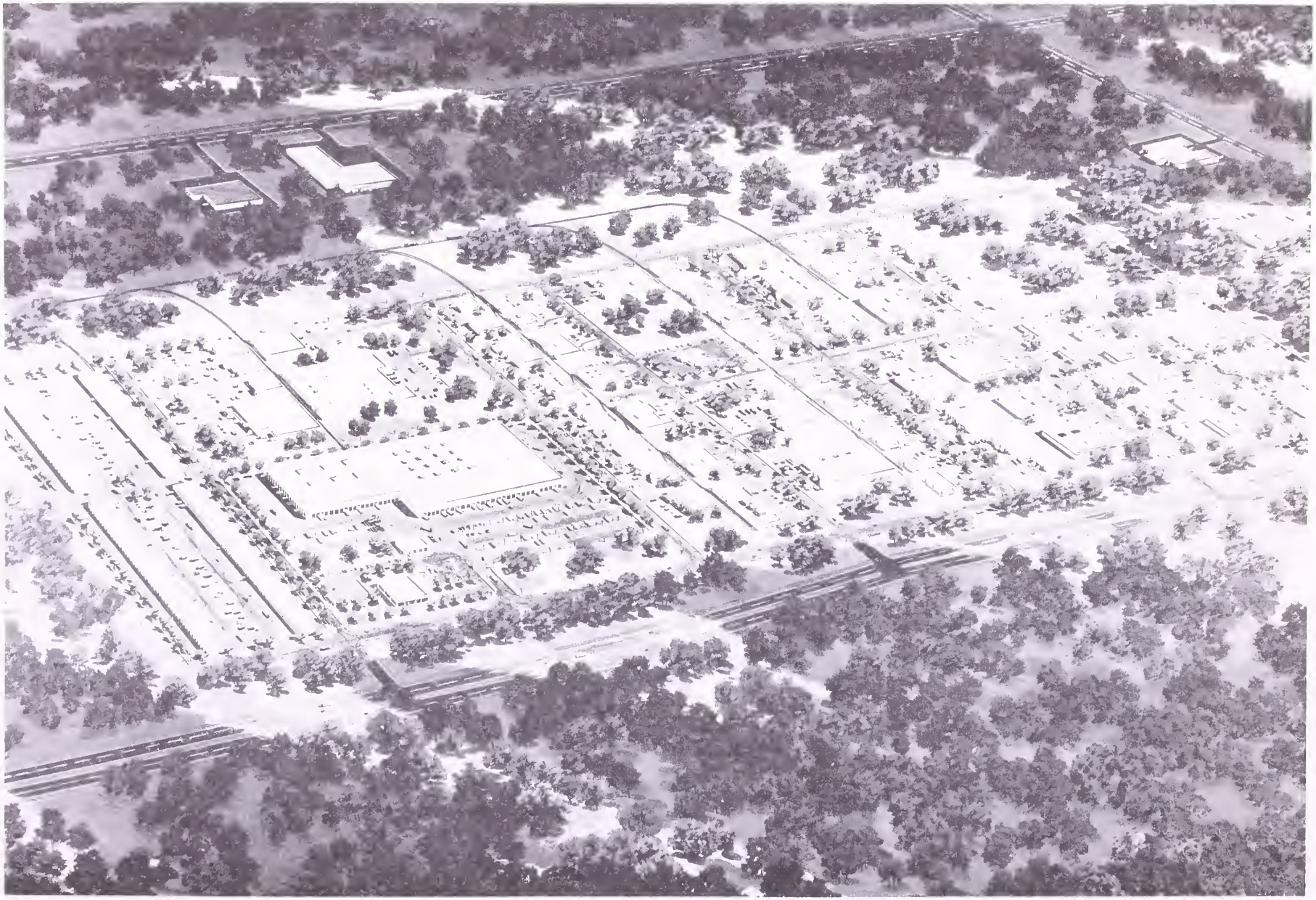


Table 23.--Proposed space and land requirements, northeastern New Jersey wholesale food firms, by type of firm and building

Type of firm	Number of firms	Buildings		Planned space			Land
		Units	Building	Initial	Expansion 1/	Total	
		Number			Sq ft		Acres
Fresh fruits and vegetables:							
Multiple occupancy	39	38	--	114,000	---	114,000	14.64
Single occupancy	8	--	8	256,800	79,912	336,712	23.55
Total	47	38	8	370,800	79,912	450,712	38.19
Meat and related products:							
Multiple occupancy	23	25	--	75,000	---	75,000	9.63
Single occupancy	21	--	21	466,620	186,648	653,268	51.54
Total	44	25	21	541,620	186,648	728,268	61.17
Groceries:							
Multiple occupancy	6	21	--	63,000	---	63,000	8.09
Single occupancy	12	--	12	892,900	755,632	1,648,532	86.87
Total	18	21	12	955,900	755,632	1,711,532	94.96
Dairy products:							
Multiple occupancy	6	13	--	39,000	---	39,000	5.00
Single occupancy	3	--	3	90,000	0	90,000	13.90
Total	9	13	3	129,000	0	129,000	18.90
Poultry and eggs:							
Multiple occupancy	6	9	--	27,000	---	27,000	3.46
Single occupancy	4	--	4	57,800	9,856	67,656	7.34
Total	10	9	4	84,800	9,856	94,656	10.80
Frozen foods:							
Multiple occupancy	5	8	--	24,000	---	24,000	3.08
Single occupancy	2	--	2	37,600	37,976	75,576	5.78
Total	7	8	2	61,600	37,976	99,576	8.86
Fish and shellfish:							
Multiple occupancy	4	9	--	27,000	---	27,000	4.92
Single occupancy	0	--	0	---	3/ 15,000	15,000	0
Total	4	9	0	27,000	15,000	42,000	4.92
Bakery products:							
Multiple occupancy	7	10	--	30,000	---	30,000	3.85
Single occupancy	5	--	5	318,300	99,750	418,050	35.73
Total	12	10	5	348,300	99,750	448,050	39.58
Beverages:							
Multiple occupancy	1	1	--	3,000	---	3,000	.39
Single occupancy	5	--	5	221,800	296,856	518,656	30.90
Total	6	1	5	224,800	296,856	521,656	31.29
Candy and confectionery:							
Multiple occupancy	8	17	--	51,000	---	51,000	6.55
Single occupancy	5	--	5	156,000	0	156,000	12.30
Total	13	17	5	207,000	0	207,000	18.85
Other foods:							
Multiple occupancy	1	1	--	3,000	---	3,000	.39
Single occupancy	5	--	5	149,600	47,872	197,472	14.07
Total	6	1	5	152,600	47,872	200,472	14.46
Offices and restaurants:							
Multiple occupancy	--	4	--	12,000	0	12,000	1.55
Single occupancy	--	--	2	5,000	0	5,000	5.19
Total	2/ --	4	2	17,000	0	17,000	6.74
Future refrigerated-storage area:							
Multiple occupancy	--	--	--	---	---	---	---
Single occupancy	--	--	--	---	---	---	32.95
Total	--	--	--	--	---	---	32.95
All facilities:							
Multiple occupancy	106	152	--	468,000	0	468,000	61.55
Single occupancy	70	--	70	2,652,420	1,529,502	4,181,922	320.12
Total	176	4/ 152	70	3,120,420	1,529,502	4,649,922	381.67

1/ No expansion planned for multiple-occupancy buildings.
2/ For nonwholesale food firms and center management.
3/ Site only. Single-occupancy building anticipated for future development.
4/ Units arranged in four buildings.

Figure 10.--Section view of a multiple-occupancy building.

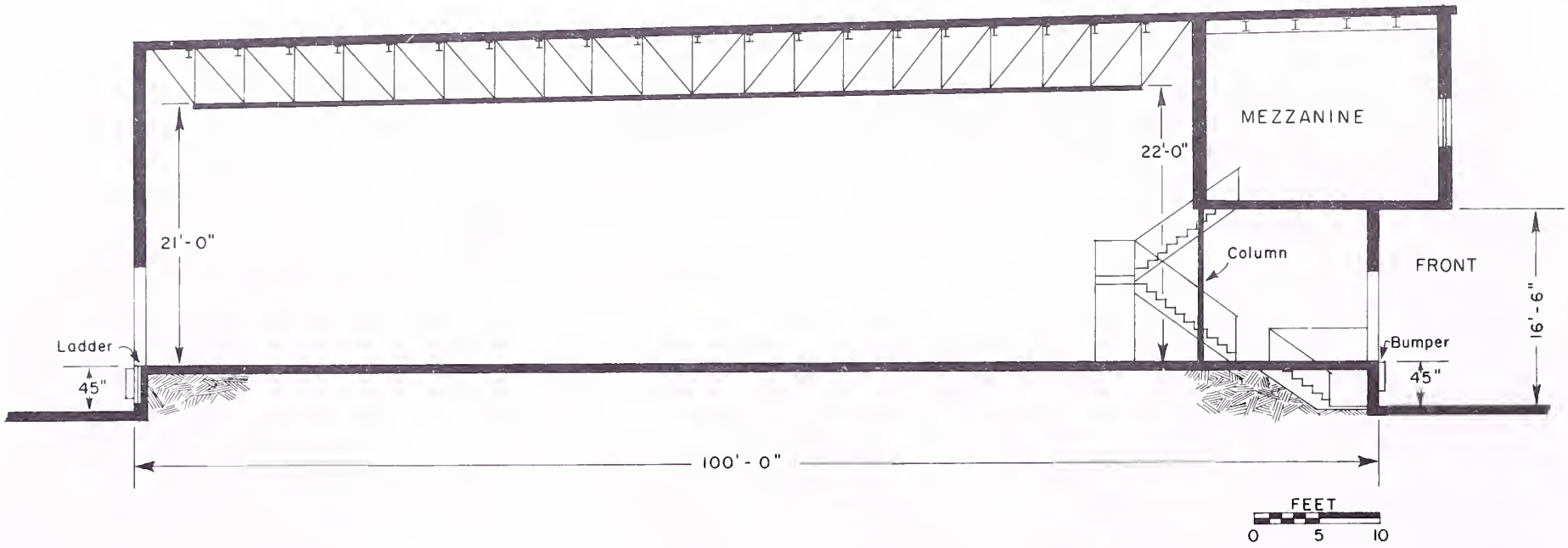


Figure 11.--Artist's conception of the interior of a multiple-occupancy building.

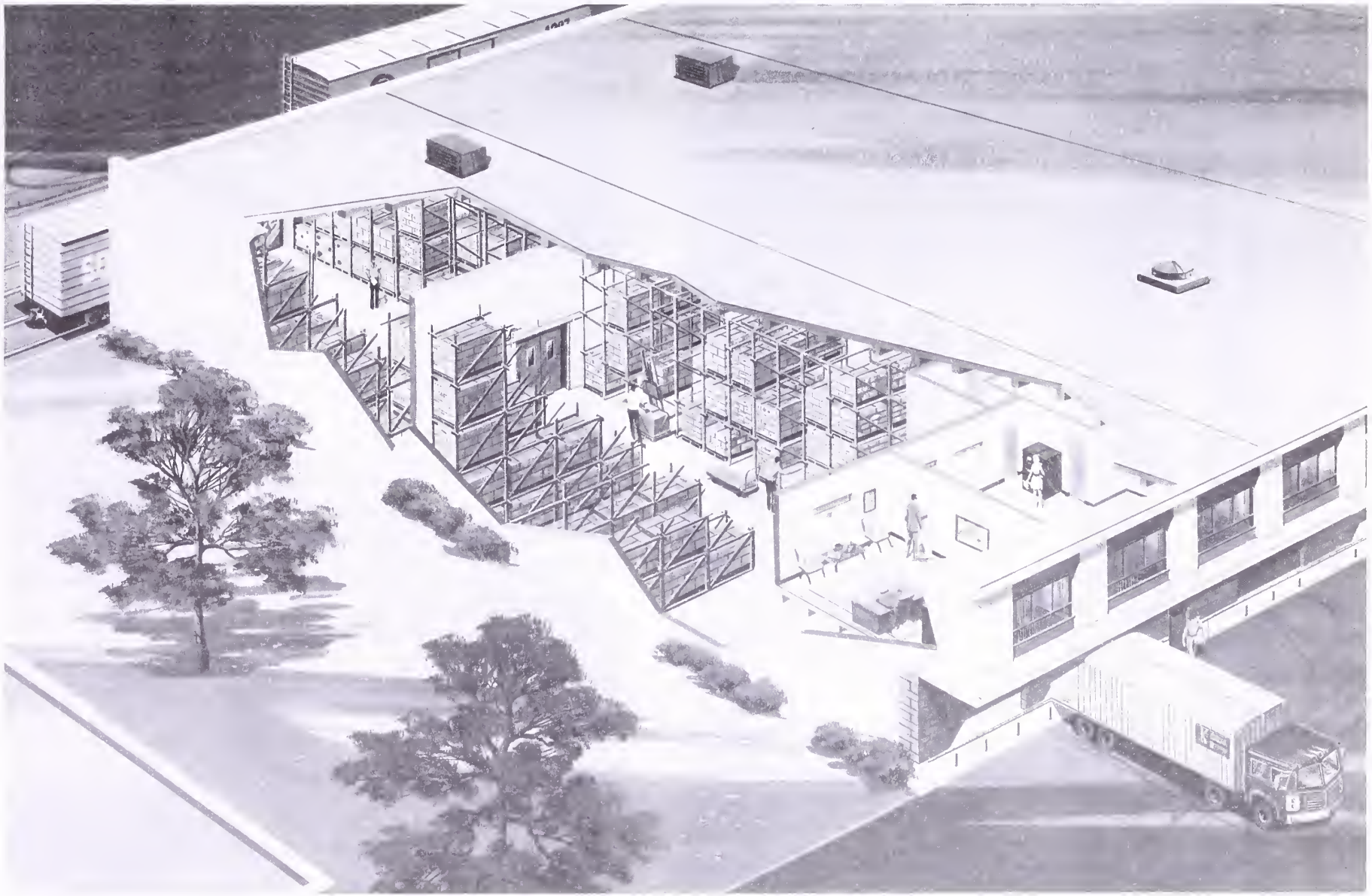
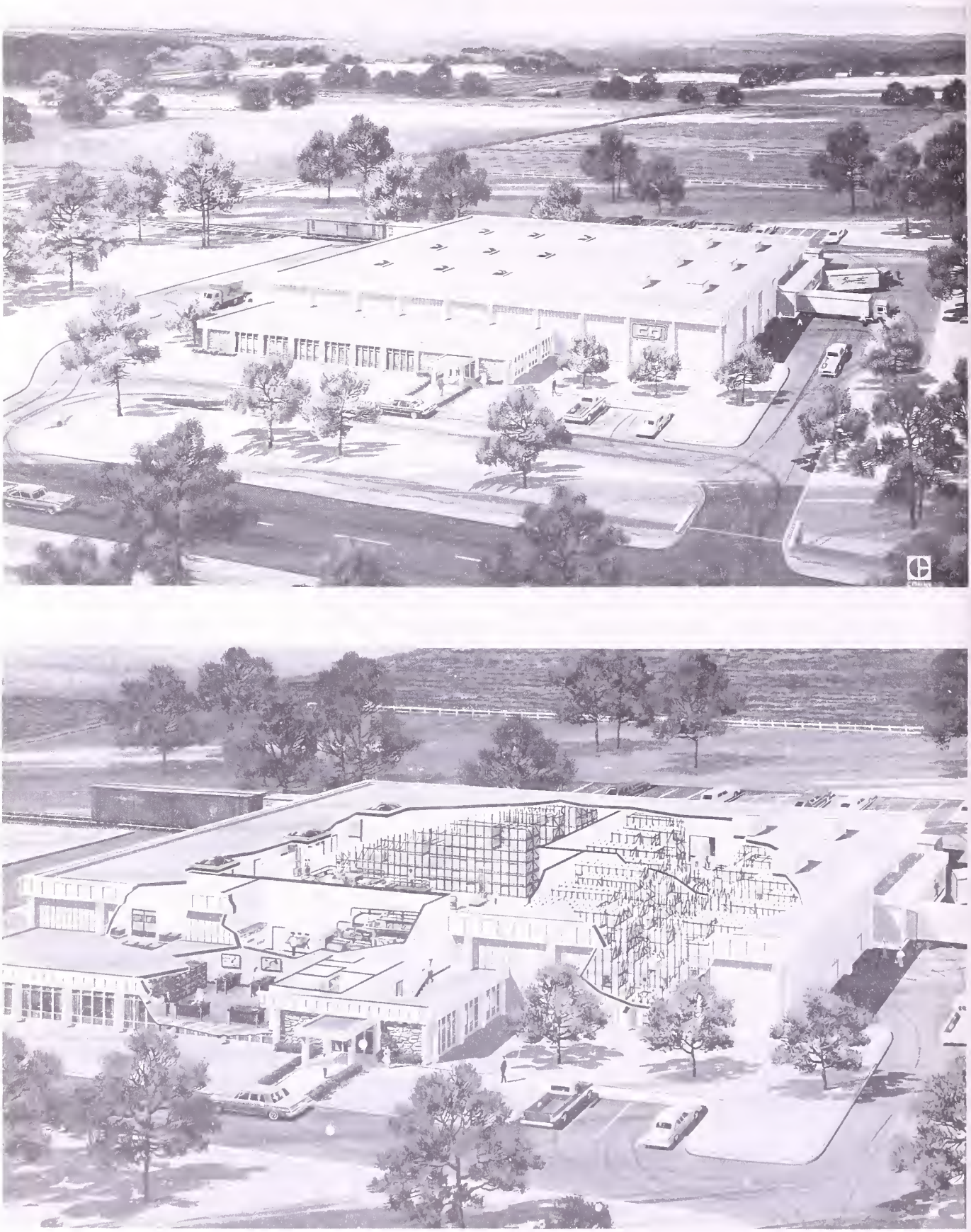


Figure 12.--Artist's conception of the (a) exterior and (b) portions of the interior of a single-occupancy building.



Facility Layouts

All 11 food groups in this study are represented in the kinds of buildings included as part of the northeastern New Jersey proposed wholesale food distribution center. Only one food group, fish and shellfish, does not require both multiple- and single-occupancy buildings at the new center. Sample layouts of some of the kinds of buildings anticipated to be used by firms relocating to the new center are shown in this section of the report. A sample layout for a fish and shellfish firm in a multiple-occupancy building is shown as are other multiple-occupancy building layouts for various kinds of firms where such designs differ substantially from equivalent arrangements in single-occupancy buildings. Layouts of single-occupancy facilities are shown for all kinds of firms using this type of building. These layouts are for illustrative purposes and do not represent the planned or recommended facilities of actual firms. In addition to the multiple- and single-occupancy buildings for food firms, some space at the center will be used for offices, restaurants, and a future refrigerated warehouse.

Fresh Fruits and Vegetables

The 47 fresh fruit and vegetable firms included in new facility planning require a total of 30 conventional multiple-occupancy units, a group of 8 units for a collection of smaller firms, and 8 single-occupancy buildings. A total of 114,000 square feet in multiple-occupancy buildings and 256,800 square feet of first-floor space in single-occupancy buildings comprises the 370,000 square feet of first-floor space required to house the firms anticipated to relocate at the proposed center.

Much of the interior of the fruit and vegetable multiple-occupancy building units will be refrigerated. To maintain proper temperatures, rear doors should be equipped with door seals to close off the space between railcars and the building. Since drainage is essential to accommodating the melting ice used to keep certain produce moist, floor drains should be provided in areas where coolers are anticipated.

The group of units set aside for firms too small to occupy conventional units will be arranged with a 6,000-square-foot common cooler completely occupying two units, with the remaining six units left open and divided into various sized stalls. A common corridor is available throughout the center of the units to serve all firms utilizing the facility. A possible arrangement of these eight units is shown in figure 13.

Single-occupancy fresh fruit and vegetable buildings will be designed to meet the particular needs of individual firms. An arrangement of a fresh fruit and vegetable single-occupancy building included in the proposed center is illustrated in figure 14.

This fresh fruit and vegetable single-occupancy building layout is designed for a firm handling a complete line of produce items. No processing is anticipated. All operational areas of the warehouse are on the first floor. Some support facilities are located on a mezzanine to avoid conflict with warehouse operations. The interior storage areas should provide a minimum of 21 feet of clear-stacking height. A minimum of 9 feet of clear space should be available under the mezzanine so forklift trucks can operate efficiently.

All areas of the warehouse are arranged to allow easy movement between them. This permits order-selection flexibility and a U-shaped flow of products, assuming truck receiving and shipping. When rail receiving is employed, the interior arrangement allows straight-through movement of incoming products. Coolers are grouped to promote efficient arrangement of refrigeration equipment and sharing of common insulated walls.

The warehouse is designed for extensive use of pallet racks in order to make efficient use of cubic space. Industrial 48-inch by 40-inch pallets and appropriate racks are suggested for major storage areas.

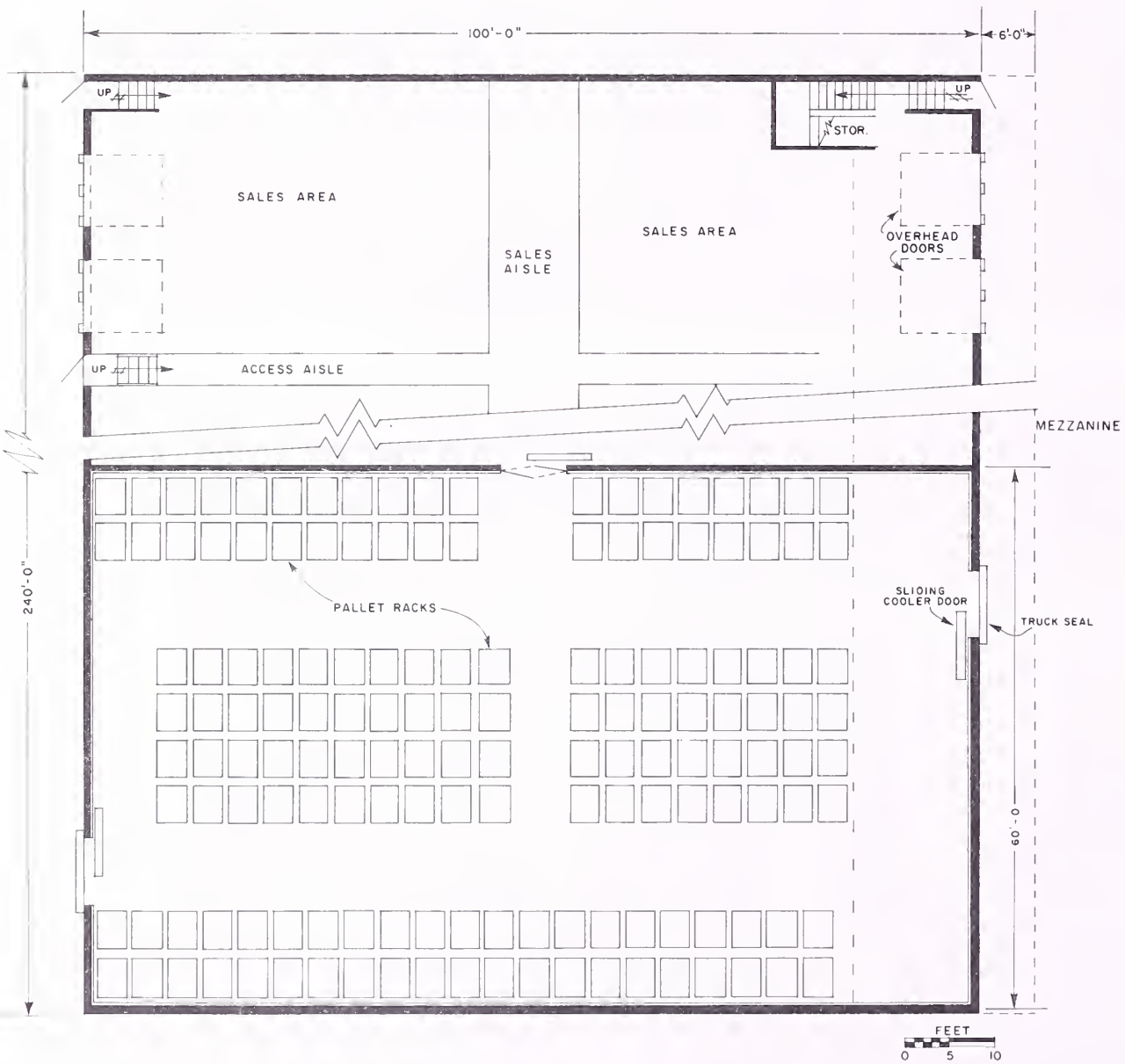
Several additional layout areas are for support activities. A truck receiving and shipping area that can accommodate three trucks is for unloading incoming trucks, temporary storage of incoming merchandise, assembly of outgoing orders, truck loading, pallet storage, and charging forklift truck batteries. Additional receiving areas are located elsewhere in the warehouse: truck receiving directly into the dry cooler, and rail receiving into the general storage area and the wet cooler. This arrangement of auxiliary receiving areas promotes efficient movement of incoming products. A small restroom on the first floor is for use by truck drivers, casual visitors, and some warehouse employees. Additional restrooms, lunchrooms, and offices are located on the mezzanine.

Groceries

The 18 grocery firms included in new facility planning will require 21 multiple-occupancy building units and 12 single-occupancy buildings to meet facility needs. A total of 955,900 square feet of

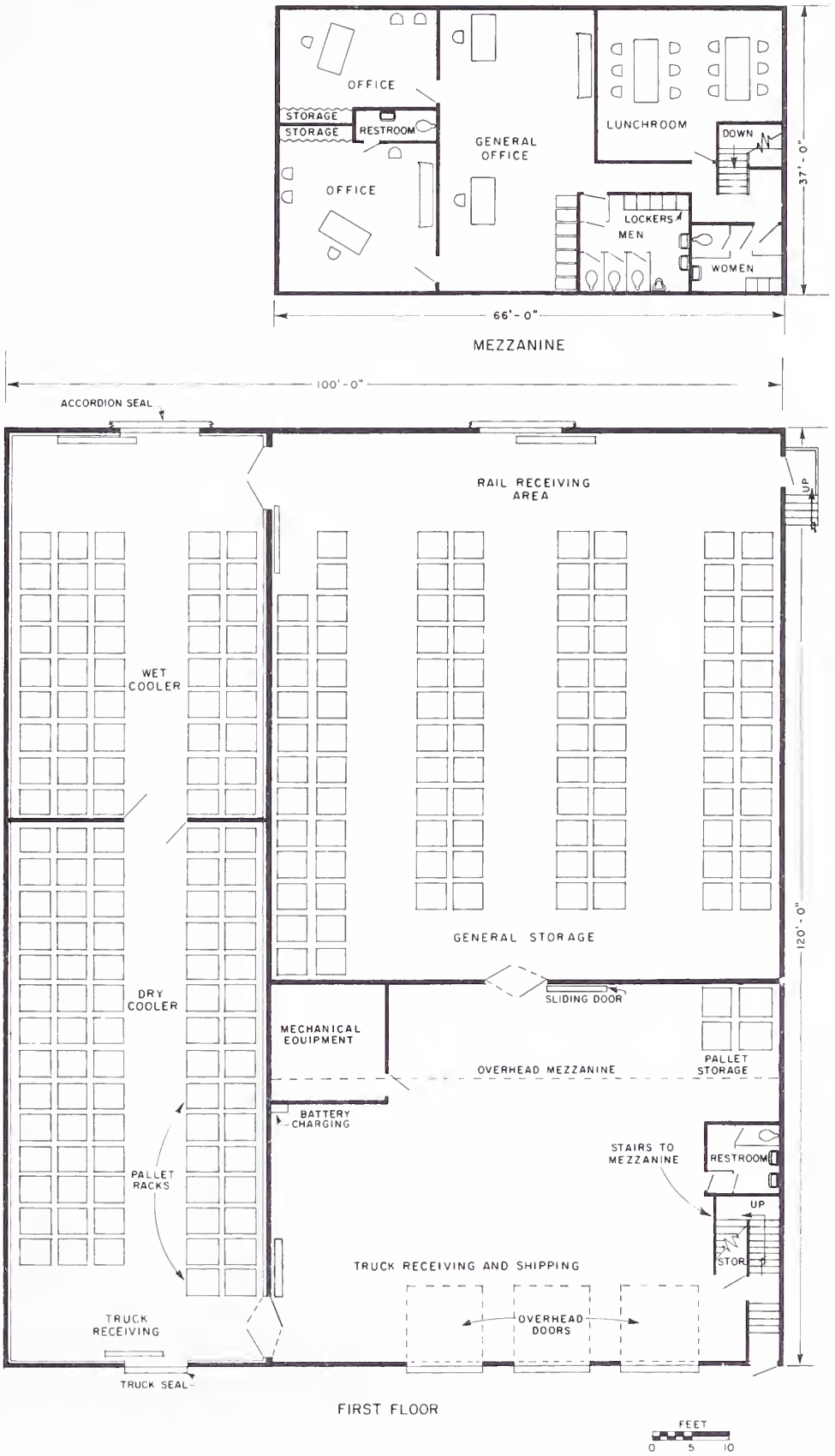
Figure 13.--Special-purpose group of units in a multiple-occupancy building for small fresh fruit and vegetable firms.

MEZZANINE



FIRST FLOOR

Figure 14.--Layout of a fresh fruit and vegetable firm in a single-occupancy building.



first-floor space is anticipated in the proposed center for grocery firms, of which 63,000 square feet is designated as multiple-occupancy building space. One grocery firm will be housed in a group of three buildings, each designed to serve special portions of the overall operations anticipated in that company after relocation.

Special floor preparation will be required in some grocery multiple-occupancy building units to accommodate freezers for storing limited amounts of frozen food. No other special requirements should be necessary for grocery multiple-occupancy building units.

A possible interior arrangement of one of the grocery buildings comprising the proposed wholesale food distribution center is illustrated in figure 15. This particular layout is designed for an institutional grocery wholesaler handling only dry groceries. No products requiring refrigeration would be handled from this facility. Ceiling heights should be designed to allow a minimum of 21 feet of clear stacking height.

All operational areas in the building are located on the first floor. Products handled in large quantities are located in deep-floor storage adjacent to truck doors with direct access to rail doors for efficient product movement through order selection, and to facilitate receiving operations. An even number of aisles is provided to allow order selection to begin and end in the same portion of the warehouse without backtracking. Support facilities, such as restrooms, lockers, and lunchrooms, are located directly adjacent to the warehouse. General and private offices are arranged to isolate the warehouse from visitors.

Meat and Related Products

Twenty-three of the 45 wholesale meat firms requiring new facilities could be accommodated in 25 standard units in multiple-occupancy buildings, with 2 of the 23 firms occupying 2 units each. Twenty-two large-volume operators will require 21 single-occupancy buildings, since two of these firms plan to merge.

Total multiple-occupancy building space will consist of 120,000 square feet and include both first- and second-floor space. These facilities are completely enclosed with each individual unit containing 3,000 square feet of first-floor space and 1,800 square feet of second-floor space. The basic design must be flexible so an independent meat firm could occupy one unit but be able to expand this unit to one and one-half units, two units, or some other multiple of the standard unit up to about 15,000 square feet of space. Partitions between units should be made of materials that can be removed to provide for possible future expansion. A possible layout arangement for a double-meat unit in a multiple-occupancy building is shown in figure 16.

An enclosed access entrance to the receiving and shipping area at the front of the facility should be provided with a stairwell that opens into an enclosed dock located at a truckbed height of 45 inches above the street.

Additional steps extend this stairway passage to a second-floor hallway that, in turn, leads directly to offices, an employee welfare room, and restrooms. A storage area for packaging materials is located toward the front of the facility. Ceilings should be 12 feet high on the first floor and 8 feet high on the second floor.

Construction of all meat facilities must follow the recommendations of the U.S. Department of Agriculture's Food Safety and Inspection Service, and the final design must be approved prior to initiation of any construction. 1/

Employee safety features also must be incorporated into the facility layout design. For example, floors must be surfaced with skidproof finishes to help prevent accidents. Also, the type of construction materials selected must be able to absorb sound to minimize the noise level and comply with other employee protection standards. 2/

Twenty-one separately incorporated meat-product firms will each require their own single-occupancy building, containing a total of 466,620 square feet of floorspace. A possible layout for a meat firm housed in a

1/ To obtain a comprehensive resume of all sanitary meat-inspection requirements necessary for a facility to be granted USDA approval to handle, process, and store federally inspected meat, refer to "U.S.- Inspected Meatpacking Plants, a Guide to Construction, Equipment, Layout," U.S. Dept. of Agr., Agr. Handbook No. 191, 73 pp. (revised July 1976).

2/ To obtain a comprehensive resume of all occupation safety and health facility-building standards established by the U.S. Department of Labor, refer to the Williams-Steiger Occupational Safety and Health Act of 1970. Parts I and II Occupational Safety and Health Administration of the U.S. Department of Labor, Vol. 36, No. 105 (effective May 1971).

Figure 15.--Layout for a grocery firm in single-occupancy building.

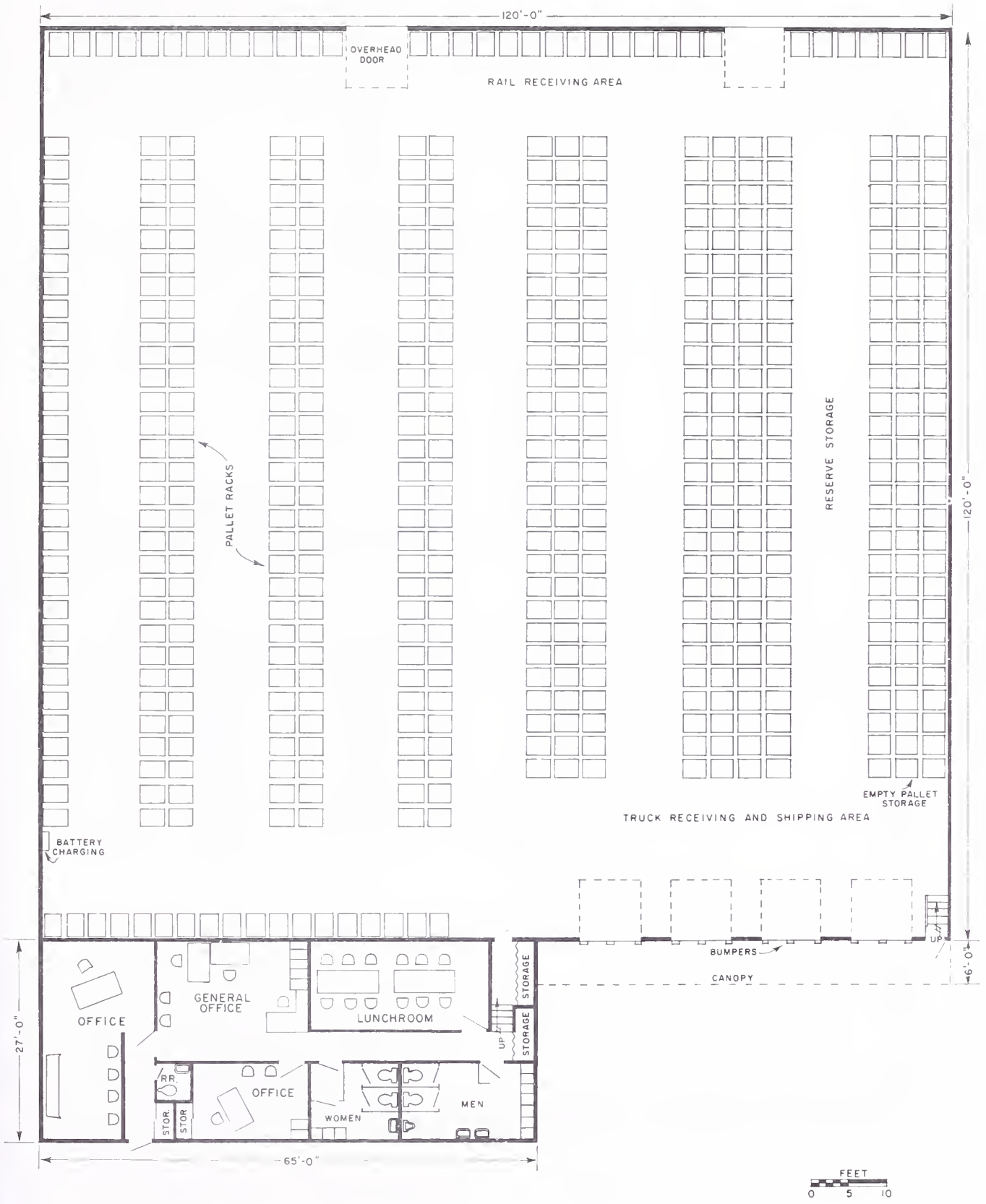
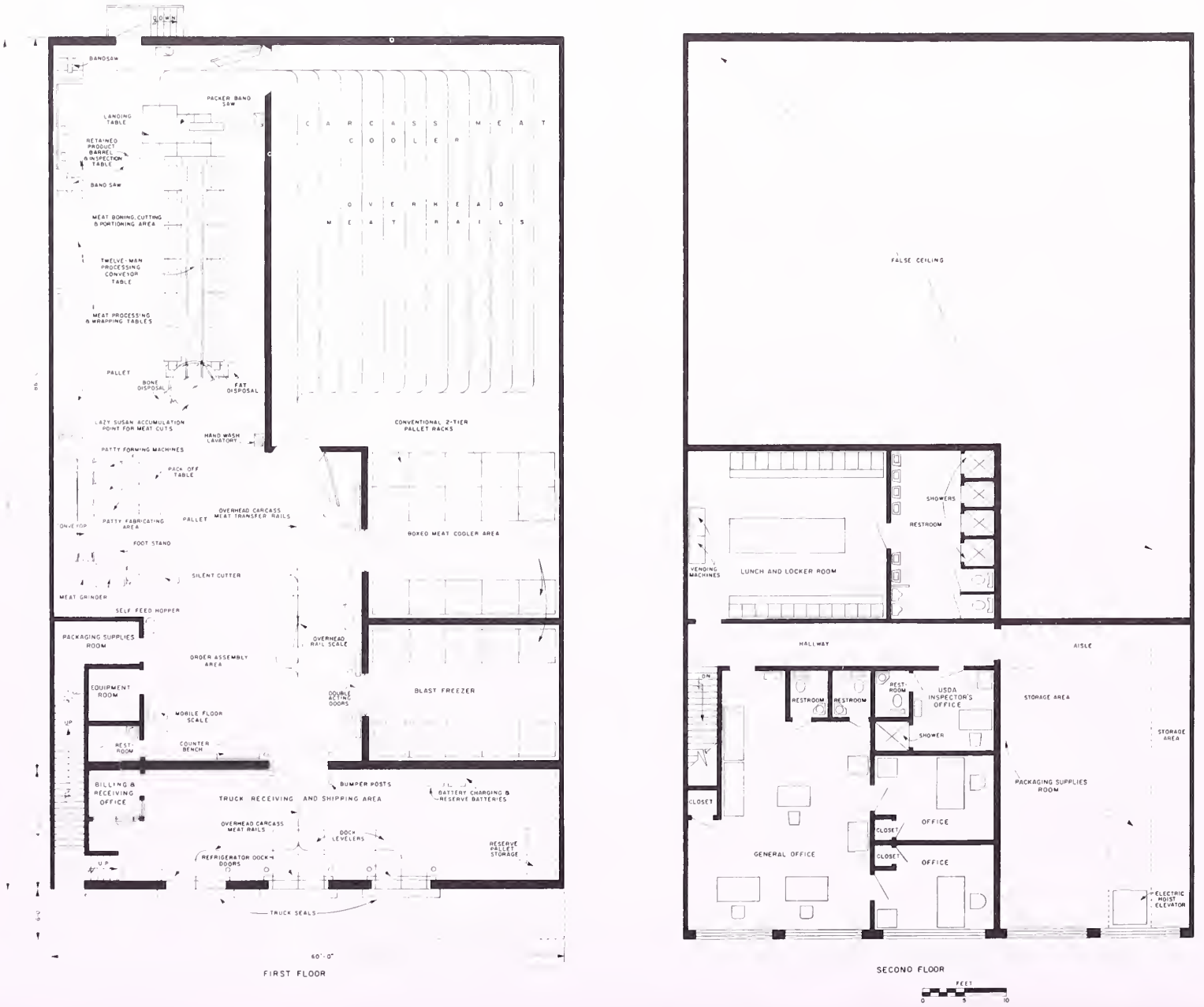


Figure 16.--Layout for a meat and related products firm in a double multiple-occupancy building unit.



single-occupancy building containing approximately 18,600 square feet of space is shown in figure 17.

This layout is designed to provide a U-shaped product flow for both carcass and boxed meats. It provides maximum inventory flexibility and product movement free of backtracking, bottlenecks, and excessive labor handling. Each product-storage area has been organized within the overall plan for effective use of labor and materials-handling equipment. This helps lower operating costs and improve job performance efficiency. All work areas are incorporated into the building's first floor to further improve product-handling efficiency.

Offices, restrooms, and lunchrooms are located on the second floor directly above the receiving and shipping platform at the front of the building. The overall interior ceiling height in the coolers should be at least 21 feet to provide sufficient room for three-tier pallet-stacking operations and adequate space for cold-air circulation. With the current trend toward shipping boxed primal meat cuts rather than carcass beef, veal, and lamb, the same ceiling height should be adopted for the carcass cooler to prevent the facility from becoming prematurely obsolete.

Equipment installations for the boxed-meat cooler and freezer storage areas include three-tiered drive-in pallet racks as well as conventional racks that are aligned and arranged for maximum space utilization and efficient order selection. Live storage installations with gravity-flow shelving and a separate loading aisle are provided for low-volume items in the boxed-meat cooler. Mobile platform scales also are shown in this room.

Dairy Products

The 9 dairy products firms included in new facility planning require 13 units in a multiple-occupancy building and 3 single-occupancy buildings to meet their facility needs. The six firms in multiple-occupancy buildings require 39,000 square feet of floorspace. The three firms to be housed in single-occupancy buildings require a total of 90,000 square feet for a combined total of 129,000 square feet of floorspace in the proposed center.

Special floor preparation will be required for one firm which needs three units in a multiple-occupancy building to accommodate freezer storage space. The remaining firms require various amounts of cooler space with all needing nonrefrigerated storage and other space on the ground floor and offices and welfare areas on the mezzanine level. The floors must be sloped for proper drainage with outlets installed in the coolers, processing rooms, and the dry storage- and order-assembly areas.

The three firms to be housed in single-occupancy buildings vary in type from those which process fluid milk products, cottage cheese, and frozen dessert items to others that process and wholesale domestic and imported cheese. A typical layout of a dairy product-processing plant included at the proposed food distribution center is shown in figure 18. The plant is designed and equipped to process and handle approximately 6.5 million gallons annually of fluid milk products, fruit drinks and juices, cottage cheese, and ice cream, and for storing and distributing over 300,000 gallons of frozen dessert items received from outside sources. It contains approximately 30,750 square feet of floorspace and is essentially a one-story structure, with all processing operations on the first floor and the administrative offices at the front of the building on the second floor. The plant has a 23-foot ceiling height, except for the portion of the cooler extending from the main body of the plant, which is 12 feet. The administrative offices have a 10-foot ceiling height, while those areas beneath, including most of the case-storage room, have a 12-foot ceiling height. Floors of the receiving shelter and the boiler and refrigeration rooms are at ground level, making the ceiling height in those areas approximately 27 feet.

The administrative offices extend 13 feet beyond the first floor and are supported by columns at ground level. They include the various areas needed to conduct the plant operations, but can be arranged as desired to fit specific requirements. The interior arrangement shown in figure 19 allows the processing- and filling-room operations to be observed through large windows installed at the rear of the offices. This improves management control and also permits visitors to observe the operations without entering the processing areas, which could affect plant sanitation and endanger the safety of individuals.

The plant is designed with the processing and filling areas near the center, and the supporting areas adjacent to and extending to the perimeter of the building. This arrangement allows each plant area to be expanded easily for future growth. A good flow pattern is provided with the individual areas and equipment arranged in a sequence to simplify operations and minimize cost.

Figure 17.--Layout for a meat and related products firm in single-occupancy building.

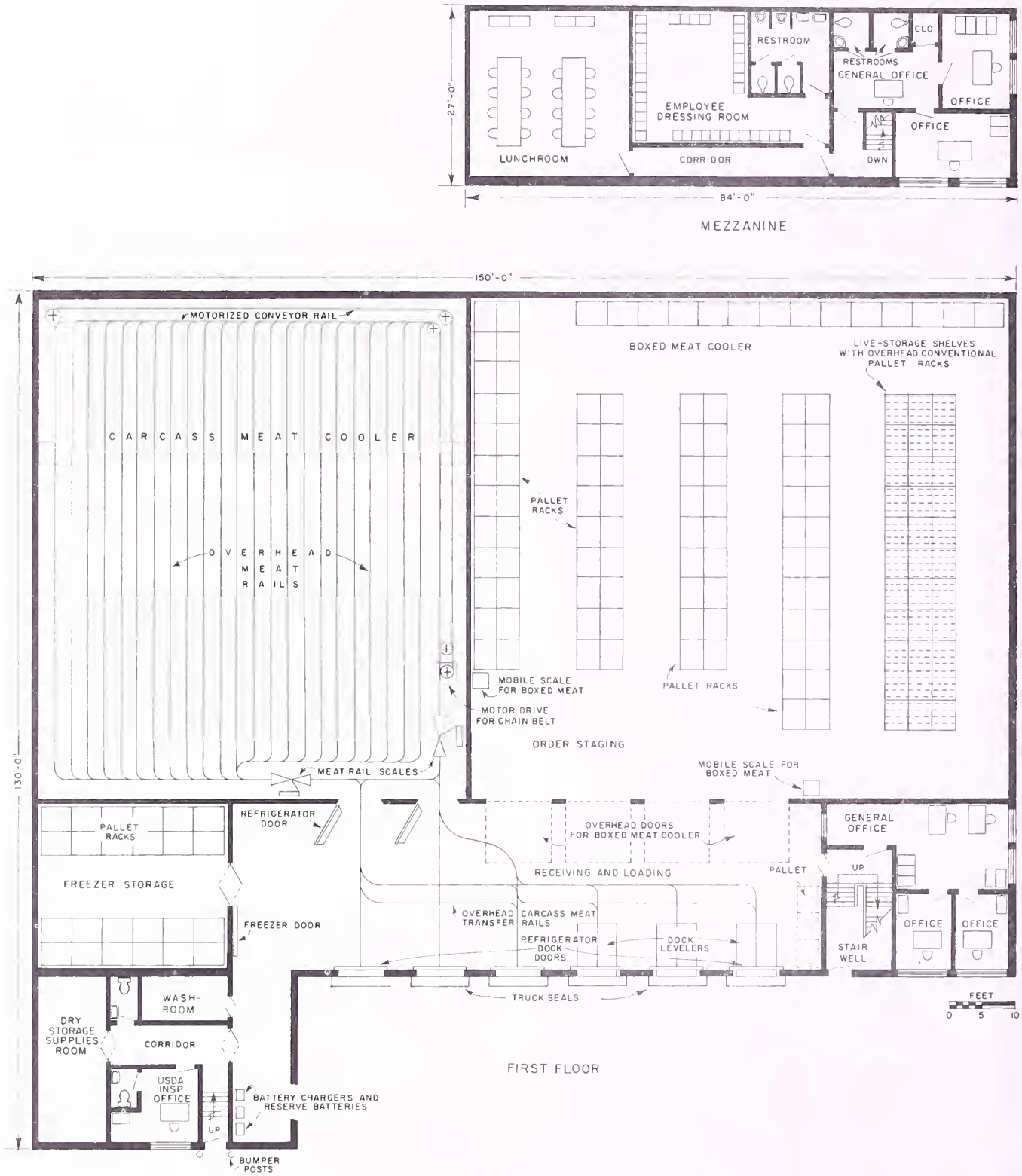


Figure 18.--Layout for a dairy products-processing plant in a single-occupancy building.

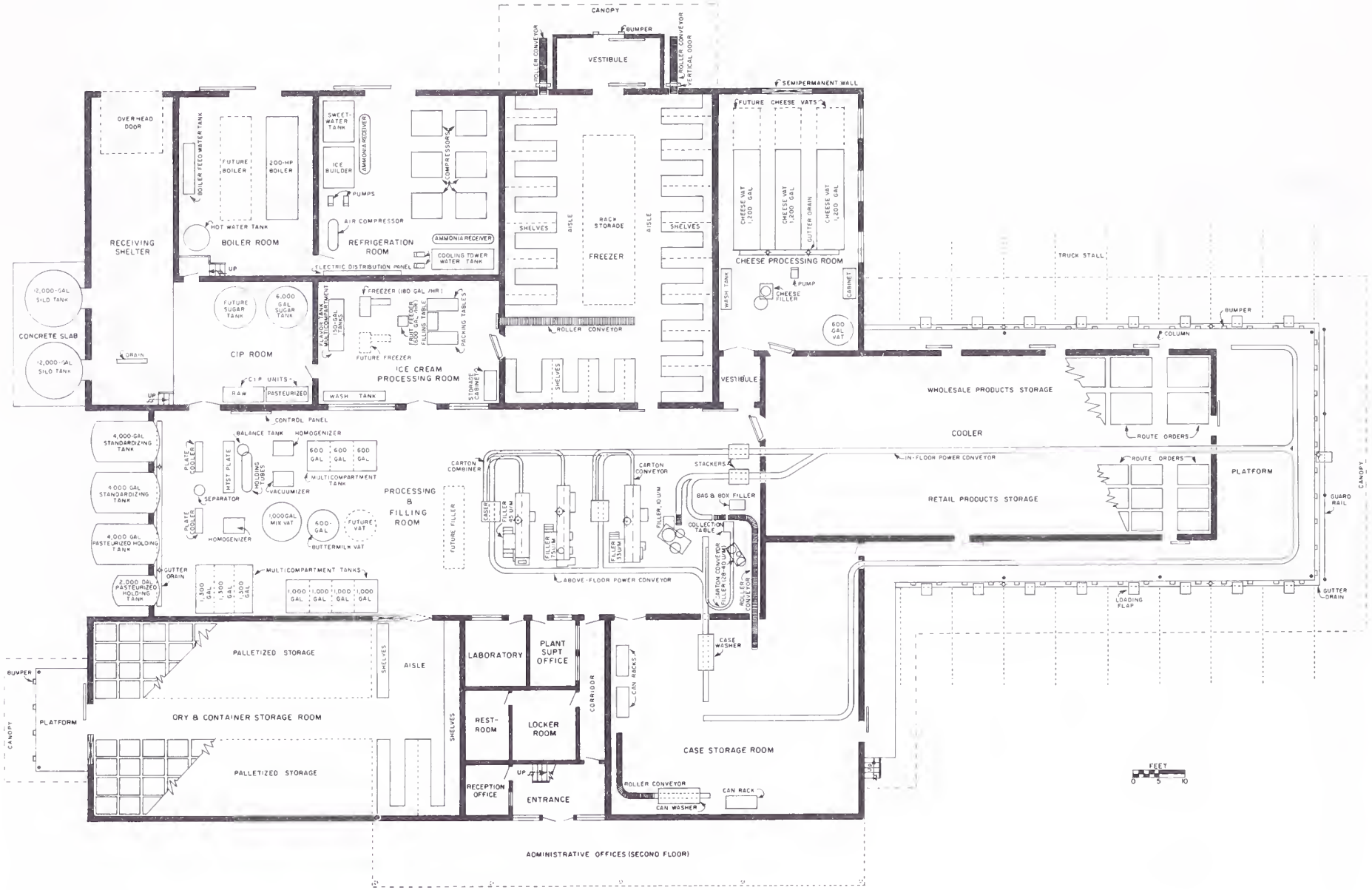
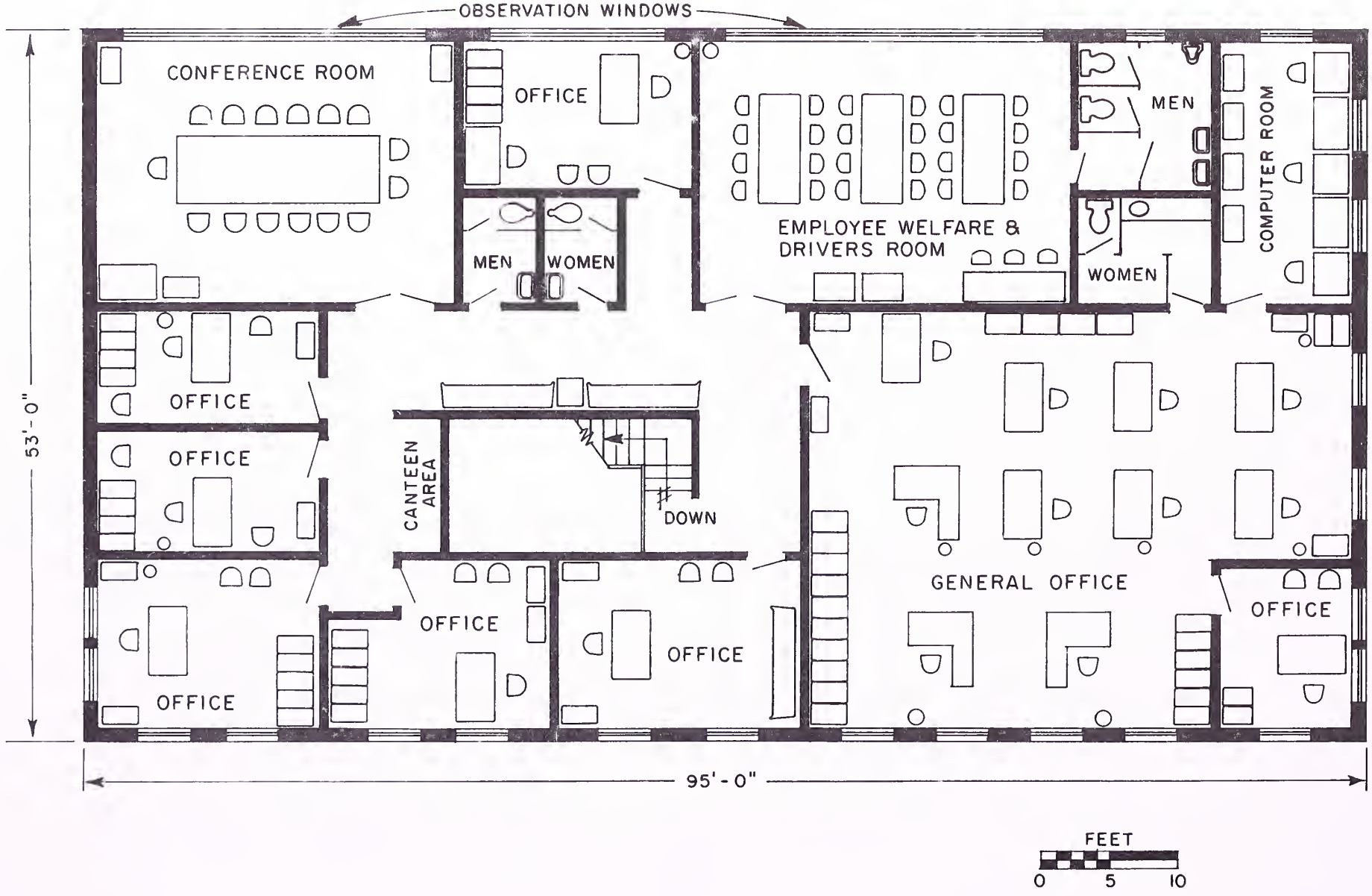


Figure 19.--Layout for administrative offices of a dairy products plant.



Many design characteristics must be incorporated into the construction of a dairy plant. These facilities must conform to Federal guidelines and regulations on building construction, 3/ employee safety, 4/ and environmental protection. 5/ All government agencies with regulations affecting dairy-processing plants must be consulted in order to comply with specific requirements. Since dairy-processing plants are highly specialized buildings, prospective firms should either lease or purchase the appropriate land on the market site and build their own facilities. However, for those firms involved in wholesaling and distributing domestic and imported cheese, a standard building design could be used and leased by the tenant.

Poultry and Eggs

The 10 poultry and egg firms for which new facilities are planned will require 9 multiple-occupancy building units and 4 single-occupancy buildings to meet their facility needs in the initial stage of market development. Six of the firms will require a total of 27,000 square feet of floorspace in a multiple-occupancy building housing poultry and egg, meat, dairy, and other firms. Four poultry and egg firms will be housed in single-occupancy buildings totaling 67,600 square feet, bringing the overall total space requirements for poultry and egg firms to 94,600 square feet of floorspace at the proposed center.

Two single-occupancy and four multiple-occupancy firms will require special floor preparation to accommodate holding freezers. Floor drains and sloped floors for adequate drainage will be required in the cooler, order assembly area, processing room, and trashroom of the poultry facility. Drainage is also an important consideration in the egg facilities recommended for the new center. Specific areas of this type of facility will need special design provisions for removing water from processing and cleaning operations. Floor drains are provided under the egg-washing machines and in the trash-room. Figure 20 illustrates a possible interior arrangement of a poultry facility and figure 21 illustrates a layout for an egg facility.

Both of these layouts are designed for products requiring refrigeration during storage. The ceiling height of each unit should provide a minimum of 21 feet of clear-stacking height.

All operational areas in the buildings are located on the first floor. Products will be handled in a unitized form to achieve efficient movement and storage. In the poultry wholesale facility, products can be moved directly to and from the platform where trucks are loaded and unloaded to refrigerated storage as unit loads, or via the order-assembly area to comprise mixed loads. The platform in each layout should be truckbed height and protected by a roof and canopy. Support facilities such as restrooms, lockers, and the lunchroom are located adjacent to the warehouses. General shipping and private offices are located for convenience of order processing while isolating visitors from the warehouses.

Frozen Foods

The seven frozen food firms included in new facility planning require a total of 61,600 square feet of first-floor space. This recommended space consists of eight multiple-occupancy building units, totaling 24,000 square feet, and two single-occupancy buildings, totaling 37,600 square feet.

Many of the firms planning to relocate their present facilities are heavily engaged in processing frozen food products for later sale to retail outlets. Accordingly, most facilities planned for this commodity include considerable processing space, coolers, unrefrigerated areas for temporary supply storage and freezers for assembling shipments to customers. Facility recommendations are based on the assumption that additional products may be stored in commercial facilities near potential or regular customers.

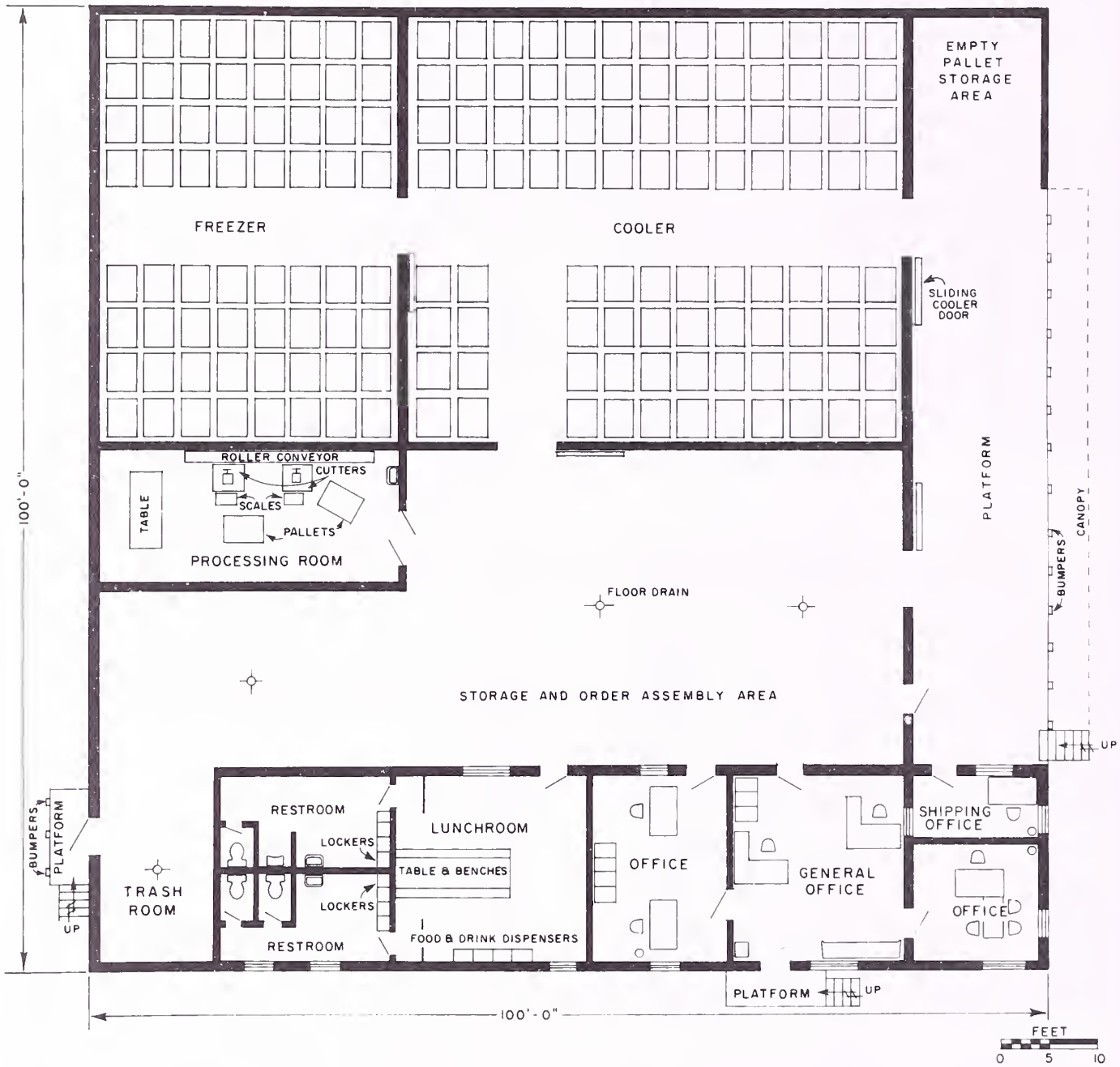
Special requirements must be met in the internal arrangements and construction of frozen food multiple-occupancy building units. Floors under freezers should be insulated. Drains should be provided in coolers and in processing space. False ceilings may be advantageous in processing areas where operations do not require high ceilings.

3/ Grade "A" Pasteurized Milk Ordinance, 1965. Recommendations of the United States Public Health Service of the U.S. Department of Health, Education, and Welfare.

4/ Williams-Steiger Occupational Safety and Health Act of 1970. Occupational Safety and Health Administration of the U.S. Department of Labor (effective date April 28, 1971).

5/ Affluent Limitation Guidelines of the Environmental Protection Agency, Pretreatment Standards Applications for the Dairy Products-Processing Industry, Point Source Category. Federal Register, Vol. 39, p. 18,594.

Figure 20.--Layout for a poultry facility in a single-occupancy building.



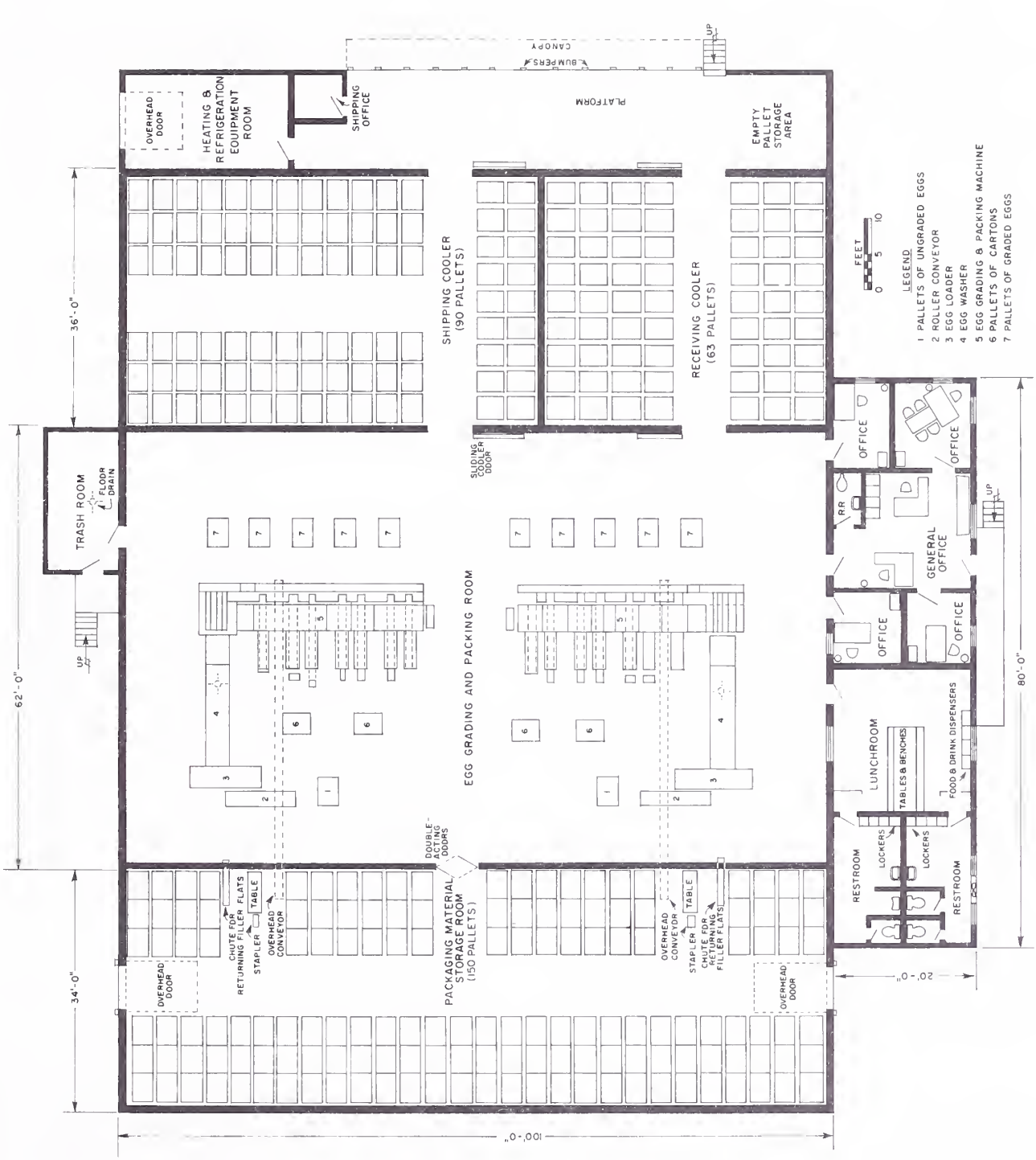


Figure 21.--Layout for an egg facility in a single-occupancy building.

Actual layouts of frozen food single-occupancy buildings would reflect particular design requirements of specific firms included in new facility planning. Figure 22 illustrates an example of how one of the frozen food buildings illustrated in figure 9 could be arranged internally.

The layout illustrated in figure 22 is intended to serve a firm engaged in major processing operations with some wholesaling of frozen food and products produced by other manufacturers. Major operational areas of the building are arranged around a central processing room to promote a smooth flow of incoming supplies from intermediate storage, to processing, through blast freezing, and into storage pending shipment to customers. The processing equipment shown in the layout does not represent lines designed to produce any particular product, but is included for illustrative purposes and to identify a particular part of the building.

Each of the storage areas shown in the layout is located to serve processing operations efficiently and promote movement of products sold directly to customers. Floor slots and various types of pallet racks are featured in each storage area to facilitate storage efficiency. The use of 48- by 40-inch and 40- by 32-inch pallets in the cooler provide added flexibility in storing products handled in different quantities.

Storage areas should be designed to provide a minimum of 21 feet clear height for stacking. Processing operations, however, do not require such high ceilings; a false ceiling in the portion of the building set aside for that purpose is recommended to conserve heating and cooling costs.

A mezzanine is located over the front of the building, covering part of the facility that does not require high ceilings. All of the support facilities are located on this mezzanine with separately defined access to employee support areas (restrooms, locker rooms, and lunchrooms) and company offices to promote security.

Fish and Shellfish

The four fish and shellfish firms needing to replace existing facilities will require nine multiple-occupancy building units, totaling 27,000 square feet of first-floor space, at the new center. No single-occupancy buildings are included in new facilities for fish and shellfish.

Figure 23 illustrates how a fish and shellfish firm could arrange the interior of two multiple-occupancy building units. The layout is designed to arrange product-storage areas in close proximity to receiving, shipping, and processing areas; the design also isolates processing areas from each other where necessary. This arrangement minimizes the distances products must be moved during receiving, order assembly, and processing.

The interior of fish and shellfish multiple-occupancy building units should be finished to minimize the effort required to maintain good sanitation. Drains should be provided in appropriate areas to facilitate cleaning and dispose of melting ice from stored and processed products. Offices and support facilities are located on the mezzanine to avoid conflict with processing and handling operations. Inspectors' offices are located adjacent to major processing areas.

Bakery Products

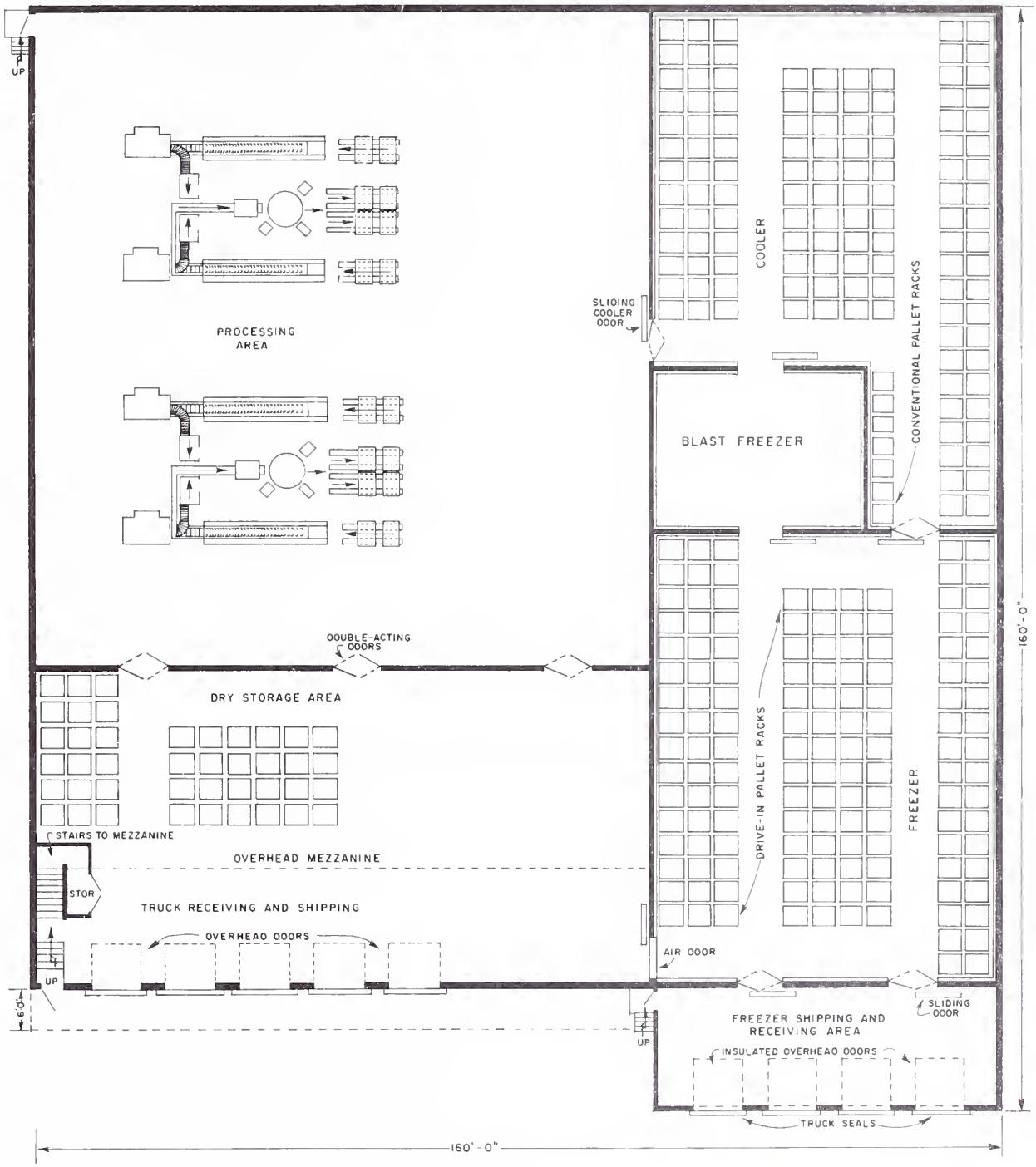
Twelve bakery products firms were included in new facility planning for the proposed center requiring a total of 348,300 square feet of first-floor space. This space is comprised of 10 units in a multiple-occupancy building and 5 single-occupancy buildings. Of the total space required at the new center, 30,000 square feet are in multiple-occupancy units and 318,300 square feet in single-occupancy facilities.

Bakery products firms included in planning for the proposed center include both processing and wholesaling firms. Some of these companies buy bakery products from nearby bakeries and distribute to retail customers with route trucks. Other companies anticipate large bakery operations in their new facilities and will sell or distribute to wholesale firms at the center or elsewhere.

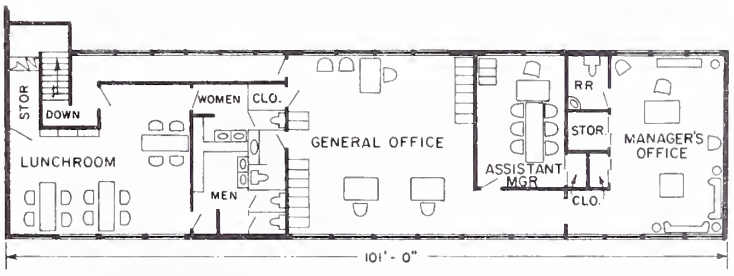
A mix of different types of bakery products firms will be located in the multiple-occupancy buildings. Bakery operations in this part of the proposed center will be small specialty bakers, processors, and distributors. Distributing firms will find ample parking in the multiple-occupancy section of the center useful for parking route trucks. A few firms in multiple-occupancy building units will maintain baking operations and also distribute directly to stores from their facilities.

All of the firms operating in single-occupancy buildings will be bakers or major processing firms. A few of these firms also will

Figure 22.--Layout of a frozen food firm in a single-occupancy building.

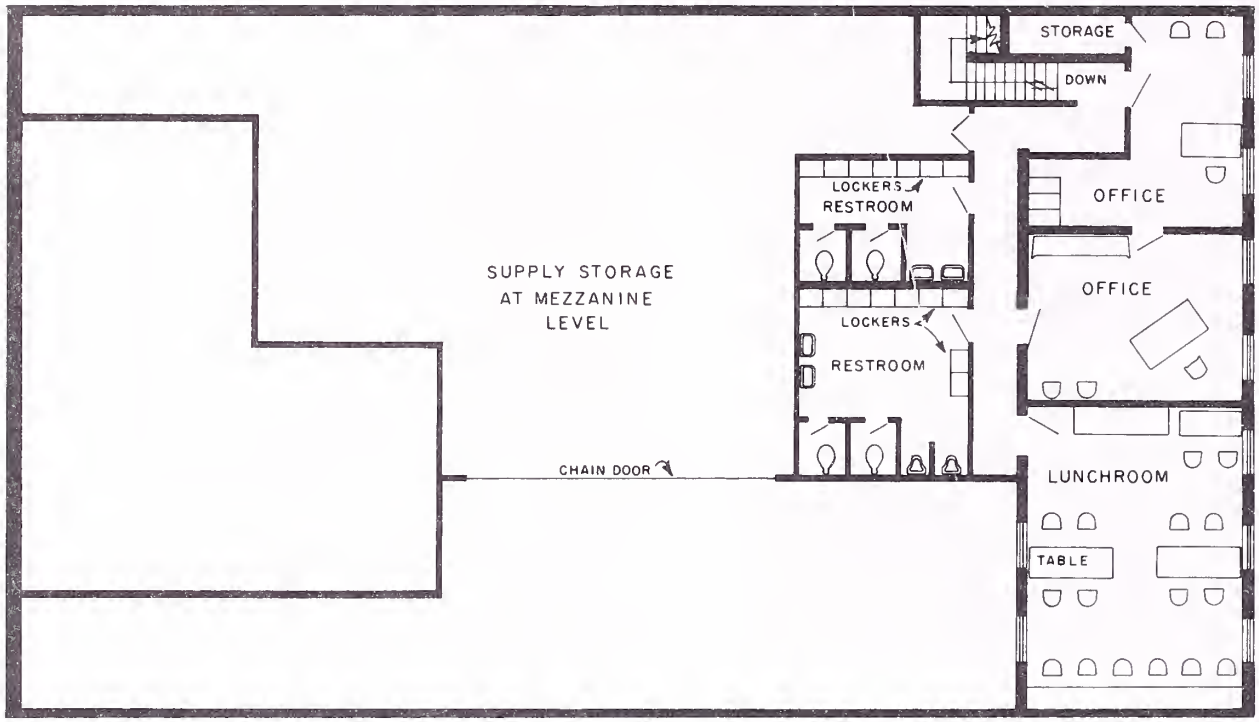


FIRST FLOOR

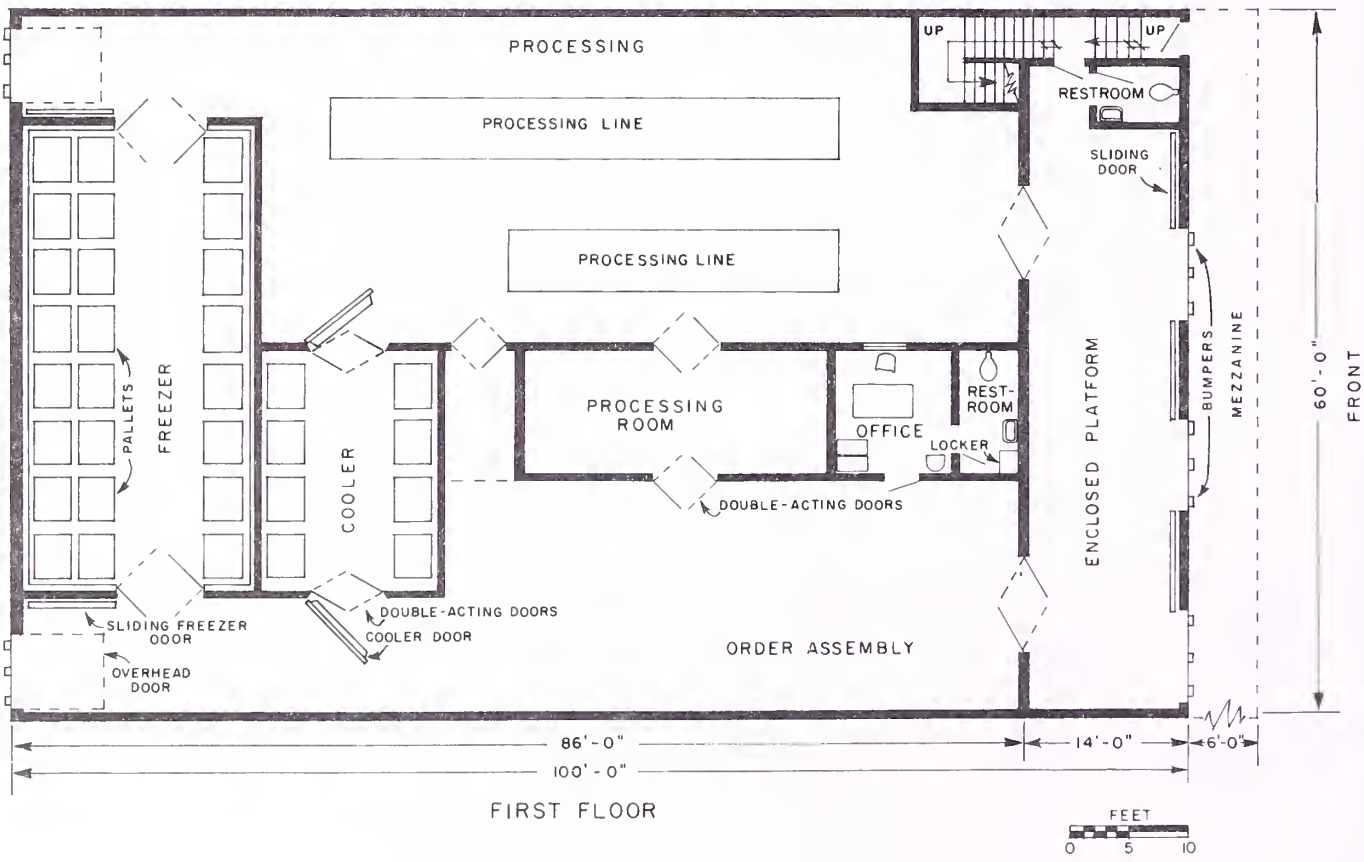


MEZZANINE

Figure 23.--Layout for a fish and shellfish firm in two multiple-occupancy buildings.



MEZZANINE



FIRST FLOOR

distribute products produced in their facilities directly to retail outlets, but the majority will distribute their products to wholesale firms located at the proposed center or elsewhere for subsequent sale to retail outlets.

Bakery products firms can utilize unaltered multiple-occupancy building units for their operations. Some processing firms using this type of facility may wish to extend the planned mezzanine into a complete second floor for light storage of packing materials and associated supplies.

All single-occupancy buildings would be designed to meet the particular needs of individual bakery products firms. Figure 24 illustrates one layout of a bakery products firm in an existing single-occupancy building. This layout is designed for a firm producing bread, buns, doughnuts, and related products, and is reproduced from a recent article in a bakery trade journal. 6/

Various portions of the building are arranged to promote a smooth flow of raw materials and products through the baking process to outgoing delivery trucks. Offices and employee welfare areas (restrooms, lunchrooms, etc.) are isolated from the main production area to promote safety, yet close enough for easy accessibility. Conveyor lines and machinery are arranged to minimize transport distances for raw materials and finished products. Even though this layout was developed for an expansion of an existing building it could represent a flexible arrangement for a new building.

Beverages

Six beverage firms are expected to need new facilities at the proposed center. These beverage firms will require a total of 224,800 square feet of first-floor space consisting of one multiple-occupancy building unit with 3,000 square feet of space and five single-occupancy buildings, totaling 221,800 square feet.

Beverage firms included in new facility planning are those processing and bottling soft drinks, as well as firms selling products produced by other wholesalers. Individual facilities are designed to reflect particular needs.

The multiple-occupancy building unit will require no particular modification from the standard design discussed earlier in this section.

Many of the firms in single-occupancy buildings would be bottling soft drinks. Figure 25 illustrates a sample layout of a moderately sized bottling plant in a single-occupancy building. This layout is based on a plant design featured in a publication prepared by an industry trade organization. 7/ Modifications to the design reflect some recent building changes and center-design criteria. An alternative arrangement used by many firms in arranging new facilities features a one-floor layout for the bottling and syrup operations. In this arrangement, the syrup room is located adjacent to the bottling operation in lieu of the traditional gravity-fed syrup system placed on a second floor.

The main floor is arranged to locate operational areas so each can support other portions of the building if required. Offices are located adjacent to the front of the facility for the convenience of visitors and staff. The bottling room, adjacent to the offices at the front of the facility, serves as a display area. The processing equipment is isolated from the storage room to prevent contamination by refuse likely to be brought in by dirty bottles. The storage room is convenient to receiving and shipping areas.

The syrup room is on the second floor and directly over the bottling room. The laboratory is located nearby. Elevator and stairs are arranged to provide convenient access from the main floor. Restrooms and lockers for employees are also located on the second floor, near to stairs for efficient access but isolated from product storage and bottling.

All sections of the plant are arranged for efficient handling, with no bottlenecks or dead-ends to delay plant operations or cause double handling. Storage areas are designed anticipating forklift trucks, pallet jacks, and pallets.

Candy and Confectionery

The 13 candy and confectionery firms included in new facility planning need a total of 207,000 square feet of first-floor space at the proposed center. The space is comprised of 17 multiple-occupancy building units, with 51,000 square feet, and 5 single-occupancy buildings totaling an additional 156,000 square feet.

6/ Bakery, Chicago, Ill., September 1977.

7/ The Bottling Plant for the Bottled Carbonated Beverage Industry, National Soft Drink Association, Washington, D.C., 1947.

Figure 24.--Layout for a bakery products firm in a single-occupancy building.

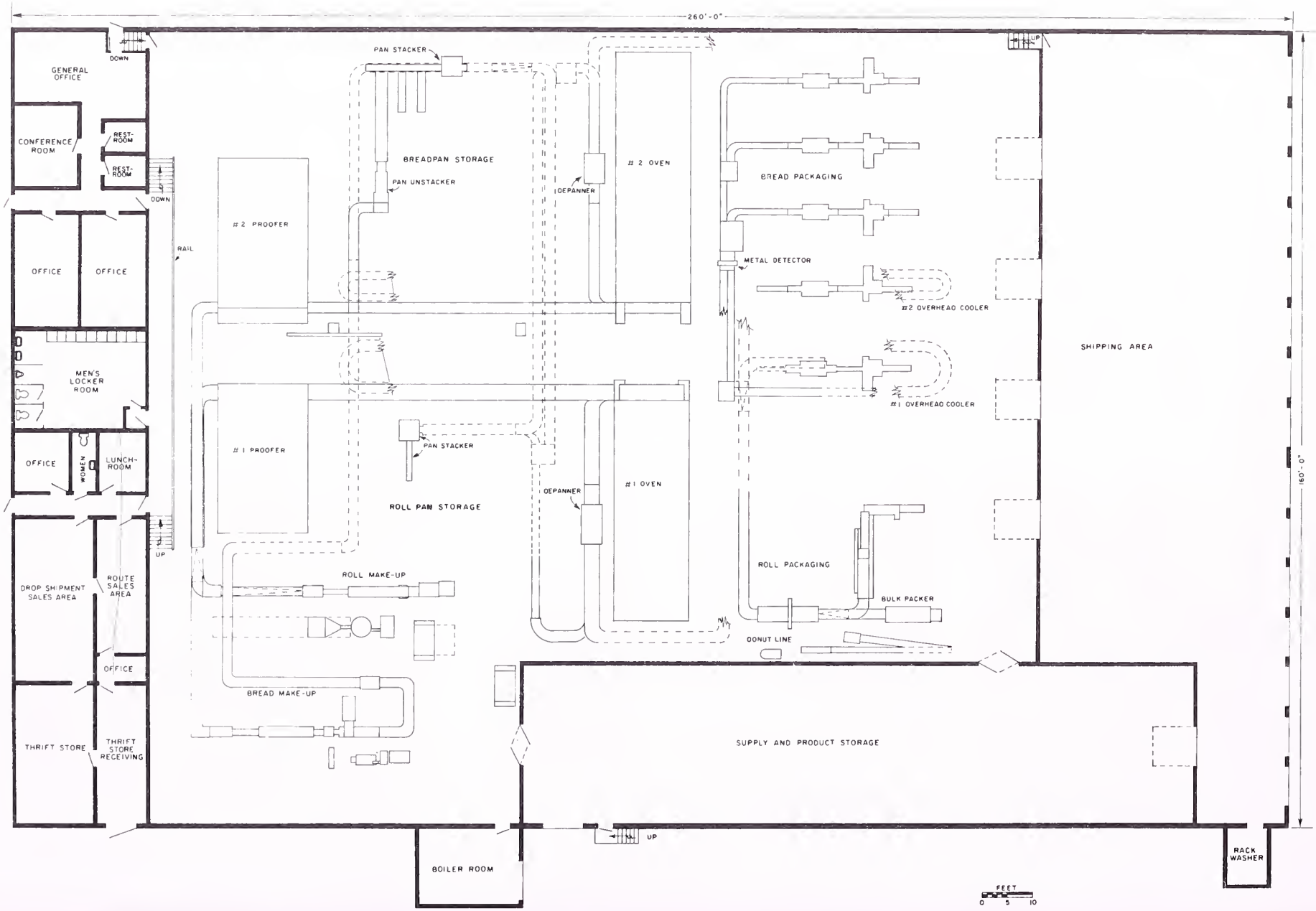
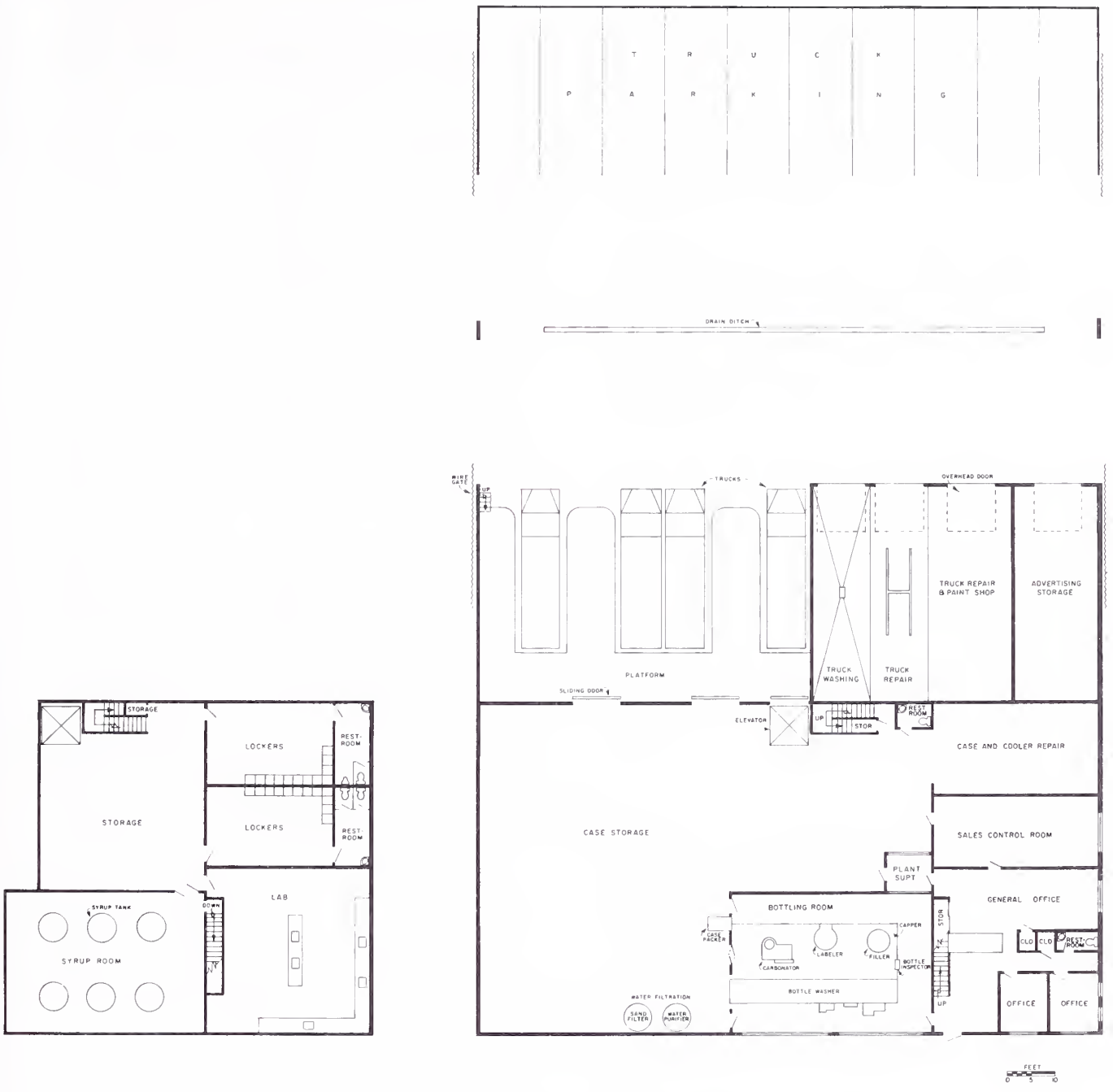


Figure 25.--Layout of a bottling plant in a single-occupancy building.



Only minor changes in multiple-occupancy building interior design should be necessary for candy and confectionery wholesalers. Some firms may consider installing false ceilings, as their mix of products may be more suitable to shelving in lieu of high pallet racks.

Firms planning to relocate into single-occupancy buildings handle a mix of products requiring several different types of handling and storage. Figure 26 illustrates a possible interior arrangement of a candy and confectionery building. This layout is designed for a firm handling a variety of candy and tobacco items and serving customers buying on a cash-and-carry basis, as well as buyers requiring delivery to their retail outlets.

All operational areas are located at different levels. Offices and support facilities are at ground level for easy access along the front of the building, serving visitors to the facility and warehouse staff. Adjacent to the offices at truckbed height is a sales area for cash-and-carry customers, with a nearby dock for loading customers' vans. A conventional dock is nearby to handle over-the-road vehicles and company delivery trucks. Each area in the warehouse is located for flexibility and efficient handling of various mixes of cash-and-carry and delivery-type orders.

Other Foods

Other food firms included in new facility planning require one multiple-occupancy building unit, providing 3,000 square feet of first-floor space, and five single-occupancy buildings providing a total of 149,600 square feet of first-floor space, for a total of 152,600 square feet of first-floor space.

No special multiple-occupancy building unit requirements are anticipated to serve other food firms.

Figure 27 illustates one possible arrangement of an other-food firm single-occupancy building. This particular layout is designed for a firm handling a limited line of specialized processed foods. No products in this firm's inventory require refrigeration.

All portions of the layout shown in figure 27 are arranged to promote an efficient product flow from receipt to shipment. Warehousing facilities feature conventional pallet racks for reserve-storage and live-storage racks (individual cartons stored on inclined, unpowered conveyors) for selection. Reserve-storage racks are located behind the live-storage racks for convenient restocking by a stock selector (a forklift truck with operating controls located directly behind the forks). A rail-receiving area is located directly adjacent to the warehousing section of the facility to minimize the distance products must be moved to storage. A second receiving area, designed for trucks, is located at the front of the facility. The truck receiving area also is used for order assembly and shipping. A small dock at the front of the facility is designed to serve the large number of small vans used by other-food firms for delivery.

All offices are located at the front of the facility with immediate access to the exterior of the building and the major operational areas of the building. Access is designed to promote security by limiting entry into the warehouse.

Arrangement of Facilities

Figure 28 illustrates a possible arrangement of facilities for the proposed northeastern New Jersey wholesale food distribution center. This arrangement is a basic design suitable for most potential sites for the new center.

The proposed center is arranged to promote efficient land use, group compatible types of firms, ease traffic flow, and provide for orderly future development. A good design benefits each firm locating in new facilities by minimizing investment and promoting efficient product movement to and from individual buildings.

Multiple-occupancy buildings, housing firms considered as traffic generators, are located at one end of the center to secure maximum access to surrounding roads. These buildings are grouped together to allow firms using the facilities to share streets, rail facilities, parking, and truck-maneuvering areas. No expansion is planned for this type of facility.

Each single-occupancy building is a free standing structure. Parking, building, and expansion are individually arranged to suit the requirements of particular firms. Rail access is available to each single-occupancy building on the center and is isolated from truck parking and maneuvering areas. Single-occupancy buildings without rail facilities have the option of adding this service at a later date by extending existing spurs.

Similar firms in single-occupancy facilities are grouped together in defined areas within the center. This arrangement allows an orderly development of different portions of the center on a commodity basis. In addition, firms may be

Figure 26.--Layout of a candy and confectionery firm in a single-occupancy building.

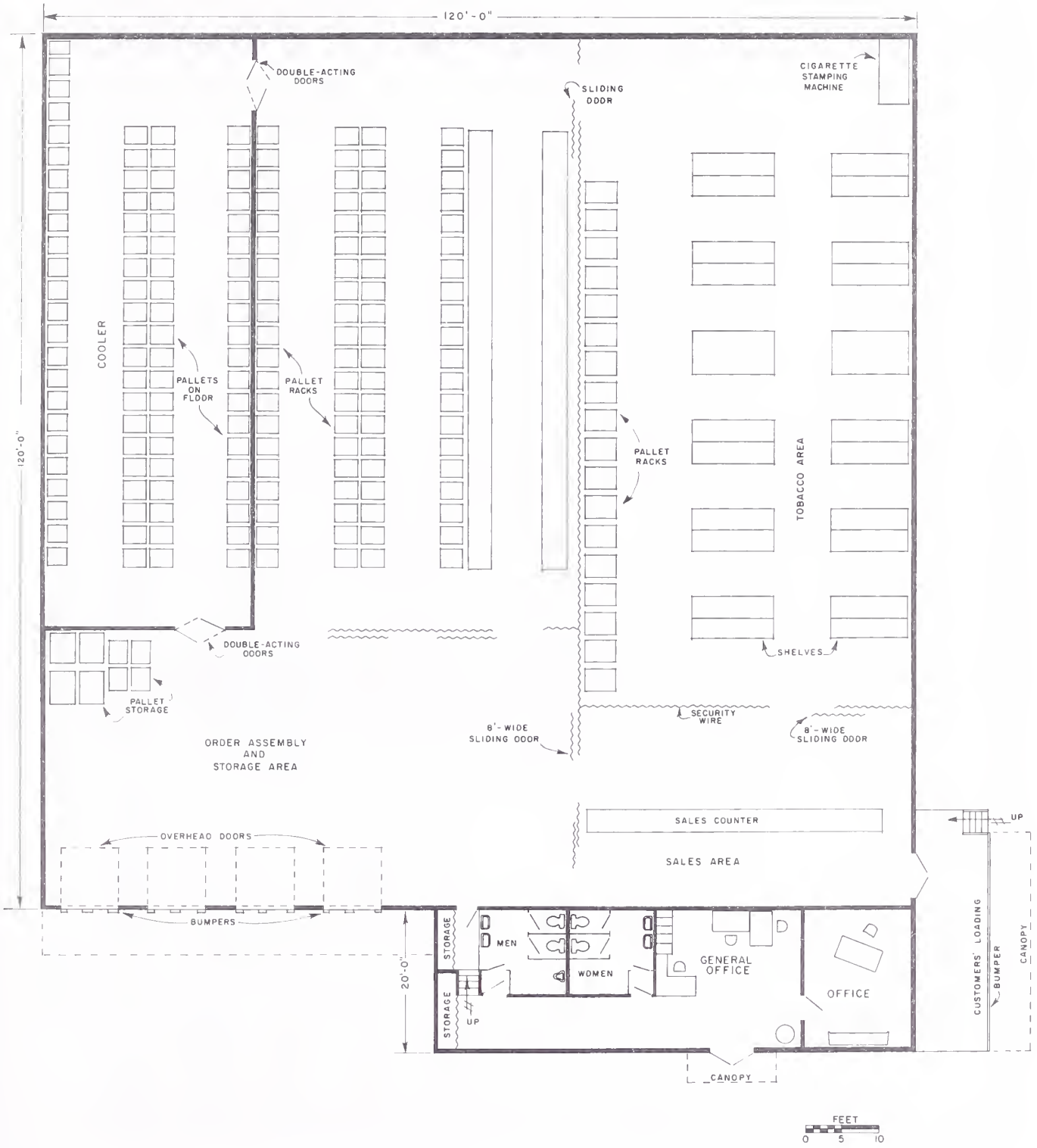


Figure 27.--Layout for other-food firm in a single-occupancy building.

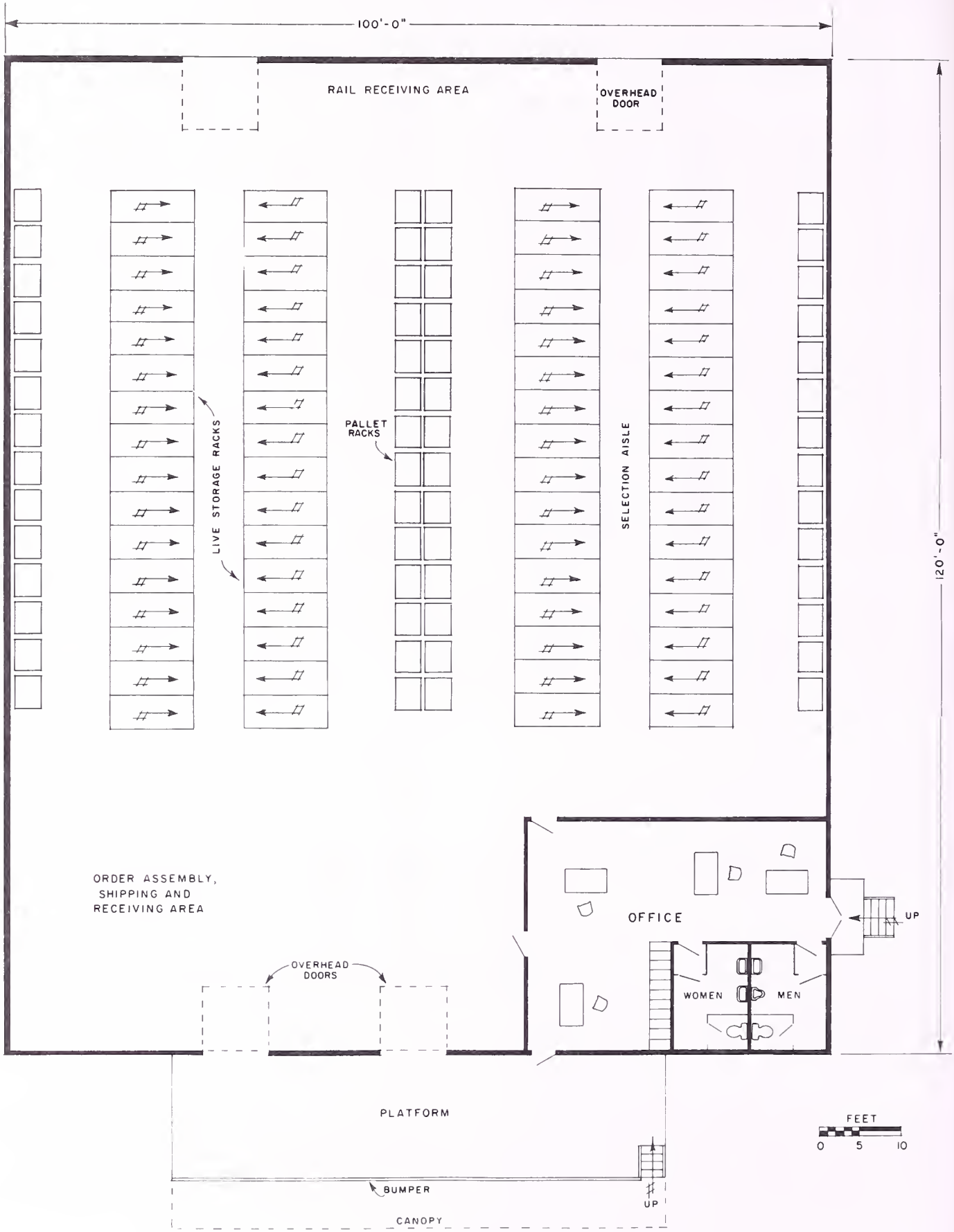
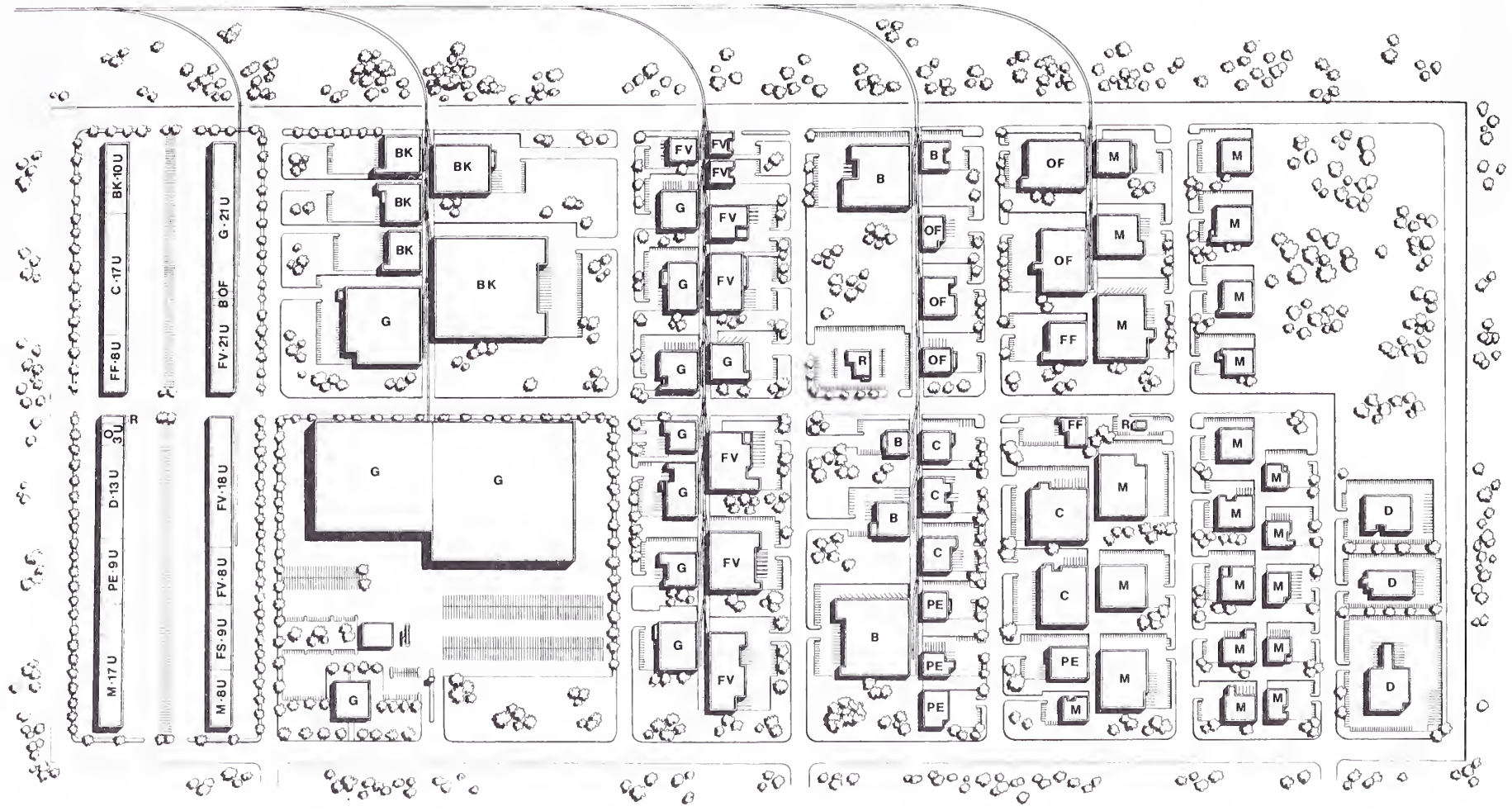


Figure 28.--Arrangement of facilities at the proposed northeastern New Jersey wholesale food distribution center.



able to share some common support facilities, such as central refrigeration. 8/

Each facility at the center has immediate access to market or public streets. Street widths reflect anticipated traffic. Market lighting is planned along all streets; additional lighting would be at individual sites.

The center is designed to be expanded. Additional facilities constructed surrounding the initial center can be served by planned rail and road facilities. Land is allocated within the initial center for a future public refrigerated warehouse.

Sites

Eight potential sites that are considered suitable for the proposed wholesale food distribution center have been identified--Edison, Kearny, Port Elizabeth, Elizabeth City, Newark, North Brunswick, Secaucus Road, and South Brunswick. Each of these sites is large enough for the proposed center, is located near customers, has land in condition to begin construction, and has access to the necessary utilities. These sites are included in this report as representative examples; additional sites may also be available and suitable for consideration. Figure 29 shows the location of the eight representative example sites. Land costs cited in this report are based on information available in January 1977.

The Kearny site is in Hudson County (see fig. 30). It is bounded on the north by Saw Mill Creek, on the south by the Port Authority Trans-Hudson (PATH) rail lines, on the east by the Hackensack River, and on the west by the P&W rail lines. This site contains almost 1,000 acres. The city of Kearny owns 880 acres, and private individuals own about 120 acres. Portions of this site are designated for wetlands preservation and other uses.

The New Jersey Turnpike Interchange 15W is on the property. There are direct connections with the Lincoln and Holland Turnpike Tunnels, and the Belleville and Jersey City-Newark Turnpikes intersect the property.

The cost of this site is estimated at $100,000 per acre.

The Edison site is in Middlesex County (see fig. 31). It is located within an area bounded by Woodbridge Avenue, the Raritan River, Interstate 400, and Middlesex County Junior College and Middlesex County Park. The site is referred to as Raritan Center. It contains about 1,800 acres of land, all privately owned. The average price for this land is estimated at $50,000 per acre.

The Port Elizabeth site is in Union County. It is bounded on the north by Bay Avenue, on the south by North Avenue East, on the east by Port Elizabeth Marine Terminal, and on the west by the Central Railroad of New Jersey and the New Jersey Turnpike. Adjoining this site is the Elizabeth City site (see fig. 32). It is bounded on the north by North Avenue East, on the south by the Central Railroad of New Jersey, on the east by Newark Bay, and on the west by the Central Railroad of New Jersey and the New Jersey Turnpike. The Port Elizabeth site, about 245 acres in size, is under the direction of the Port Authority of New York. In order to provide adequate acreage for future development of the proposed food center, it would be necessary to combine this site with the Elizabeth City site. The Elizabeth City site has about 400 acres and is privately owned. Land costs have been estimated at $100,000 per acre at both of these sites.

The Newark site is in Essex County (see fig. 33). It is in an area bounded on the north by Wilson Avenue extended, on the south by the New Jersey Turnpike extension, on the east by Newark Bay, and on the west by the New Jersey Turnpike. The site is adjacent to Port Authority and contains about 565 acres. Ownership includes the Port Authority, the Penn Central Railroad, and private owners.

Access to the New Jersey Turnpike is by Exit 14. Tidal creeks pass through the site.

The cost per acre at this site is estimated at $40,000.

The North Brunswick site is in Middlesex County between the Penn Central Railroad and U.S. 130, near the junction of Church Lane and George's Road (see fig. 34). This site contains 430 acres and is privately owned. The value of land at this site is estimated at $20,000 per acre.

The Secaucus Road site is in Hudson County (see fig. 35). It can be identified as extending north from the postal complex to the Lincoln Tunnel viaduct from the turnpike. The Secaucus Road site is in an area bounded on the north by

8/ Stahlman, Robert L. A study of refrigeration systems for urban food distribution centers. MRR-921, USDA, 107 pp., ill., 1972.

Figure 29.--Representative sites for the proposed northeastern New Jersey food distribution center.

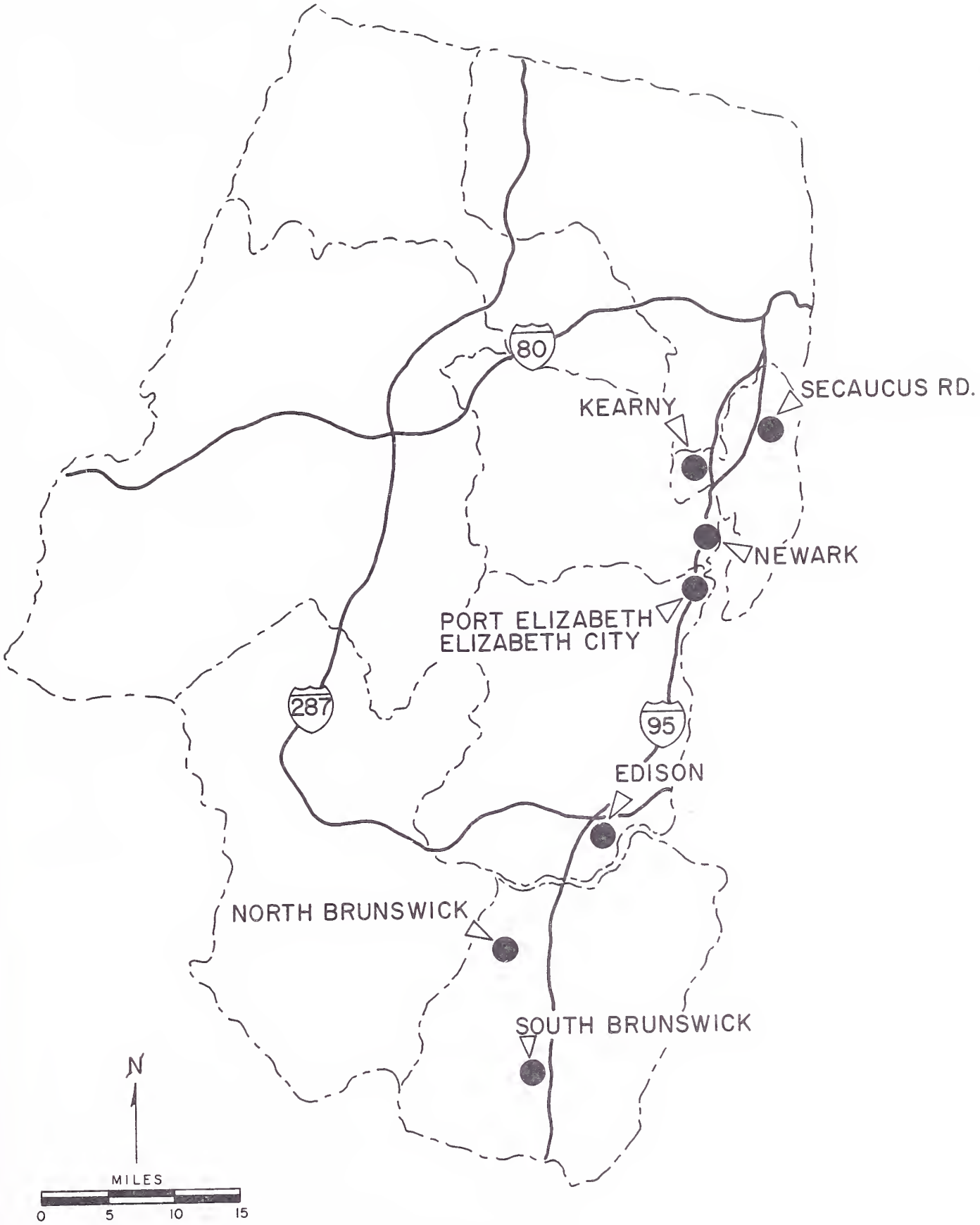


Figure 30.--Kearny site.

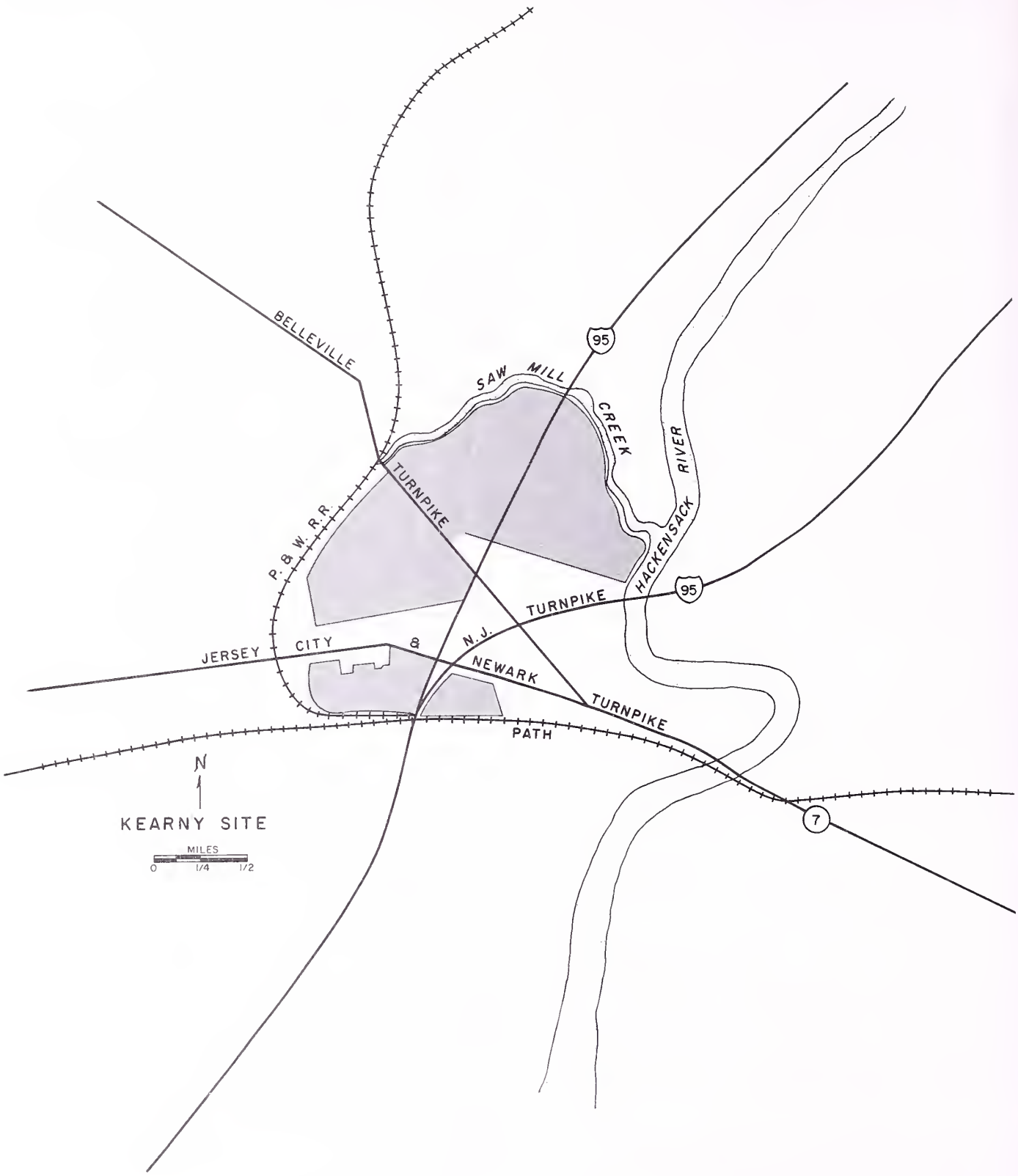


Figure 31.--Edison site.

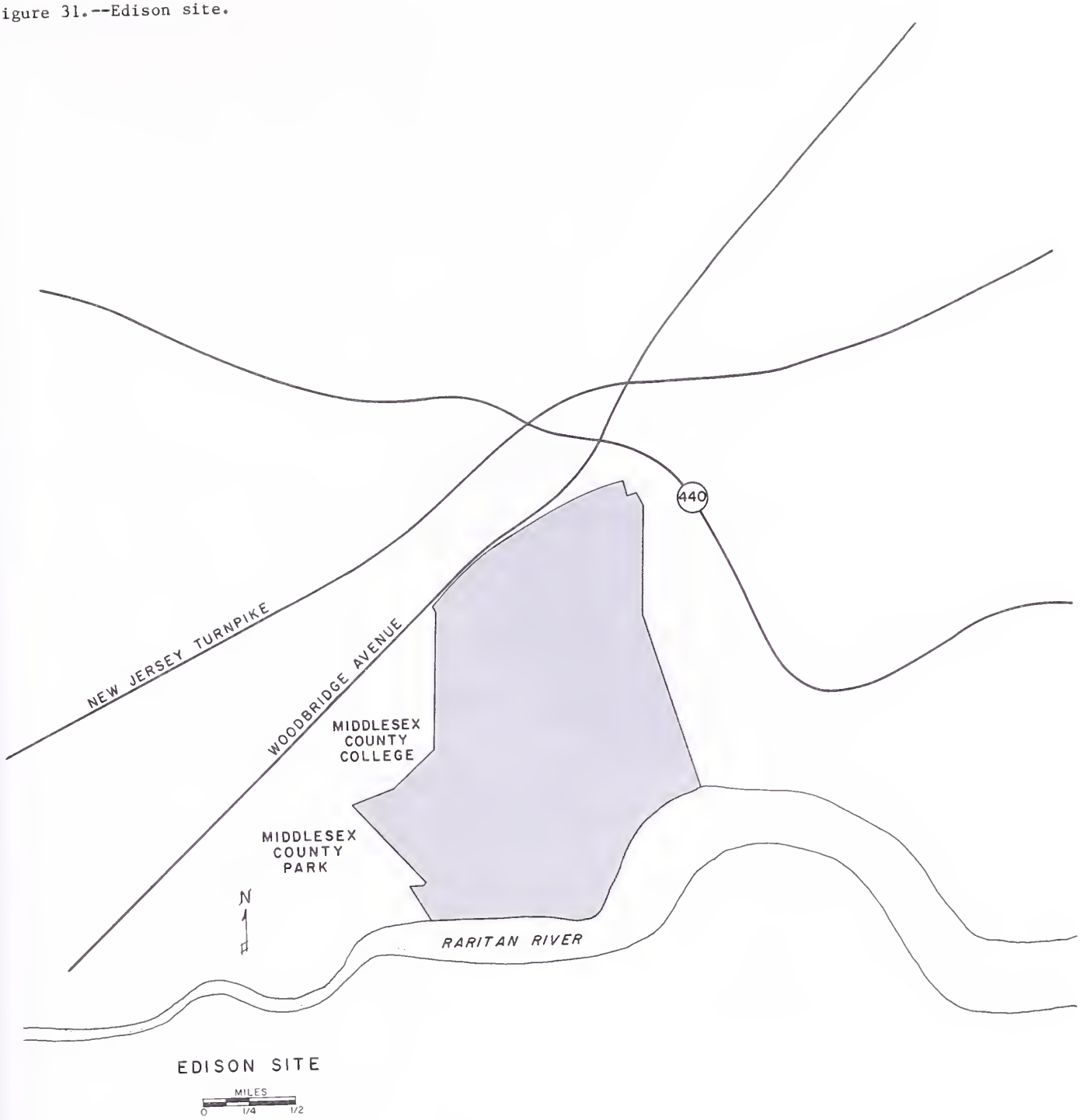


Figure 32.--Port Elizabeth and Elizabeth City sites.

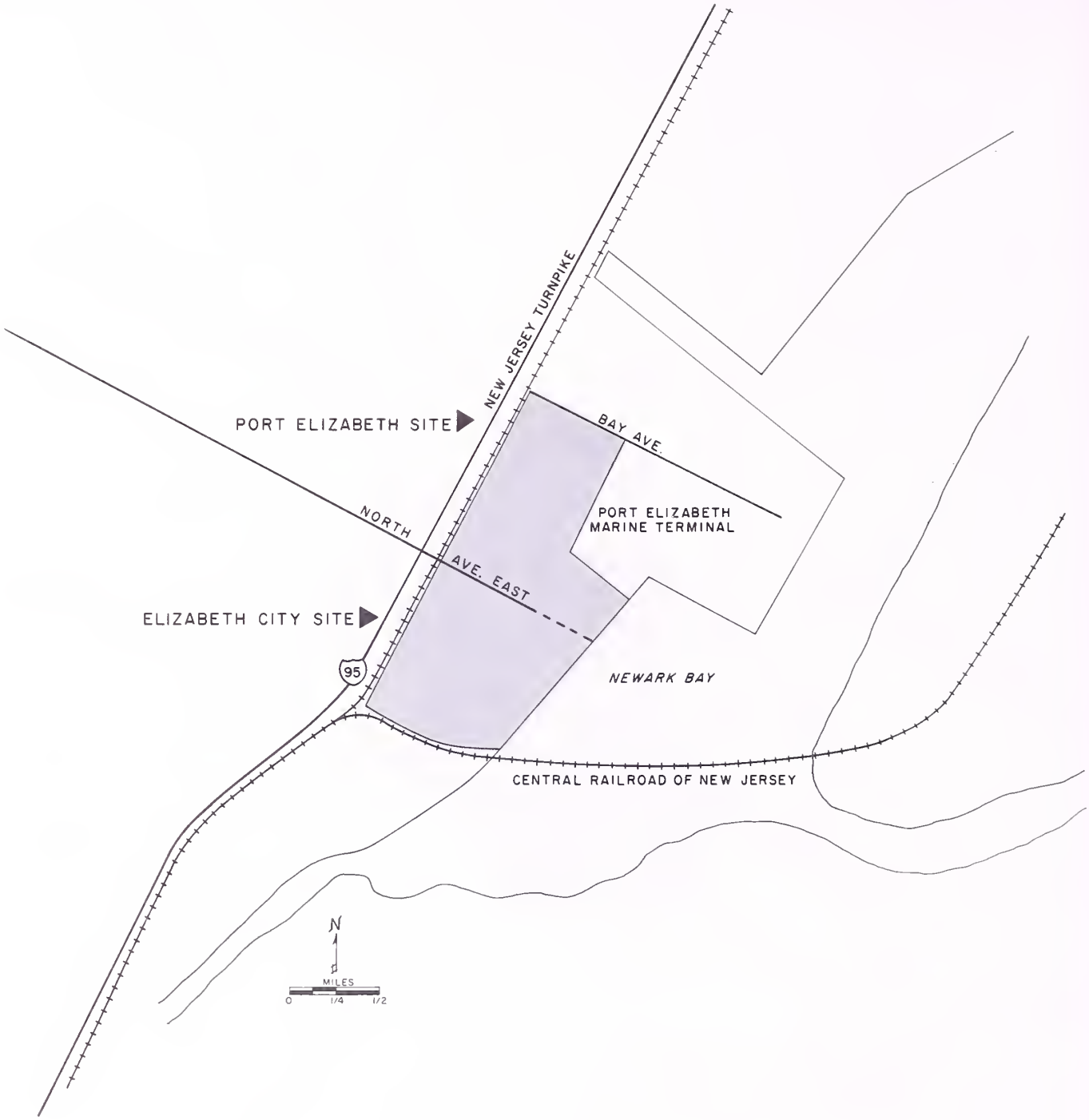


Figure 33.--Newark site boundaries.

Figure 34.—North Brunswick site boundaries.

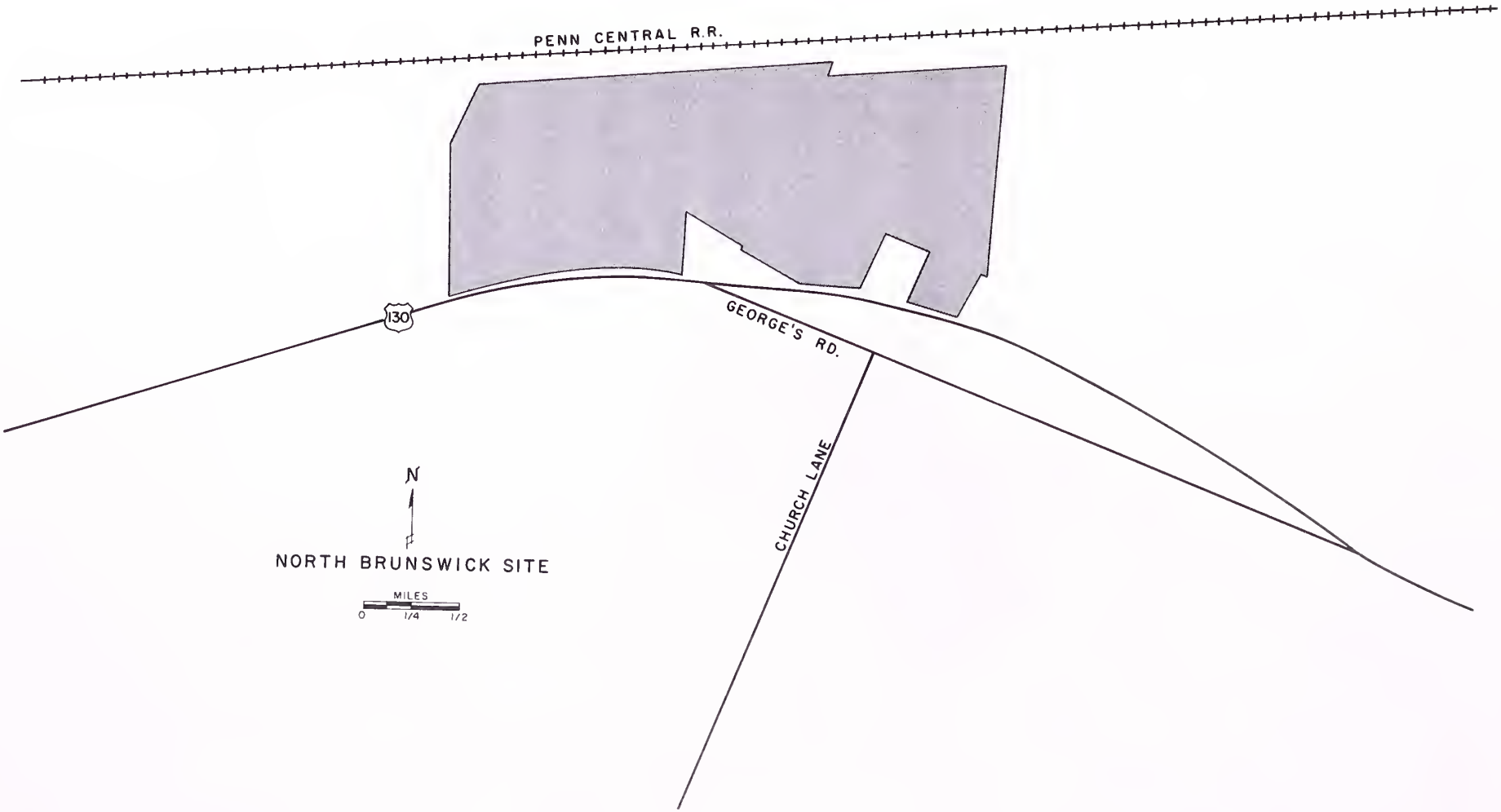
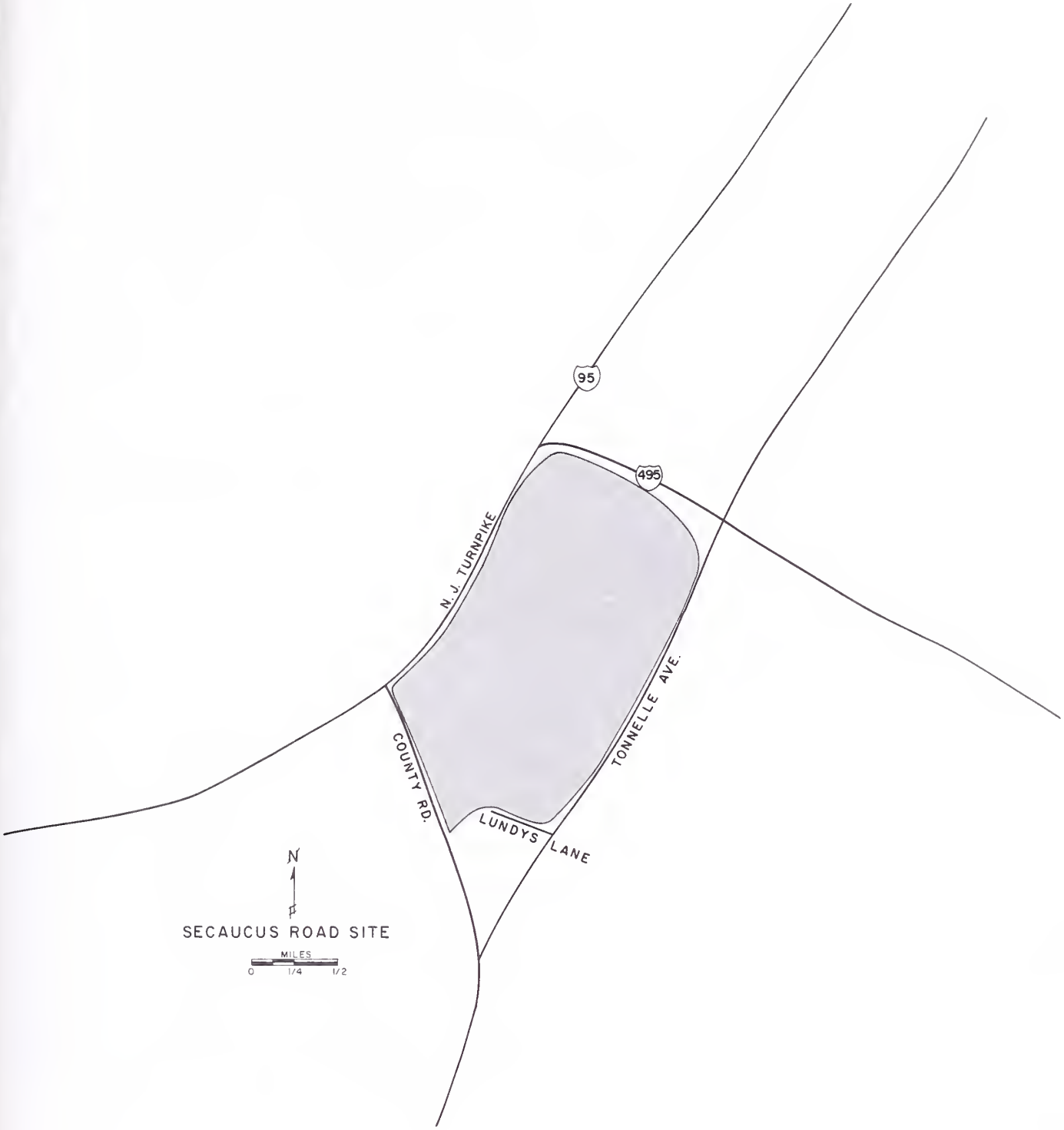


Figure 35.--Secaucus Road site boundaries.



I-495, on the south by County Road and Lundy's Lane, on the east by Tonnele Avenue, and on the west by the New Jersey Turnpike. It is about 500 acres in size. Jersey City owns 386 acres and private individuals own 114 acres. New Jersey Turnpike Exit 16 is one-half mile from the site, and access to U.S. 1 and U.S. 9 is nearby. Rail can be made available. The site is under the jurisdiction of Hackensack Meadowland Development Corporation. The estimated cost of this site is $100,000 per acre.

The South Brunswick site is also in Middlesex County (see fig. 36). It lies generally in an area bounded by Fresh Road, Hall Road, the United New Jersey Railroad and Canal Company, and the New Jersey Turnpike. About 800 acres of land are available at this site. The average land cost is estimated at $13,000 per acre.

Investment in Land and Facilities

The cost of land and facilities comprises the total investment required to construct the proposed northeastern New Jersey wholesale food distribution center. For the purposes of this report, facility costs are assumed to remain the same regardless of location. Site costs will vary, depending on the land costs at a particular location. Table 24 and figure 37 summarize the required investment in facilities and land by site. A more detailed examination of facility costs is contained in appendix II, Developing the Master Plan. Total investment in facilities and land ranges from $130.8 million to $164 million.

Facility costs included charges for constructing the recommended buildings and other necessary facilities. Building costs include the

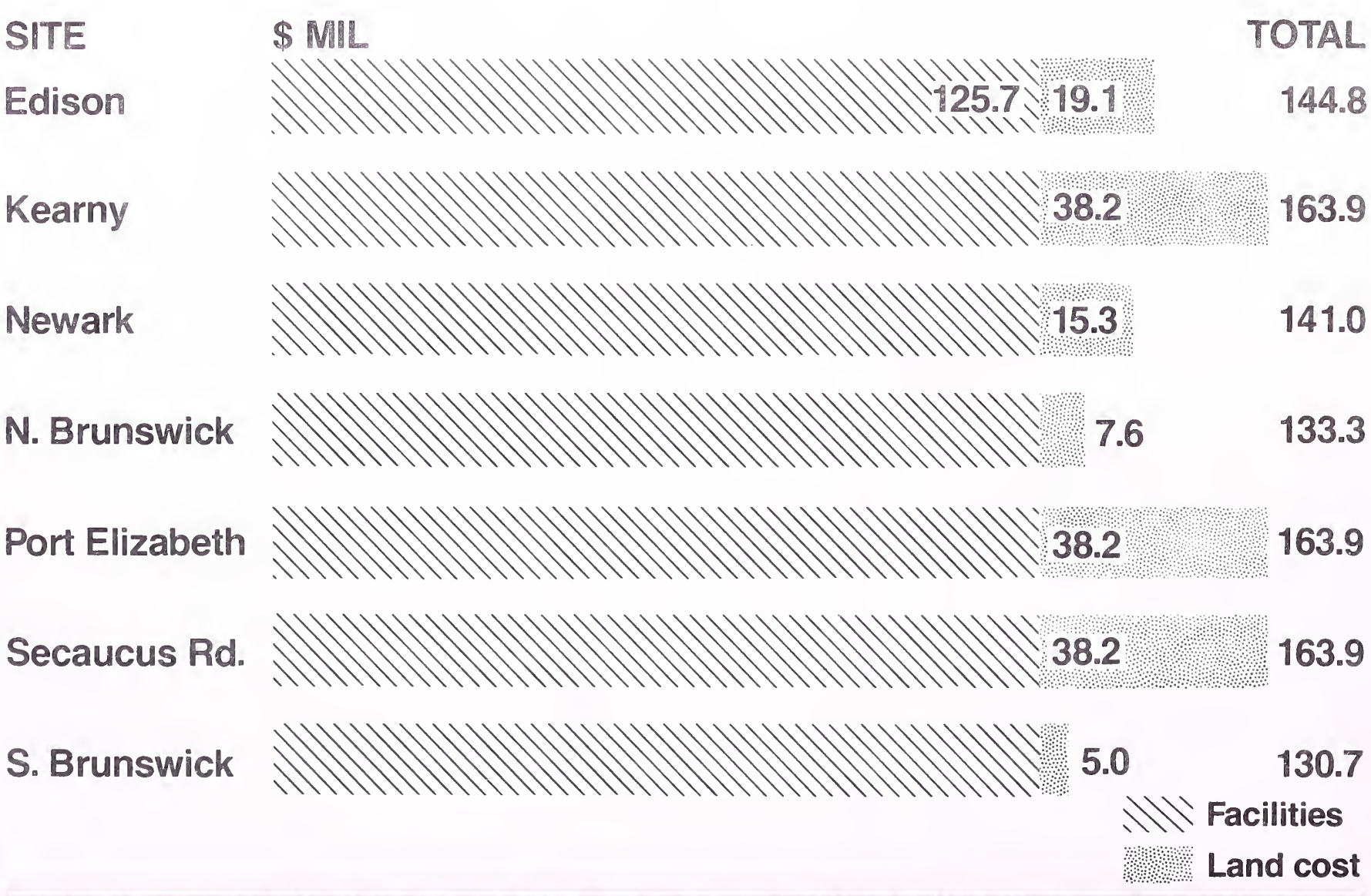
Table 24.--Summary of total investment in facilities and land for the proposed northeastern New Jersey food distribution center, by site 1/

Type of facility	Site				
	Edison	Kearny, Elizabeth City, Port Elizabeth, and Secaucus Road	Newark	North Brunswick	South Brunswick
Fresh fruits and vegetables	$20,556,332	$22,465,832	$20,174,432	$19,410,632	$19,143,302
Meat and related products	36,667,161	39,725,661	36,055,461	34,832,061	34,403,871
Groceries	36,935,016	41,683,016	35,985,416	34,086,216	33,421,496
Dairy products	6,700,374	7,645,374	6,511,374	6,133,374	6,001,074
Poultry and eggs	5,488,103	6,028,103	5,380,103	5,164,103	5,088,503
Frozen foods	2,897,372	3,340,372	2,808,772	2,631,572	2,569,552
Fish and shellfish	1,504,616	1,750,616	1,455,416	1,357,016	1,322,576
Bakery products	11,248,258	13,227,258	10,852,458	10,060,858	9,783,798
Beverages	7,523,399	9,087,899	7,210,499	6,584,699	6,365,669
Candy and confectionery	6,715,613	7,658,113	6,527,113	6,150,113	6,018,163
Other foods	5,037,103	5,760,103	4,892,503	4,603,303	4,502,083
Offices and restaurants	1,430,045	1,767,045	1,362,645	1,227,845	1,180,665
Future refrigerated-storage area	2,216,188	3,863,688	1,886,688	1,227,688	997,038
All facilities	144,919,580	164,003,080	141,102,880	133,469,480	130,797,790

1/ See table 2, appendix II.

Figure 36.--South Brunswick site boundaries.

Figure 37.--Investment in land and facilities.



cost of the structure, appropriate amounts of cooler and freezer space, restrooms, stairs, electrical and mechanical equipment incidental to the building, and sprinkler systems throughout unrefrigerated areas. Other facility costs include paving and curbing, railroad trackage, switches and stops, storm and sanitary sewers, and street lighting. Additionally, other costs include architectural and engineering fees, soil borings, foundation analyses and surveys, financing, legal and administrative fees, and a contingency allowance.

The cost of specific groups of buildings, other facilities, and other costs by commodity and type of structure are shown in appendix II. Construction costs listed under other facilities are allocated to specific groups of buildings on the basis of relative size. The cost of any construction on specific sites within the center would be borne by the user. All construction costs are estimates and intended only as a guide in planning the proposed center. They are not intended to replace estimates by local architects or engineering firms responsible for actual planning or construction.

Methods of Financing

Private and public financing represent the two basic alternatives for retiring the investment in land and facilities required to construct the proposed wholesale food distribution center for northeastern New Jersey. In actual practices some combination of financing methods may be chosen for the center. Each alternative will affect the center's organization and the sources of revenue available for debt retirement and associated expenses.

Private Organization

If private financing is chosen for the proposed center, a private corporation would probably direct the development. Such a corporation is usually organized for profit but may be operated on a nonprofit basis for the benefit of the participants. A private corporation is a legal entity organized in conformity with appropriate State statutes, and is made up of individuals bound together for a common purpose or objective. Few organizational restrictions are placed on a private developer, and usually there are no limits on the sale of voting stock to any individual or firm. Many wholesale food distribution centers have been organized on this basis. Some privately organized centers are owned by a railroad company or other type of nonfood organization. A few centers are owned by individuals.

Organizers of a private center usually obtain a charter from their State. This charter defines the purpose and powers of the corporation owning the center, and powers of its officers and directors.

Some wholesale food distribution centers organized as private corporations have become a "closed market." These centers have occasionally limited their expansion to maintain control in the hands of the original owners. Restrictions and limitations have been placed on the operation of other private wholesale food distribution centers to serve the particular interests of a majority of the owners. Sometimes these restrictions conflict with the interests of a minority of the wholesale firms at the center.

Obtaining sufficient equity capital is a major problem in organizing a privately owned wholesale food distribution center. This often results, in turn, in difficulties in obtaining funds to finance the complete development.

Public Organization

Publicly organized and financed wholesale food distribution centers fall into two broad categories: (1) public benefit corporations and (2) direct public ownership. Either type of organization probably would reflect some form of public financing of the proposed center.

Public benefit corporation.--A public benefit corporation is publicly owned and is organized as a nonprofit agency. Rentals and other charges usually do not exceed the amount needed to pay operating costs, amortize the original investment, and maintain a limited contingency fund. Under public ownership the revenue would be considered as public funds and not paid to lessees as dividends. Under some circumstances, these funds may be appropriated for public use while bonds remain outstanding. Under other circumstances funds are specifically committed to redemption of bonds.

Some public benefit corporations organized for center development have the power of eminent domain. This power may prove useful in assembling sufficient land for the complete development.

A public benefit corporation is more likely than some types of private ownership to provide for future expansion and to work toward the establishment of a complete wholesale food center. A center development authority may or may not be required to pay property taxes to the community in which it is located.

Center development public benefit corporations have certain limitations. They find it difficult to raise funds through revenue bonds unless considerable equity funds are provided in some way or the bonds are guaranteed by the city, county, or State. In addition, management personnel may be expected to change when a new political administration takes office.

Direct public ownership.--Some wholesale food distribution centers have been financed, constructed, and operated by States, counties, or municipalities. Several States and some municipalities have passed enabling legislation covering the improvement or establishment of such centers.

State ownership and operation usually can be contrasted with ownership and operation by a State market authority by the methods of financing and delegation of authority by the State legislature. Although some States have appropriated funds and otherwise assisted market authorities with financial problems, they do not usually underwrite the total cost of a market constructed by an authority nor have the States always assumed responsibility for operating these markets.

Under State ownership a wholesale food distribution center is financed completely or partly by an appropriation of State funds. If the financing is not entirely by this method, the State often obligates itself for the balance. The State usually is also responsible for maintenance and other expenses involved in day-to-day operations. States may finance, construct, and operate wholesale food distribution centers, because legislatures believe that improved wholesale food facilities in themselves serve the public's interest.

Municipal ownership of a food distribution center is comparable in many of its basic aspects to direct State ownership. Some municipalities are authorized in their charters to construct and operate food markets. Some city councils or commissions are authorized to make appropriations from general funds in the city treasury for the construction of market facilities on a basis comparable to that of a State legislative body.

Wholesale and processing food firms at a publicly owned wholesale food distribution center would have to pay rent indefinitely to the State or municipality owning the development. In some instances, however, such centers have been sold later to the food firms occupying the facilities and subsequently operated as a private corporation.

Sources of Financing

Financing for the proposed wholesale food distribution center for northeastern New Jersey may be obtained from a number of different sources. These sources may be both private and public. Private sources of financing include insurance companies, labor union pension funds, credit associations, and groups of large commercial banks. Public financing could include industrial revenue bonds and mortgage insurance. In addition, public financing could include appropriated funds provided as matching monies or as supplements to revenue bonds or private stock subscriptions. In some instances, loan guarantees and other incentives may be available from local governments. Fundings for portions of the total center development, particularly in planning stages, may be available from various Federal agencies. 9/

Revenue Required

The revenue required to operate the proposed center is comprised of (1) debt service, (2) insurance, management, maintenance, security, and waste management, and (3) real estate taxes. Debt service, fire insurance, and taxes are all affected by the different investment requirements and local charges associated with each potential site for the new center. Liability insurance, maintenance, security, and waste management are assumed to remain constant, regardless of site. Table 25 and figure 38 summarize the total revenue required to support the proposed center and represent the sum of the individual cost categories. Table 26 summarizes each of the major cost categories, by site, for all firms anticipated to locate on the new center. These costs are based on current estimates. Changes in business conditions or other circumstances may arise which cause higher or lower individual annual costs within the total revenue requirements required to support the new center. Revenue requirements do not include expenses directly associated with conducting wholesale or processing operations; they do include major expenses associated directly with the facilities and the center as a whole. Detailed methodology for calculating revenue requirements is included in appendix II.

9/ Catalog of Federal Domestic Assistance. Office of Management and Budget, 900 pp., ill.

Table 25.--Summary of total annual revenue required for the proposed northeastern New Jersey food distribution center 1/

Type of facility	Edison site		Kearny site		Newark site		North Brunswick site	
	Method of financing		Method of financing		Method of financing		Method of financing	
	Private	Public	Private	Public	Private	Public	Private	Public
Fresh fruits and vegetables	$3,473,113	$2,388,759	$3,720,172	$2,578,531	$4,202,163	$2,409,313	$3,303,457	$2,271,936
Meat and related products	5,965,258	4,022,337	6,361,051	4,326,374	7,277,530	4,055,331	5,690,018	3,835,585
Groceries	5,979,048	4,063,746	6,593,349	4,535,608	7,244,395	4,114,841	5,571,171	3,773,199
Dairy products	1,101,423	756,065	1,223,748	850,042	1,328,197	766,296	1,021,188	698,541
Poultry and eggs	907,090	618,348	976,979	672,035	1,100,729	624,182	859,541	585,417
Frozen foods	463,802	315,323	521,143	359,375	560,701	320,117	426,419	288,345
Fish and shellfish	241,053	164,348	272,900	188,814	290,840	167,014	220,420	149,389
Bakery products	1,797,032	1,227,111	2,053,137	1,423,843	2,164,400	1,248,466	1,631,425	1,106,302
Beverages	1,238,401	863,249	1,440,922	1,018,833	1,476,026	880,188	1,109,110	768,019
Candy and confectionery	1,077,358	731,098	1,199,279	824,744	1,304,724	741,221	996,900	673,323
Other foods	825,949	566,636	919,488	638,486	995,956	574,416	764,408	522,382
Offices and restaurants	221,992	151,675	265,643	185,216	265,849	155,352	194,475	131,309
Future refrigerated-storage area	304,869	224,122	518,369	388,195	335,014	242,195	175,555	125,024
All facilities	23,596,388	16,092,817	26,066,180	17,990,096	28,546,524	16,298,932	21,964,087	14,928,771

1/ See appendix I.

Table 25.--Summary of total annual revenue required for the proposed northeastern New Jersey food distribution center--continued

Type of facility	Port Elizabeth and Elizabeth City sites		Secaucus Road site		South Brunswick site	
	Method of financing		Method of financing		Method of financing	
	Private	Public	Private	Public	Private	Public
Fresh fruits and vegetables	$4,034,019	$2,631,883	$3,650,977	$2,566,796	$3,359,626	$2,247,925
Meat and related products	6,916,018	4,411,828	6,328,696	4,307,534	5,797,843	3,797,124
Groceries	7,175,661	4,668,266	6,464,965	4,506,358	5,643,771	3,713,495
Dairy products	1,330,553	876,445	1,200,200	844,220	1,032,559	686,657
Poultry and eggs	1,061,190	687,123	958,412	668,708	873,884	578,625
Frozen foods	567,808	371,751	510,856	356,645	430,596	282,774
Fish and shellfish	297,356	195,688	267,509	187,299	222,247	146,296
Bakery products	2,237,922	1,479,137	2,012,397	1,411,652	1,642,070	1,081,416
Beverages	1,567,878	1,062,545	1,412,930	1,009,194	1,111,051	748,345
Candy and confectionery	1,306,263	851,078	1,175,691	818,939	1,008,397	661,470
Other foods	999,957	658,687	901,748	634,031	772,686	513,291
Offices and restaurants	290,327	194,632	260,199	183,139	193,992	127,069
Future refrigerated-storage area	572,345	434,227	506,469	378,046	150,609	104,308
All facilities	28,357,297	18,523,290	25,651,049	17,872,561	22,239,331	14,688,795

Figure 38.--Annual revenue required.

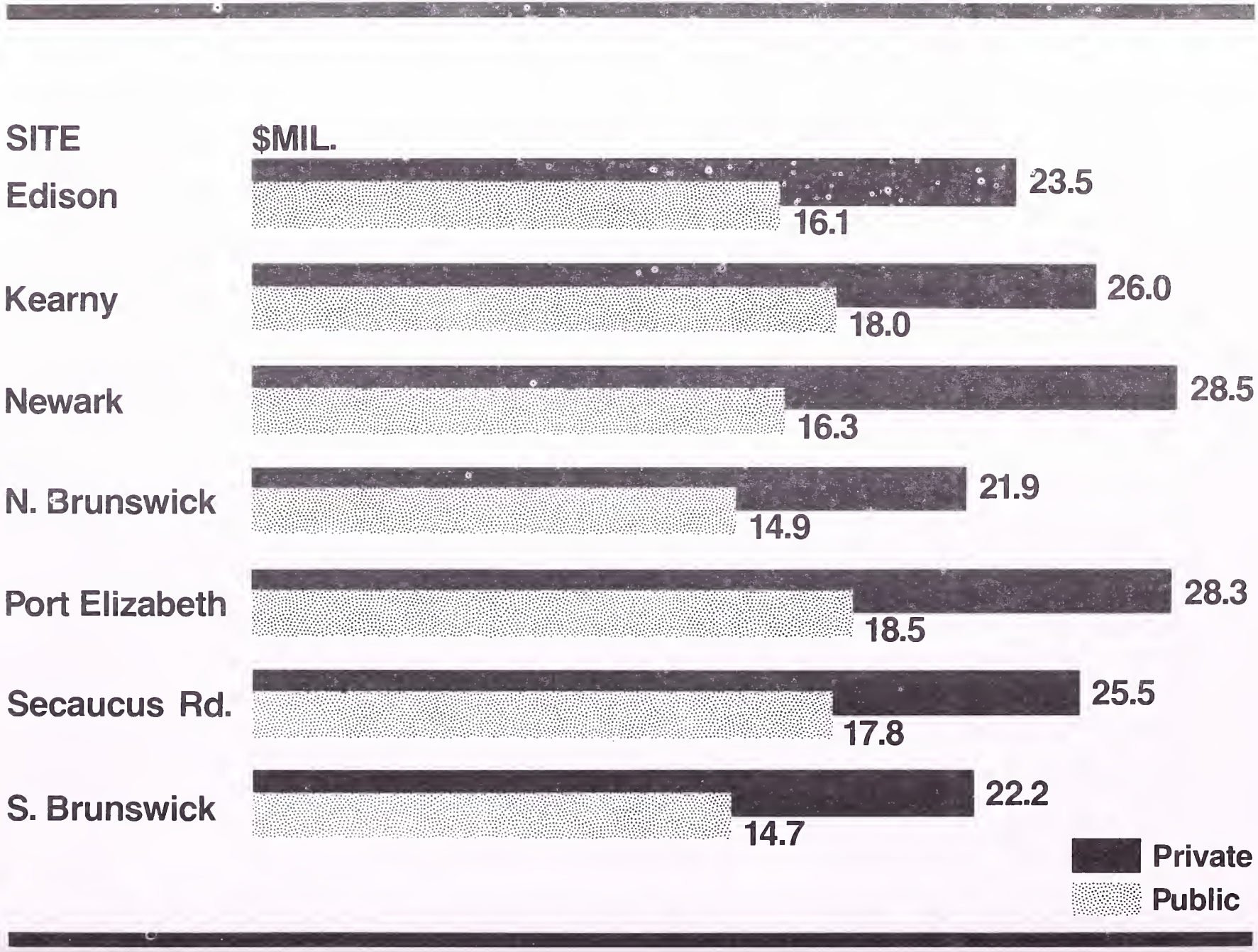


Table 26.--Summary of annual costs by category and site for the proposed northeastern New Jersey food distribution center 1/

Type of annual cost	Edison site		Kearny site		Newark site		North Brunswick site	
	Method of financing		Method of financing		Method of financing		Method of financing	
	Private	Public	Private	Public	Private	Public	Private	Public
Debt service----------	$15,257,039	$11,476,963	$17,165,389	$12,812,808	$14,875,369	$11,209,794	$14,112,029	$10,675,456
Insurance, management, maintenance, and waste management-----	4,051,184	4,051,184	4,047,947	4,047,947	4,047,947	4,047,947	4,034,998	4,034,998
Real estate taxes-----	4,288,165	564,670	4,902,844	1,129,341	9,623,208	1,041,191	3,817,221	218,317
Total revenue required--------	23,596,388	16,092,817	26,066,180	17,990,096	28,546,524	16,298,932	21,964,087	14,928,771

1/ See appendix II for methods of calculation.

Table 26.--Summary of annual costs by category and site for the proposed northeastern New Jersey food distribution center--continued

Type of annual cost	Port Elizabeth and Elizabeth City sites		Secaucus Road site		South Brunswick site	
	Method of financing		Method of financing		Method of financing	
	Private	Public	Private	Public	Private	Public
Debt service----------	$17,165,389	$12,812,808	$17,165,389	$12,812,808	$13,844,860	$10,488,431
Insurance, management, maintenance, and waste management-----	4,047,947	4,047,947	4,047,947	4,047,947	4,034,998	4,034,998
Real estate taxes-----	7,143,961	1,662,535	4,347,713	1,011,779	4,359,473	165,366
Total revenue required--------	28,357,297	18,523,290	25,651,049	17,872,561	22,239,331	14,688,795

Debt Service

Debt service assumes two different types of financing--private and public. For the purposes of this report, an annual interest rate of 10 and 7 percent for 30 years was assumed for private and public debt service, respectively. In both instances, an annual carrying charge equal to the interest rate was applied to the land costs. Actual terms and rates would be established prior to actual construction.

The total investment requirements for facilities and land were included in the debt service calculation. These charges could be lowered by the application of equity by prospective tenants or owners.

Debt service charges were affected by the method of financing. Assuming private financing, total debt service charges ranged from a low of $13.8 million annually to a high of $17.2 million. Public financing would lower the equivalent range to a low of $10.5 million to a high of $12.8 million. Choice of financing method could affect total debt service charges approximately 30 percent.

Insurance, Maintenance, Security, and Solid-Waste Management

Table 26 also summarizes the total estimated charges for insurance, maintenance, security, and solid-waste management. These charges, while important, vary less than 1 percent depending on site.

Two basic types of insurance are required for the operation of the proposed wholesale food distribution center--fire and liability. For the purposes of this report, fire insurance rates were considered to be unaffected by site. Liability insurance rates would be affected by the market location. Fire insurance rates are based on the cost of the buildings covered and are based on brick and steel construction and a sprinkler system in appropriate areas. Liability insurance rates are based on the size of the proposed facilities. All insurance rates would be subject to negotiation at time of construction.

Management, maintenance, and security charges are based on a percentage of the total construction cost of buildings, other facilities, and other costs. These charges total approximately 2.5 percent annually of such costs.

Real Estate Taxes

Real estate taxes for the proposed food distribution center are also summarized in table 26 for each of the eight representative sites. These taxes range from less than $200,000 to a high of $9.6 million.

Tax charges are affected by both the local tax rates and the financing method. If private financing is chosen to retire the debt incurred from developing the proposed center, real estate taxes would be applied to the total investment for both land and facilities. In contrast, if public financing of the proposed center is undertaken, real estate taxes would generally apply only to the land cost. Detailed methodology for calculating the real estate taxes, tax rates applicable to the various sites, and detailed tax charges by type of building are also included in appendix II.

Taxes may be expected to increase through revised evaluation, higher rates, or changes in law. For the purpose of this report, the tax charges included in table 26 include a 10-percent contingency allowance.

Ownership Costs

Table 27 summarizes the annual per-square-foot ownership costs for the proposed center. These costs are based on the annual revenue requirements (table 25) and the total number of square feet of first-floor space (table 23). Both site and financing method affect these costs. Private financing would produce a range of ownership costs from a low of $7.04 to a high of $9.15 per square foot. Public financing would produce an equivalent range from $4.71 to $5.94, depending on site.

The costs outlined in this section may include items not normally found in commercial rental charges and should not be compared directly with such rental charges without a similar comparison of the cost items comprising the total charge. Ownership costs for the proposed center include all major costs associated with facilities, excluding utilities.

Table 27.--Summary of annual total-per-square foot revenue required for the proposed northeastern New Jersey food distribution center 1/

Type of facility	Edison site		Kearny site		Newark site		North Brunswick site	
	Method of financing		Method of financing		Method of financing		Method of financing	
	Private	Public	Private	Public	Private	Public	Private	Public
Fresh fruits and vegetables	$9.37	$6.44	$10.03	$6.95	$11.33	$6.50	$8.91	$6.13
Meat and related products	11.01	7.42	11.74	7.99	13.44	7.49	10.51	7.08
Groceries	6.25	4.25	6.90	4.74	7.58	4.30	5.83	3.95
Dairy products	8.54	5.86	9.49	6.59	10.30	5.94	7.92	5.42
Poultry and eggs	10.70	7.29	11.52	7.92	12.98	7.36	10.14	6.90
Frozen foods	7.53	5.12	8.46	5.83	9.10	5.20	6.92	4.68
Fish and shellfish	8.93	6.09	10.11	6.99	10.77	6.19	8.16	5.53
Bakery products	5.16	3.52	5.89	4.09	6.21	3.58	4.68	3.18
Beverages	5.51	3.84	6.41	4.53	6.57	3.92	4.93	3.42
Candy and confectionery	5.20	3.53	5.79	3.98	6.30	3.58	4.82	3.25
Other foods	5.41	3.71	6.02	4.18	6.53	3.76	5.01	3.42
Offices and restaurants	13.06	8.92	15.63	10.90	15.64	9.14	11.44	7.72
Future refrigerated-storage area	---	---	---	---	---	---	---	---
All facilities	7.56	5.16	8.35	5.76	9.15	5.22	7.04	4.78

1/ See appendix II and tables 23 and 25.

Table 27.--Summary of annual total-per-square foot revenue required for the proposed northeastern New Jersey food distribution center--continued

Type of facility	Port Elizabeth and Elizabeth City sites		Secaucus Road site		South Brunswick site	
	Method of financing		Method of financing		Method of financing	
	Private	Public	Private	Public	Private	Public
Fresh fruits and vegetables	$10.88	$7.10	$9.85	$6.92	$9.06	$6.06
Meat and related products	12.77	8.14	11.52	7.95	10.70	7.01
Groceries	7.51	4.88	6.76	4.71	5.90	3.88
Dairy products	10.31	6.79	9.30	6.54	8.00	5.32
Poultry and eggs	12.51	8.10	11.30	7.89	10.30	6.82
Frozen foods	9.22	6.03	8.29	5.79	6.99	4.59
Fish and shellfish	11.01	7.25	9.91	6.93	8.23	5.42
Bakery products	6.43	4.25	5.78	4.05	4.71	3.10
Beverages	6.97	4.73	6.29	4.49	4.94	3.41
Candy and confectionery	6.31	4.11	5.68	3.96	4.87	3.20
Other foods	6.55	4.32	5.91	4.15	5.06	3.36
Offices and restaurants	17.08	11.45	15.31	10.77	11.41	7.47
Future refrigerated-storage area	---	---	---	---	---	---
All facilities	9.09	5.94	8.19	5.73	7.12	4.71

Based on the results of this study, the construction of a new wholesale food distribution center is anticipated to meet the needs for new facilities of northeastern New Jersey wholesalers. Such a center would benefit individual firms, northeastern New Jersey governments, the area food industry, employees, and consumers.

Individual firms needing new facilities will have the opportunity to solve existing problems with buildings and sites by relocating at the proposed wholesale food distribution center. Modern facilities at such a center will allow for adequate expansion to accommodate planned growth while also offering the opportunity for modern operations in well designed buildings. Smaller firms will have the opportunity to share common support facilities such as rail trackage, truck and car parking, and maneuvering areas. Larger companies will have individually designed buildings suited to their particular needs. Experience in existing centers shows savings in handling and storage costs can be expected. 10/

The cost of interdealer transfers at the proposed wholesale food distribution center can be reduced below present levels because of the proximity of similar type firms. Direct rail service will reduce the cost of cartage; common rail facilities at the multiple-occupancy building will allow wholesalers to share incoming shipments. Adequate parking and wide streets to handle center traffic will reduce avoidable delay and congestion.

Sales volumes handled by the firms needing new facilities may expand beyond present levels. As the proposed center grows, its firms will reach to serve an increasing population in the northeastern New Jersey area and contiguous States. Without improved facilities and handling methods, high operating costs that result from existing situations can be expected to increase still further as the costs for labor, repairs, materials, space, and service are inflated.

One of the areas in which the greatest opportunity exists to reduce costs of the proposed wholesale food distribution center is in handling and associated costs. However, to achieve maximum efficiency, proper use of materials-handling equipment, including forklift trucks, pallets, pallet racks, and handtrucks, is necessary. Operating at the new center provides an effective means for achieving the most efficient use of mechanized handling equipment. Similarly, the use of pallet racks at the new center could reduce time required to assemble products and fully utilize cubic space.

Commodities could be unloaded directly to pallets at the proposed center and transported into facilities with no intermediate step. Meat wholesalers could place carcass meat on overhead rails at the edge of the platform and move directly to coolers and processing areas. Similar loading operations could achieve similar efficiencies. In some instances, it may be possible to move commodities directly to delivery vehicles without movement through wholesale facilities.

Buyers visiting the center would be able to park conveniently, make selections quickly, load their trucks expeditiously, and leave promptly. These buyers would be able to shop from a variety of wholesalers at the center.

Wholesale firms at the proposed center would be able to make efficient use of service firms. Common contracts for equipment purchase and maintenance and shared centralized refrigeration and computer services may be possible with the large concentration of food firms at the proposed center. Private security and cleaning may provide economical alternatives to civic services at the proposed center. Salvage firms may offer an attractive market for damaged products and trash that would not be possible for similar products available at widely scattered locations.

Northeastern New Jersey governments also will benefit from construction of the proposed wholesale food distribution center. Such a center may encourage wholesalers to relocate from areas ill suited for wholesale and processing operations. This relocation should allow local governments to redevelop congested areas to promote activities generating higher tax revenues with less demand for city services. Such redevelopment took place concurrently with the construction of the Philadelphia food distribution center. The new Pennsylvania center prompted the relocation of antiquated wholesale food facilities located in the Dock Street area of the city. The Dock Street market was largely comprised of old multistory buildings no longer suitable for modern wholesale and processing operations. This area was served by narrow streets which often became congested during peak

10/ Karitas, James J. and Volz, Marvin D. Selected costs of produce wholesaling in old and modern facilities, Boston, Mass. ARS-NE-50, USDA, 20 pp., ill., 1974.

Volz, Marvin D. and Karitas, James J. Handling and space costs for selected food wholesalers in urban food distribution centers. MRR-992, USDA, 24 pp., ill., 1973.

activity periods. After the new Philadelphia food distribution center was constructed in 1959, the area was redeveloped with projects more suitable for urban locations and generated increased tax revenues for the city.

The northeastern New Jersey food industry as a whole would benefit from construction of the proposed wholesale food center. This center would enhance the competitive status of the area food industry by promoting quick and efficient movement of food and food products through modern wholesale and processing facilities to retail and other customers. The availability of such a center would allow northeastern New Jersey retail and associated wholesale customers to order supplies locally in lieu of turning to out-of-State sources. Still additional customers could be drawn to the center from outside the area. The proposed center would also serve as a model of efficient operations and modern facilities for area firms without an immediate need for new facilities.

Employees of firms relocating to the proposed center also would benefit from this project's construction and use. Modern facilities designed for particular operations could be expected to promote improved employee morale, better working conditions, regular hours, and reflect a generally improved working environment. Additional employment can be expected as firms at the proposed center expand their operations. Concentrating a large number of related firms would promote efficient use of public transport of workers employed at the center. Safety and health regulations could be enforced more efficiently and followed more easily in the new facilities constructed at the proposed center.

The public would be one of the principal beneficiaries of the construction of the proposed northeastern New Jersey wholesale food distribution center. First, construction of the center would provide a considerable influx of resources into the area, providing a major source of employment in the construction industry. Second, the completed center would represent a major source of tax revenue both from the value of the improved property and from wages to employees. Such tax revenue could be expected to lessen the burden on local residential property taxes. Third, the completed center would represent a major source of continuous employment, particularly for semiskilled labor. Fourth, efficient operations and expanded sales of firms locating at the proposed center would offer the northeastern New Jersey food industry the opportunity to realize cost reductions that could be passed on to the food-buying public. Fifth, and finally, food moving through buildings designed for particular operations and functions would be of better quality, as damage resulting from inadequate and antiquated facilities could be avoided.

Appendix I. Present Marketing System

Appendix I presents space, product movement, and employment of the independent wholesalers included in this study. This material is presented by type of firm and county. Chainstore warehouse information is not included in this section of the report to avoid revealing confidential information concerning individual companies. All material is summarized in the text of the report.

Appendix table 1 defines the 32 types of operations of firms in the study area. Appendix tables 2 through 3 show amounts and types of space. In a similar manner, appendix tables 4 through 11 illustrate delivery method, and appendix tables 12 through 19 detail product movement to various types of customers. Certain information in these tables has been combined to avoid revealing confidential information concerning individual independent wholesalers.

Table 1.--Definition of the types of operations included in each commodity area

I. General

1. Wholesaler.--A food firm selling to retailers, other wholesalers, or institutional users, mainly for resale or commercial use.

2. Slaughterer.--Procures livestock for the explicit purpose of slaughtering domestic animals and merchandising their carcasses. Slaughterers typically specialize in killing only one species, but perform other complementary functions, such as rendering offal and further processing animal carcasses, depending on species.

3. Processor.--A wholesale firm that purchases food and related products, changes the form in some manner, and packages the product for resale.

4. Full-line distributor.--A wholesaler selling a complete line of food items to retailers, other wholesalers, and institutional users.

5. Chainstore.--A wholesaler or retailer that operates 11 or more retail stores.

6. Broker.--An agent or firm which negotiates contracts or sales between wholesalers and retail outlets.

II. Fresh fruits and vegetables

7. Direct receiver.--Purchases the major portion of fresh fruits and vegetables handled in full carlot or trucklot quantity from production area or shipping points.

8. Wholesale jobber.--Purchases the majority of volume handled from other wholesalers in local or regional market area and sells the products to retail stores or institutional outlets.

9. Banana jobber.--A firm that ripens and/or repacks bananas exclusively and provides customer delivery. These firms usually are the first receivers within a market area.

10. Repacker-prepackager.--A firm that ripens, sorts, packs, and distributes its products in consumer packages.

III. Meat and related products

11. Hotel, restaurant, institutional purveyor.--A nonslaughterer who generally processes and fabricates all types of red meats, as well as boning and slicing smoked meats for the food service trade.

12. Portion-control manufacturer (meat).--A nonslaughterer who prepares various meats through intensified fabricating and processing procedures into portions suitable for individual servings. These portions typically are flash-frozen immediately after manufacture and sold directly to large volume users.

13. Boner.--A nonslaughterer who purchases carcass beef, veal, and sometimes selected cuts of pork for boning and possible further processing depending on the scope of operations. The cuts are sorted, boxed, and usually frozen.

14. Breaker.--A nonslaughterer who buys beef carcasses and breaks them into primal and subprimal cuts.

15. Sausage manufacturer.--A nonslaughterer who processes boneless beef, veal, and pork by grinding, seasoning, stuffing, and often smoking the raw material products either separately or in a special formula mix.

16. Kosher wholesaler.--A nonslaughterer who specializes in handling beef, veal, and lamb forequarters that have been obtained from animals slaughtered under the auspices of a certified Rabbi.

IV. Groceries

17. Institutional wholesaler.--A wholesaler selling to restaurants, commercial feeding establishments, and to public and private institutions.

18. Cash and carry.--A wholesaler whose warehouse is arranged to allow self service and pickup by retailers who pay cash for each transaction.

19. Distribution warehouse.--A facility used for the temporary storage of food and related products prior to shipping to retail outlets.

20. Importer.--A wholesaler who specializes in selling a limited number of different food and related products that are produced or manufactured outside the United States.

21. Ethnic wholesaler.--A wholesaler serving the specialized food needs of a particular nationality.

22. Food products wholesaler.--A firm selling a select number of food items to retailers, other wholesalers, and institutional users.

23. Packer.--A firm that receives bulk merchandise and repackages it into smaller quantities adequate for consumer and commercial use.

24. Food product manufacturer.--A firm that produces a consumable product from raw ingredients (coffee, flour, etc.) for resale.

25. Ship chandler.--A firm that specializes in selling food and other products to shipowners for use by passengers and crew members.

26. Bottler.--A firm that manufactures and/or bottles soft drinks, distilled water, or carbonated beverages for resale.

V. Poultry

27. Further processing.--Processing functions performed after the bird has been slaughtered, defeathered, and eviscerated. Such a bird is classified as ready to cook.

28. Custom order speciality wholesaler.--A firm whose primary business is to prepare food to the specifications of a retailer, and/or wholesaler, and/or an institution, and/or a caterer.

29. Convenience food wholesaler.--A firm whose primary business is to distribute convenience foods in wholesale lots.

30. Portion-control manufacturer (poultry).--A firm whose primary business is to prepare food according to size and quality specifications for individual or group portions.

VI. Dairy

31. Wholesale distributor.--A firm that receives products in finished form and distributes them to their sales outlets.

32. Processor distributor.--A firm that receives raw ingredients for processing, as well as bulk products for further processing, packaging, and distribution to their sales outlet.

Table 2.--Primary and secondary space used by northeastern New Jersey independent wholesale food firms

Type of firm	Non-refrigerated	Refrigerated cooler	Refrigerated freezer	Office	Other	Total
			Sq ft			
Fresh fruits and vegetables						
Basement	9,403	3,062	0	0	6,875	29,340
First floor	235,665	94,802	11,049	19,673	111,286	472,475
Second floor	6,575	625	0	5,000	12,375	24,575
Other	1,500	3,000	0	0	0	4,500
Subtotal	253,143	101,489	11,049	24,673	130,536	530,890
Meat and related products						
Basement	50,535	34,794	2,850	280	58,210	146,669
First floor	137,438	569,135	115,615	83,661	459,781	1,365,630
Second floor	52,932	44,110	6,580	58,974	83,331	245,927
Other	7,705	288	400	0	7,965	16,358
Subtotal	248,610	648,327	125,445	142,915	609,287	1,774,584
Groceries						
Basement	2,431	144	225	0	0	2,800
First floor	2,507,135	115,229	83,376	85,816	24,403	2,815,959
Second floor	51,625	0	0	49,830	8,917	110,372
Other	19,000	0	0	0	8,667	27,667
Subtotal	2,580,191	115,373	83,601	135,646	41,987	2,956,798
Dairy products						
Basement	4,400	360	0	0	14,200	18,960
First floor	491,556	234,518	54,648	65,200	440,390	1,286,312
Second floor	26,425	1,400	0	42,058	40,825	110,708
Other	11,675	5,000	0	200	0	16,875
Subtotal	534,056	241,278	54,648	107,458	495,415	1,432,855
Poultry						
Basement	1,750	0	1,500	1,500	0	4,750
First floor	14,000	31,350	11,270	4,675	1,705	63,000
Second floor	4,700	0	0	2,050	1,500	8,250
Other	0	0	0	0	0	0
Subtotal	20,450	31,350	12,770	8,225	3,205	76,000
Shell eggs						
Basement	0	0	0	0	0	0
First floor	14,600	41,910	19,740	11,882	49,775	137,907
Second floor	0	0	0	0	0	0
Other	0	0	0	0	0	0
Subtotal	14,600	41,910	19,740	11,882	49,775	137,907
Frozen foods						
Basement	2,000	0	0	0	0	2,000
First floor	106,875	15,094	78,036	18,375	101,433	319,813
Second floor	0	0	11,500	3,900	0	15,400
Other	0	0	0	3,000	5,000	8,000
Subtotal	108,875	15,094	89,536	25,275	106,433	345,213
Fish and shellfish						
Basement	0	0	0	0	0	0
First floor	20,061	5,585	87,367	11,422	27,063	151,498
Second floor	0	0	0	1,124	0	1,124
Other	0	0	0	0	0	0
Subtotal	20,061	5,585	87,367	12,546	27,063	152,622

Table 2.--Primary and secondary space used by northeastern New Jersey independent wholesale food firms--continued

Type of firm	Non-refrigerated	Refrigerated cooler	Refrigerated freezer	Office	Other	Total
			Sq ft			
Bakery products						
Basement	76,872	0	1,000	1,000	9,500	88,372
First floor	258,670	22,584	8,814	33,953	2,046,861	2,370,882
Second floor	45,350	0	0	98,850	469,182	613,382
Other	165,000	600	0	1,200	100,640	267,440
Subtotal	545,892	23,184	9,814	135,003	2,626,183	3,340,076
Beverages						
Basement	0	0	0	0	0	0
First floor	613,431	100	0	17,650	195,690	826,871
Second floor	0	0	0	500	0	500
Other	0	0	0	0	0	0
Subtotal	613,431	100	0	18,150	195,690	827,371
Candy and confectionery						
Basement	24,206	0	0	0	41,875	66,081
First floor	597,694	34,600	18,000	56,276	301,200	1,007,770
Second floor	11,125	0	0	2,250	0	13,375
Other	4,625	0	0	5,000	0	9,625
Subtotal	637,650	34,600	18,000	63,526	343,075	1,096,851
Other foods						
Basement	0	0	0	0	0	0
First floor	659,632	28,879	32,390	67,449	364,413	1,152,763
Second floor	39,435	14,800	0	2,300	5,560	62,095
Other	5,220	0	0	0	10,220	15,440
Subtotal	704,287	43,679	32,390	69,749	380,193	1,230,298
Totals						
Basement	171,597	38,360	5,575	2,780	130,660	348,972
First floor	5,656,757	1,193,786	520,305	476,032	4,124,000	11,970,880
Second floor	238,167	60,935	18,080	266,836	621,690	1,205,708
Other	214,725	8,888	400	9,400	132,492	365,905
Subtotal	6,281,246	1,301,969	544,360	755,048	5,008,842	13,891,465

Table 3.--Primary and secondary space used by northeastern New Jersey wholesale food firms, by county

County	Non-refrigerated	Refrigerated cooler	Refrigerated freezer	Office	Other	Total
			Sq ft			
Bergen						
Basement------	4,650	0	0	0	0	4,650
First floor---	1,367,345	178,043	83,694	122,134	619,195	2,370,411
Second floor--	31,550	0	0	16,900	19,667	68,117
Other---------	9,330	0	400	5,000	8,667	23,397
Subtotal--	1,412,875	178,043	84,094	144,034	647,529	2,466,575
Essex						
Basement------	117,641	4,906	2,575	80	43,488	168,690
First floor---	933,996	301,534	78,451	91,139	628,250	2,033,370
Second floor--	106,532	15,275	4,620	44,514	93,657	264,598
Other---------	26,300	5,600	0	3,200	92,840	127,940
Subtotal--	1,184,469	327,315	85,646	138,933	858,235	2,594,598
Hudson						
Basement------	18,256	25,154	2,000	200	19,092	64,702
First floor---	982,858	225,717	167,988	69,005	508,770	1,954,338
Second floor--	69,310	39,858	12,844	94,374	204,063	420,449
Other---------	23,220	0	0	1,200	24,735	49,155
Subtotal--	1,093,644	290,729	182,832	164,779	756,660	2,488,644
Middlesex						
Basement------	3,500	1,200	0	0	13,000	17,700
First floor---	627,340	100,965	55,899	58,272	1,200,524	2,043,000
Second floor--	4,000	0	0	14,500	13,000	31,500
Other---------	1,500	3,288	0	0	0	4,788
Subtotal--	636,340	105,453	55,899	72,772	1,226,524	2,096,988
Morris						
Basement------	13,000	0	1,000	1,000	7,000	22,000
First floor---	22,775	10,750	0	2,834	9,216	45,575
Second floor--	0	0	0	0	0	0
Other---------	0	0	0	0	0	0
Subtotal--	35,775	10,750	1,000	3,834	16,216	67,575
Passaic						
Basement------	14,000	7,100	0	0	42,880	63,980
First floor---	1,108,156	168,506	76,660	50,730	591,464	1,995,516
Second floor--	15,375	5,802	616	61,690	1,128	84,611
Other---------	4,375	0	0	0	6,250	10,625
Subtotal--	1,141,906	181,408	77,276	112,420	641,722	2,154,732
Somerset						
Basement------	0	0	0	0	0	0
First floor---	15,460	15,830	6,400	4,960	17,730	60,380
Second floor--	0	0	0	0	0	0
Other---------	0	0	0	0	0	0
Subtotal--	15,460	15,830	6,400	4,960	17,730	60,380
Union						
Basement------	500	0	0	1,500	5,200	7,250
First floor---	598,827	192,441	51,213	76,958	548,851	1,468,290
Second floor--	11,400	0	0	34,858	290,175	336,433
Other---------	150,000	0	0	0	0	150,000
Subtotal--	760,727	192,441	51,213	113,316	844,226	1,961,973
Grand total						
Basement------	171,597	38,360	5,575	2,780	130,660	348,972
First floor---	5,656,757	1,193,786	520,305	476,032	4,124,000	11,970,880
Second floor--	238,167	60,935	18,080	266,836	621,690	1,205,708
Other---------	214,725	8,888	400	9,400	132,492	365,905
Subtotal--	6,281,246	1,301,969	544,360	755,048	5,008,842	13,891,465

Table 4.--Total volume handled by northeastern New Jersey independent wholesalers in Bergen County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	84,433	1,643	2,115	88,191
Meat and related products----	35,197	1,038	2,105	38,340
Groceries----------	23,249	1,572	269,751	294,572
Dairy products----------	79,393	20,146	5,317	104,856
Shell eggs----------	3,114	78	0	3,192
Frozen foods----------	54,668	414	178	55,260
Fish and shellfish----------	160	0	0	160
Bakery products----------	11,475	1,154	2,059	14,688
Beverages----------	132,525	73,200	0	205,725
Candy and confectionery------	1,772	16	20,315	22,103
Other foods----------	70,322	9,012	37,435	116,769
Total----------	496,308	108,273	339,275	943,856

Table 5.--Total volume handled by northeastern New Jersey independent wholesalers in Essex County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	235,382	57,749	4,826	297,957
Meat and related products----	171,879	18,039	24,327	214,245
Groceries----------	96,211	21,949	1,584	119,744
Dairy products----------	80,091	858	0	80,949
Poultry----------	36,500	1,598	0	38,098
Shell eggs----------	1,461	63	0	1,524
Frozen foods----------	11,287	1,852	7,922	21,061
Fish and shellfish----------	7,139	267	0	7,406
Bakery products----------	51,095	1,500	0	52,595
Beverages----------	106,960	1,520	6,680	115,160
Candy and confectionery------	4,004	751	4,599	9,354
Other foods----------	5,122	7,670	10,692	23,484
Total----------	807,131	113,816	60,630	981,577

Table 6.--Total volume handled by northeastern New Jersey independent wholesalers in Hudson County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	31,582	3,029	0	34,611
Meat and related products----	71,888	14,212	18,576	104,676
Groceries----------	166,157	50,382	52,374	268,913
Dairy products----------	30,889	5,474	1,875	38,238
Poultry----------	108	0	0	108
Shell eggs----------	554	0	0	554
Frozen foods----------	36,884	738	5	37,627
Fish and shellfish----------	2,438	62	25,000	27,500
Bakery products----------	27,218	7,983	94,467	129,668
Beverages----------	4,201	380	0	4,581
Candy and confectionery------	2,420	2,594	27,714	32,728
Other foods----------	838	3,380	46,359	50,577
Total----------	375,177	88,234	266,370	729,781

Table 7.--Total volume handled by northeastern New Jersey independent wholesalers in Middlesex County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	15,055	3,802	0	18,857
Meat and related products----	56,759	467	0	56,226
Groceries----------	21,961	4,394	43,134	69,489
Dairy products----------	92,363	468	1,538	94,369
Poultry----------	0	0	0	0
Shell eggs----------	25,610	0	0	25,610
Frozen foods----------	79,583	0	0	79,583
Fish and shellfish----------	1,625	292	0	1,917
Bakery products----------	43,243	75	43,600	86,918
Beverages----------	65,220	1,080	0	66,300
Candy and confectionery------	8,184	1,037	6,041	15,262
Other foods----------	57,901	444	12,885	71,230
Total----------	467,504	12,059	107,198	585,761

Table 8.--Total volume handled by northeastern New Jersey independent wholesalers in Morris County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	441	0	0	441
Meat and related products----	364	0	0	364
Bakery products----------	3,600	0	900	4,500
Candy and confectionery------	602	0	250	852
Other foods----------	665	0	35	700
Total----------	5,672	0	1,185	6,857

Table 9.--Total volume handled by northeastern New Jersey independent wholesalers in Passaic County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	81,361	28,915	0	110,276
Meat and related products----	49,848	3,301	2,600	55,749
Groceries----------	18,813	2,293	210,000	231,106
Dairy products----------	33,997	13,510	1,000	48,507
Poultry----------	13,158	300	1,040	14,498
Shell eggs----------	0	0	0	0
Frozen foods----------	2,882	0	0	2,882
Fish and shellfish----------	1,316	642	0	1,958
Bakery products----------	57,763	10,822	4,000	72,585
Beverages----------	187,060	14	1,538	188,612
Candy and confectionery------	12,670	128	7,603	20,401
Other foods----------	3,832	3,393	14	7,239
Total----------	462,700	63,318	227,795	753,813

Table 10.--Total volume handled by northeastern New Jersey independent wholesalers in Somerset County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Meat and related products----	6,500	0	260	6,760
Groceries----------	2,265	29	0	2,294
Poultry----------	776	0	0	776
Bakery products----------	1,167	0	0	1,167
Candy and confectionery------	209	11	0	220
Total----------	10,917	40	260	11,217

Table 11.--Total volume handled by northeastern New Jersey independent wholesalers in Union County, by delivery method

Type of firm	Delivered by wholesaler	Picked up by customer	Delivered by for-hire firms	Total volume handled
		Tons		
Fresh fruits and vegetables--	5,390	1,521	0	6,911
Meat and related products----	37,444	4,195	5,736	47,375
Groceries----------	58,994	7,143	944	67,081
Dairy products----------	176,181	24,384	50,866	251,431
Poultry----------	16,393	507	0	16,900
Shell eggs----------	25,720	0	1,320	27,040
Frozen foods----------	2,880	0	2,340	5,220
Fish and shellfish----------	0	0	0	0
Bakery products----------	6,971	3,420	28,518	38,909
Beverages----------	23,400	0	0	23,400
Candy and confectionery------	2,714	10,912	11,600	25,226
Other foods----------	67	0	2,527	2,594
Total----------	356,154	52,082	103,851	512,087

Table 12.--Total volume distributed for northeastern New Jersey independent wholesale firms in Bergen County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	13,838	3,421	70,932	0	88,191
Meat and related products----	30,849	3,048	4,360	83	38,340
Groceries----------	132,295	51,489	105,677	5,111	294,572
Dairy products----------	29,980	15,560	5,837	53,479	104,856
Poultry----------	0	0	0	0	0
Shell eggs----------	2,997	0	195	0	3,192
Frozen foods----------	54,051	0	1,209	0	55,260
Fish and shellfish----------	160	0	0	0	160
Bakery products----------	9,827	2,350	2,227	284	14,688
Beverages----------	11,250	138,875	55,600	0	205,725
Candy and confectionery------	2,263	11,014	8,826	0	22,103
Other foods----------	72,673	2,356	34,000	7,740	116,769
Total----------	360,183	228,113	288,863	66,697	943,856

Table 13.--Total volume distributed for northeastern New Jersey independent wholesale firms in Essex County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	71,867	138,934	82,450	4,706	297,957
Meat and related products----	87,284	62,976	56,694	7,291	214,245
Groceries----------	115,011	222	4,511	0	119,744
Dairy products----------	78,987	0	1,962	0	80,949
Poultry----------	21,789	15,378	931	0	38,098
Shell eggs----------	1,524	0	0	0	1,524
Frozen foods----------	2,759	12,589	5,713	0	21,061
Fish and shellfish----------	4,954	2,219	0	233	7,406
Bakery products----------	49,695	33	1,400	1,467	52,595
Beverages----------	65,721	40,439	9,000	0	115,160
Candy and confectionery------	4,108	1,521	1,892	1,833	9,354
Other foods----------	10,084	1,584	4,427	7,389	23,484
Total----------	513,783	275,895	168,980	22,919	981,577

Table 14.--Total volume distributed for northeastern New Jersey independent wholesale firms in Hudson County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	20,288	14,029	294	0	34,611
Meat and related products----	33,800	33,753	18,391	18,732	104,676
Groceries----------	168,846	95,444	1,706	2,917	268,913
Dairy products----------	28,276	4,902	5,060	0	38,238
Poultry----------	108	0	0	0	108
Shell eggs----------	554	0	0	0	554
Frozen foods----------	248	36,842	11	526	37,627
Fish and shellfish----------	21,563	5,937	0	0	27,500
Bakery products----------	22,475	44,329	62,864	0	129,668
Beverages----------	3,190	0	1,203	188	4,581
Candy and confectionery------	2,903	1,411	28,414	0	32,728
Other foods----------	46,675	2,325	1,357	220	50,577
Total----------	348,926	238,972	119,300	22,583	729,781

Table 15.--Total volume distributed for northeastern New Jersey independent wholesale firms in Middlesex County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	8,184	4,436	2,559	3,678	18,857
Meat and related products----	29,514	25,809	1,560	343	57,226
Groceries----------	69,489	0	0	0	69,489
Dairy products----------	68,761	0	14,443	11,165	94,369
Poultry----------	0	0	0	0	0
Shell eggs----------	15,808	5,850	3,952	0	25,610
Frozen foods----------	76,951	2,106	526	0	79,583
Fish and shellfish----------	1,683	117	117	0	1,917
Bakery products----------	32,559	42,159	12,200	0	86,918
Beverages----------	43,461	21,605	1,234	0	66,300
Candy and confectionery------	5,189	10,073	0	0	15,262
Other foods----------	14,856	51,284	1,190	3,900	71,230
Total----------	366,455	163,439	37,781	19,086	586,761

Table 16.--Total volume distributed for northeastern New Jersey independent wholesale firms in Morris County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	441	0	0	0	441
Meat and related products----	328	0	0	36	364
Groceries----------	0	0	0	0	0
Dairy products----------	0	0	0	0	0
Poultry----------	0	0	0	0	0
Shell eggs----------	0	0	0	0	0
Frozen foods----------	0	0	0	0	0
Fish and shellfish----------	0	0	0	0	0
Bakery products----------	0	0	1,125	3,375	4,500
Beverages----------	0	0	0	0	0
Candy and confectionery------	852	0	0	0	852
Other foods----------	0	0	0	700	700
Total----------	1,621	0	1,125	4,111	6,857

Table 17.--Total volume distributed for northeastern New Jersey independent wholesale firms in Passaic County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	72,262	30,956	7,058	0	110,276
Meat and related products----	44,677	6,396	4,193	483	55,749
Groceries----------	20,867	210,000	239	0	231,106
Dairy products----------	1,245	2,500	43,969	793	48,507
Poultry----------	3,278	10,810	410	0	14,498
Shell eggs----------	0	0	0	0	0
Frozen foods----------	2,882	0	0	0	2,882
Fish and shellfish----------	1,625	0	333	0	1,958
Bakery products----------	24,239	47,467	129	750	72,585
Beverages----------	107,858	46,147	0	34,607	188,612
Candy and confectionery------	5,954	3,500	4,697	6,250	20,401
Other foods----------	396	0	176	6,667	7,239
Total----------	285,283	357,776	61,204	49,550	753,813

Table 18.--Total volume distributed for northeastern New Jersey independent wholesale firms in Somerset County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	0	0	0	0	0
Meat and related products----	390	6,292	0	78	6,760
Groceries----------	2,294	0	0	0	2,294
Dairy products----------	0	0	0	0	0
Poultry----------	776	0	0	0	776
Shell eggs----------	0	0	0	0	0
Frozen foods----------	0	0	0	0	0
Fish and shellfish----------	0	0	0	0	0
Bakery products----------	1,167	0	0	0	1,167
Beverages----------	0	0	0	0	0
Candy and confectionery------	220	0	0	0	220
Other foods----------	0	0	0	0	0
Total----------	4,847	6,292	0	78	11,217

Table 19.--Total volume distributed for northeastern New Jersey independent wholesale firms in Union County, by type of customer

Type of firm	Institutions, restaurants, and retailers	Full-line distributors	Wholesalers	Other	Total
			Tons		
Fresh fruits and vegetables--	6,117	294	500	0	6,911
Meat and related products----	25,086	4,095	17,705	489	47,375
Groceries----------	50,970	0	16,111	0	67,081
Dairy products----------	96,301	44,523	108,865	1,742	251,431
Poultry----------	9,321	5,590	1,989	0	16,900
Shell eggs----------	18,258	1,690	7,092	0	27,040
Frozen foods----------	2,620	0	260	2,340	5,220
Fish and shellfish----------	0	0	0	0	0
Bakery products----------	25,296	7,341	6,272	0	38,909
Beverages----------	4,680	16,380	2,340	0	23,400
Candy and confectionery------	3,300	6,700	15,226	0	25,226
Other foods----------	567	0	600	1,427	2,594
Total----------	242,516	86,613	176,960	5,998	512,087

Developing the master plan required (1) planning initial facilities, (2) determining the amount of expansion required, (3) calculating construction costs, and (4) examining the total revenue required to support the proposed wholesale food distribution center.

Initial Facilities

Initial facility requirements for each firm featured in the master plan were developed after careful consultation with the management of specific firms included in new facility planning. In some instances anticipated changes in operating techniques, product mix, or processing operations are reflected in future facility recommendations. Where firm plans for future facility requirements had not been determined yet by company management, standard building space-requirement formulas were utilized in developing recommendations. General building shapes and location of sites reflected current industrial park-design concepts applicable to food firms.

Expansion

Individual expansion requirements were developed for illustrative purposes for each firm included in new facility planning. These expansion requirements were featured in the overall arrangement shown in the master plan (figures 9 and 28). The total amount of land required for the proposed food distribution center also reflected the expansion requirements of the individual firms included in new facility planning. These expansion requirements were designed to serve the candidates' need for additional space for the anticipated life of the development.

As outlined in this section of the appendix, the methodology for estimating building expansion requirements is partly based on trends of consumption established for each of the various products handled by the New Jersey wholesalers. Available information concerning certain products was insufficient to develop fully credible estimates of future consumption. In addition, changing consumption patterns for food groups precluded full reliability concerning these estimates. For these reasons, projections of expansion space outlined in this report are for illustrative purposes only. These projections should not be substituted for more accurate data that may be made possible with additional information available prior to the beginning of actual facility planning and construction.

Two factors were considered in estimating the amount of land required for expansion of individual facilities. These factors are (1) changes in annual tonnage handled and (2) changes in the way products will be handled or processed in future years.

Change in Annual Tonnage Handled

Population changes within the study area and changing consumption patterns were considered to be the two factors most directly affecting overall changes in annual tonnage handled by firms included in new facility planning. Population projections were based on series II projections. 1/ Series II projections were, in turn, based on a continuation of trends of population growth in New Jersey from the period 1970 through 1974. Population estimates for the study area in 1974 were obtained from the U.S. Bureau of Census. 2/

Trends of consumption of different selected food categories handled by firms included in new facility planning were estimated by regressing indices of consumption with the single variable time by least square fit of points. The indices of consumption used in these calculations were obtained from USDA references. 3/ Using such indices as a basis for projections is discussed in a previous USDA study. 4/ The resulting linear-trend lines consisted of an equation describing a straight-line plot of the data with the index ,y, for any given number of years from the base year equal to the time coefficient multiplied by the number of years from the base year plus the intercept. Mathematically, this equation would be expressed as: $y = mx + b$,

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1/ New Jersey Population Projections 1980-2020, New Jersey Department of Labor and Industry, Division of Planning and Research, Office of Business Economics, 6 pp., 1975.

2/ U.S. Bureau of Census, Current Population Reports, Series P. 25, No. 620 "Estimates of the Population of Counties July 1, 1973, and 1974," U.S. Government Printing Office, Washington, D.C., 1976.

3/ U.S. Department of Agriculture, Agricultural Statistics, 1975, table 762, U.S. Government Printing Office, Washington, D.C.

U.S. Department of Agriculture, Food Consumption Prices Expenditures, U.S. Government Printing Office, Washington, D.C.

4/ Taylor, Earl G., et al. Food Distribution Facilities for Memphis, Tennessee, 1976-2000. U.S. Department of Agriculture, Marketing Research Report 1099, 53 pp., 1979.

where m = the time coefficient, b the intercept, and x = the number of years from the base year (base year represented as 1). The period of regression for most of the food categories extends from 1959 to 1974. Indices for two food categories, beverages and spices, were only available from 1960 to 1975. Equivalent data for confectionery extended from 1969 to 1975.

Some food groups, as defined for the purposes of this report, are directly equivalent to previously defined food categories. These food groups are (1) meat and related products, (2) manufactured dairy products, (3) poultry, (4) shell eggs, (5) fish and shellfish, and (6) beverages. Other food groups in this report are comprised of a number of separate food categories. The food group, fresh fruits and vegetables, includes the food categories (1) fresh fruits, (2) fresh vegetables, and (3) potatoes and sweet potatoes. Groceries include (1) flour and cereal products, (2) canned vegetables, (3) coffee, tea, cocoa, (4) sugar and other sweeteners, (5) fats and oils (excluding butter), (6) processed fruit, (7) beans, peas, nuts, soy products, and (8) fish and shellfish. Frozen foods include (1) processed fruit and (2) frozen vegetables. The food group, bakery products, includes only the food category flour and cereal products. Candy and confectionery includes the two categories, confectionery and tobacco. Other foods include (1) flour and cereal products, (2) spices, (3) coffee, tea, and cocoa, (4) processed fruits, and (5) fats and oils (excluding butter).

Projected and adjusted indices (1967 = 1.000) were calculated for 1980, 1990, 2000, and 2010. The projected and adjusted indices were calculated by applying the appropriate data to the trend lines multiplying the resulting food category index by its adjustment factor, and adding the products of all categories in each of n food groups. Mathematically, this calculation would be expressed as:

$$I_{fg} = \sum_{i=1}^{i=n} A_{fc} (mx + b)_{fc},$$

where I represents the index for the food group, A the adjustment factor, and $(mx + b)_{fc}$ the appropriate trend line for each food category in the food group. Adjustment factors are based on relative retail-weight equivalents of food categories within a food group (see footnote 2), information developed during the course of the study of specific food groups, or consumption patterns illustrated in a USDA report.5/

The projected volumes shown in appendix II, table 1 were calculated in a series of steps. The volume of each food group, as defined for the purposes of this report, were summarized for each of the firms included in new facility planning. The projected volumes of each of these food groups were individually calculated by multiplying a ratio of the projected eight-county area (appendix II, table 1) and the 1974 population, a ratio of the projected and 1974 index of consumption as calculated for each food group, and the 1974 volume of that particular food group as handled by each firm. Mathematically, these calculations could be expressed as:

$$V_a = (P_a/P_{1974}) (I_a/I_{1974}) (V_{1974}),$$

where V_a represents the volume of a food group handled by a specific firm included in new facility planning in year a; P_a represents the population of the study area in year a; P_{1974} represents the population of the study area in 1974; I_a represents the index of consumption in year a for the food group; I_{1974} represents the equivalent index in 1974; and V_{1974} represents the 1974 volume of a food group handled by a candidate firm to be projected.

The next step in the analysis was to combine the volumes of all the different food groups handled by individual firms in each type of firm category as shown in appendix II, table 1. Subsequently, the aggregate volumes of the individual firms in each of these firm types were further combined into the totals shown by firm type category in appendix II, table 1. Changes in the volume of nonfood products were assumed to vary in a similar fashion as the aggregate volume.

The projected volume of corporate chainstores included in new facility planning was calculated on the basis of a trend line describing per capita sales from 1960 to 1975. 6/

5/ U.S. Department of Agriculture, Food Consumption of Households in the Northeast. U.S. Government Printing Office, April 1965.

6/ Progressive Grocer, April 1977.

Table 1.--Present and projected volumes of northeastern New Jersey firms included in new facilities planning

Type of firm	1974	1980	1990	2000	2010
			Tons		
Fresh fruits and vegetables--	459,499	504,031	548,999	595,928	644,733
Meat and related products----	113,254	128,585	145,234	162,772	181,199
Groceries 1/----------	386,368	445,123	526,873	613,546	705,216
Dairy products----------	98,303	101,502	99,645	97,327	94,549
Poultry----------	53,665	66,539	81,955	98,361	115,753
Shell eggs----------	13,843	15,331	16,016	16,707	17,403
Frozen foods----------	7,980	9,560	11,475	13,509	15,662
Fish and shellfish----------	6,792	7,664	8,687	9,764	10,897
Bakery products----------	41,558	43,805	43,898	43,861	43,694
Beverages----------	160,020	211,383	282,734	358,957	440,051
Candy and confectionery------	13,272	11,870	8,530	4,894	1,560
Other foods----------	64,133	70,309	75,672	81,232	86,989
Total----------	1,418,687	1,615,702	1,849,718	2,096,858	2,357,706

1/ Includes chains and independents.

This trend line, adjusted to reflect leveled (1967) dollar sales, and applied to the population projections, indicated a 113 percent increase in annual volume over the life of the new center. The wide variety of food and nonfood items handled by the chainstores considered in new facility planning made it impractical to calculate trend-line and volume projections for this type of food firm. Both the volume of independent grocery wholesalers and chainstore volume is included under the firm category "grocery" in appendix II, table 1.

Changes in Internal Operations

Some changes in internal operations that affect space utilization were anticipated in planning for the expansion of the facilities illustrated in the master plan. In warehousing operations, increased use of data processing equipment to manage inventory levels should limit the necessity for additional storage space. Some processing operations were anticipated to be transferred from wholesale firms included in the facility planning to producing areas, again limiting the need for additional space.

Application to Individual Firms

Estimates of future volumes were used as the basis of the actual calculation of expansion requirements. Estimates were made for the additional building space required to store and, if appropriate, process these additional volumes of food. Estimates were also made of the additional land required to service the larger warehousing and processing facilities projected through the life of the new center. This additional land constituted the amount of site expansion required by each firm in the master plan.

Different methods were used to project the additional space required by the firms included in new facility planning. Some linear relationships were developed based on survey data obtained in this study and on unpublished research involving turnover rates and storage space. These relationships were used to estimate the amount of space within the new facility required to handle anticipated additional volumes of each food group comprising the total annual sales projected for the firm included in new facility planning.

Additional space would be required for offices, processing operations, and other specialized areas planned for the overall facility. The difference between the projected size of the proposed facility and the initial, recommended building in the master plan constitutes the additional building expansion.

Care was taken in utilizing mathematical formulas relating turnover rate and space, as they were found to provide reasonable estimates of facility requirements only within certain ranges of turnover rates. In addition,

particular characteristics of individual firms also affected the relationship between turnover rates and storage space.

Estimates of future facility requirements of certain types of firms were based on experience within the industry and established trends within particular portions of the food industry.

Construction Costs

The estimated construction costs of buildings and other facilities were based on standard construction cost references adjusted to Newark, New Jersey, January 1977. Additional construction cost information was provided by northern New Jersey architectural and engineering firms. All cost information in this section is general and should not be used as an accurate measure against proposal bids. Unit costs used to develop overall construction to costs are as follows:

	Cost per sq ft
Building:	
Multiple-occupancy building	$16.46
Mezzanine installed in multiple-occupancy buildings	9.72
Single-occupancy building	15.41
Offices	34.28
Coolers (in addition to basic building)	30.27
Freezers (in addition to basic building)	36.49
Sprinklers	1.05
Other facilities:	
Paving and curbing:	
Paving	7.85/sq yd
Curbs	7.50/lin ft
Truck-maneuvering area	10.92/sq ft
Railroad trackage, switches, and stops:	
Unpaved railroad track	36.00/lin ft
Paved railroad track	65.57/lin ft
Turnouts	6,470.00 ea
Car bumpers	934.50 ea
Sewers:	
Sanitary	11.59/lin ft
Storm	16.57/lin ft
Street lighting	1,277.00/pole

Building costs included normal electrical and mechanical equipment associated with structures ready for occupancy. Stairs, lighting, and restrooms for offices also were included in the listed costs. Costs of completing offices, equipping processing areas, storage aids, and similar customizing expenses were not included and were considered to be borne by the tenant or owner after occupancy.

Freezers and cooler costs included doors but did not include the cost of internal storage aids. All buildings are assumed to be completely equipped with sprinklers outside refrigerated areas.

Asphalt paving specifications were assumed to be those typically associated with industrial parks and were applied to center streets. Truck maneuvering areas were assumed to be concrete.

Rail facilities proposed for the center conformed to recommendations provided by railroad companies serving the area. Unpaved rail lines were assumed to serve all single-occupancy buildings; paved lines were provided in the multiple-occupancy section of the center. Turnouts included the costs of switches. Car bumpers were provided at the end of each rail line or spur.

Some facilities included in this section represent an average cost per unit. Sewer costs included, where appropriate, the cost of support facilities and pipes of various sizes. Lighting costs included electrical distribution lines. All costs included installation.

Table 2 summarizes the overall construction cost for the proposed food distribution center, by type of firm and type of building.

Table 2.--Construction costs for the proposed northeastern New Jersey food distribution center, by type of firm and building 1/

Fresh Fruits and Vegetables	
Multiple-occupancy facilities:	
Buildings (38 units, 30 by 100 ft), 114,000 sq ft of first-floor space @ $16.46 per sq ft and 22,800 sq ft of mezzanine space @ $9.72 per sq ft	$2,098,056
Coolers, 60,000 sq ft @ $30.27 per sq ft	1,816,200
Sprinkler system	80,640
Total construction cost of buildings	3,994,896
Other facilities: 2/	
Paving and curbing (street and parking areas)	466,567
Railroad trackage, switches, and stops	154,856
Sewers (storm and sanitary)	51,773
Street lighting	25,923
Total construction cost of other facilities	699,119

Other costs: 3/	
Architectural and engineering fees	246,436
Soil borings, foundation analyses, and surveys	46,940
Financing, legal, and administrative fees	563,282
Contingency allowance	555,067
Total other costs	1,411,725
Total construction cost of buildings, other facilities, and other costs	6,105,740
Single-occupancy facilities:	
Buildings (8) totaling 256,800 sq ft of first-floor space @ $15.41 per sq ft	3,957,288
Coolers, 154,080 sq ft @ $30.27 per sq ft	4,664,002
Sprinkler system	107,856
Total construction cost of buildings	8,729,146
Other facilities: 2/	
Paving and curbing (street and parking areas)	602,515
Railroad trackage, switches, and stops	139,101
Sewers (storm and sanitary)	140,022
Street lighting	30,648
Total construction cost of other facilities	912,286
Other costs: 3/	
Architectural and engineering fees	506,175
Soil borings, foundation analyses and surveys	96,414
Financing, legal, and administative fees	1,156,972
Contingency allowance	1,140,099
Total other costs	2,899,660
Total construction cost of buildings, other facilities, and other costs	12,541,092

Meat and Related Products

Multiple-occupancy facilities:	
Buildings (25 units, 30 by 100 ft), 75,000 sq ft of first-floor space @ $16.46 per sq ft and 15,000 sq ft of mezzanine space @ $9.72 per sq ft	1,380,300
Coolers, 67,400 sq ft @ $30.27 per sq ft	2,040,198
Freezers, 7,600 sq ft @ $36.49 per sq ft	277,324
Sprinkler system	15,750
Total construction cost for buildings	3,713,572
Other facilities: 2/	
Paving and curbing (street and parking areas)	306,973
Railroad trackage, switches, and stops	12,455
Sewers (storm and sanitary)	34,074
Street lighting	10,343
Total construction costs of other facilities	363,845
Other costs: 3/	
Architectural and engineering fees	214,064
Soil borings, foundation analyses and surveys	40,774
Financing, legal, and administrative fees	489,290
Contingency allowance	482,155
Total other costs	1,226,283
Total construction cost of buildings, other facilities, and other costs	5,303,700
Single-occupancy facilities:	
Buildings (21) totaling 466,620 sq ft of first-floor space @ $15.41 per sq ft	7,190,614
Coolers	10,911,639
Freezers, 51,290 sq ft @ $36.49 per sq ft	1,871,572
Sprinkler system	57,596
Total construction cost of buildings	20,031,421
Other facilities: 2/	
Paving and curbing (street and parking areas)	1,237,852
Railroad trackage, switches, and stops	65,703
Sewers (storm and sanitary)	351,451
Street lighting	74,066
Total construction cost of other facilities	1,729,072
Other costs: 3/	
Architectural and engineering fees	1,142,426
Soil borings, foundation analyses and surveys	217,605

Financing, legal, and administrative fees	2,611,259
Contingency allowance	2,573,178
Total other costs	6,544,468
Total construction cost of buildings, other facilities, and other costs	28,304,961

Groceries

Multiple-occupancy facilities:	
Buildings (21 units, 30 by 100 ft), 63,000 sq ft of first-floor space @ $16.46 per sq ft and 12,600 sq ft of mezzanine space @ $9.72 per sq ft	1,159,452
Coolers	199,782
Freezers, 1,800 sq ft @ $36.49 per sq ft	65,682
Sprinkler system	70,560
Total construction cost of buildings	1,495,476
Other facilities: 2/	
Paving and curbing (street and parking areas)	257,901
Railroad trackage, switches, and stops	107,596
Sewers (storm and sanitary)	28,612
Street lighting	14,175
Total construction cost of other facilities	408,284
Other costs: 3/	
Architectural and engineering fees	99,947
Soil borings, foundation analyses and surveys	19,038
Financing, legal, and administrative fees	228,451
Contingency allowance	225,120
Total other costs	572,556
Total construction cost of buildings, other facilities, and other costs	2,476,316
Single-occupancy facilities:	
Buildings (12) totaling 892,900 sq ft of first-floor space, 870,400 sq ft @ $15.41 per sq ft and 22,500 sq ft @ $34.28 per sq ft	14,184,164
Coolers, 134,900 sq ft @ $30.27 per sq ft	4,083,423
Freezers, 29,900 sq ft @ $36.49 per sq ft	1,091,051
Sprinkler system	764,505
Total construction cost of buildings	20,123,143
Other facilities: 2/	
Paving and curbing (street and parking areas)	1,822,514
Railroad trackage, switches, and stops	347,938
Sewers (storm and sanitary)	427,574
Street lighting	120,038
Total construction cost of other facilities	2,718,064
Other costs: 3/	
Architectural and engineering fees	1,199,163
Soil borings, foundation analyses and surveys	228,412
Financing, legal, and administrative fees	2,740,945
Contingency allowance	2,700,973
Total other costs	6,869,493
Total construction cost of buildings, other facilities, and other costs	29,710,700

Dairy Products

Multiple-occupancy facilities:	
Buildings (13 units, 30 by 100 ft), 39,000 sq ft of first-floor space @ $16.46 per sq ft and 7,800 sq ft of mezzanine space @ $9.72 per sq ft	717,756
Coolers, 16,650 sq ft @ $30.27 per sq ft	503,996
Freezers, 2,400 sq ft @ $36.49 per sq ft	87,576
Sprinkler system	29,137
Total construction cost of buildings	1,338,465
Other facilities: 2/	
Paving and curbing (street and parking areas)	159,574
Railroad trackage, switches, and stops	6,479
Sewers (storm and sanitary)	17,715
Street lighting	9,194
Total construction cost of other facilities	192,962

Other costs: 3/	
Architectural and engineering fees	80,400
Soil borings, foundation analyses and surveys	15,314
Financing, legal, and administrative fees	183,771
Contingency allowance	181,091
Total other costs	460,576
Total construction cost of buildings, other facilities, and other costs	1,992,003
Single-occupancy facilities:	
Buildings (3) totaling 90,000 sq ft of first-floor space @ $15.41 per sq ft	1,386,900
Coolers, 23,500 sq ft @ $30.27 per sq ft	711,345
Freezers, 500 sq ft @ $36.49 per sq ft	18,245
Sprinkler system	69,300
Total construction cost of buildings	2,185,790
Other facilities: 2/	
Paving and curbing (street and parking areas)	572,995
Railroad trackage, switches, and stops	16,426
Sewers (storm and sanitary)	84,818
Street lighting	33,202
Total construction cost of other facilities	707,441
Other costs: 3/	
Architectural and engineering fees	151,895
Soil borings, foundation analyses and surveys	28,932
Financing, legal, and administrative fees	347,188
Contingency allowance	342,125
Total other costs	870,140
Total construction cost of buildings, other facilities, and other costs	3,763,371

Poultry and Eggs

Multiple-occupancy facilities:	
Buildings (9 units, 30 by 100 ft), 27,000 sq ft of first-floor space @ $16.46 per sq ft and 5,400 sq ft of mezzanine space @ $9.72 per sq ft	496,908
Coolers, 8,100 sq ft @ $30.27 per sq ft	245,187
Freezers, 6,900 sq ft @ $36.49 per sq ft	251,781
Sprinkler system	18,270
Total construction cost of buildings	1,012,146
Other facilities: 2/	
Paving and curbing (street and parking areas)	110,510
Railroad trackage, switches, and stops	4,507
Sewers (storm and sanitary)	12,270
Street lighting	6,640
Total construction cost of other facilities	133,927
Other costs: 3/	
Architectural and engineering fees	60,169
Soil borings, foundation analyses and surveys	11,460
Financing, legal, and administrative fees	137,529
Contingency allowance	135,523
Total other costs	344,681
Total construction cost of buildings, other facilities, and other costs	1,490,754
Single-occupancy facilities:	
Buildings (4) totaling 57,800 sq ft of first-floor space @ $15.41 per sq ft	$890,698
Coolers, 41,000 sq ft @ $30.27 per sq ft	1,241,070
Freezers, 7,000 sq ft @ $36.49 per sq ft	255,430
Sprinkler system	10,290
Total construction cost of buildings	2,397,488
Other facilities: 2/	
Paving and curbing (street and parking areas)	184,576
Railroad trackage, switches, and stops	8,213
Sewers (storm and sanitary)	54,919
Street lighting	12,770
Total construction cost of other facilities	260,478

Other costs: 3/	
Architectural and engineering fees	139,543
Soil borings, foundation analyses and surveys	26,580
Financing, legal, and administrative fees	318,956
Contingency allowance	314,304
Total other costs	799,383
Total construction cost of buildings, other facilities, and other costs	3,457,349

Frozen Foods

Multiple-occupancy facilities:	
Buildings (8 units, 30 by 100 ft), 24,000 sq ft of first-floor space @ $16.46 per sq ft and 4,800 sq ft of mezzanine space @ $9.72 per sq ft	441,696
Coolers, 800 sq ft @ $30.27 per sq ft	24,216
Freezers, 3,850 sq ft @ $36.49 per sq ft	140,487
Sprinkler system	25,357
Total construction cost of buildings	631,756
Other facilities: 2/	
Paving and curbing (street and parking areas)	98,233
Railroad trackage, switches, and stops	3,974
Sewers (storm and sanitary)	10,901
Street lighting	6,385
Total construction cost of other facilities	119,493
Other costs: 3/	
Architectural and engineering fees	39,441
Soil borings, foundation analyses and surveys	7,512
Financing, legal, and administrative fees	90,150
Contingency allowance	88,835
Total other costs	225,938
Total construction cost of buildings, other facilities, and other costs	977,187
Single-occupancy facilities:	
Buildings (2) totaling 37,600 sq ft of first-floor space @ $15.41 per sq ft	579,416
Coolers, 600 sq ft @ $30.27 per sq ft	18,162
Freezers, 9,000 sq ft @ $36.49 per sq ft	328,410
Sprinkler system	29,400
Total construction cost of buildings	955,388
Other facilities: 2/	
Paving and curbing (street and parking areas)	130,336
Railroad trackage, switches, and stops	8,262
Sewers (storm and sanitary)	32,716
Street lighting	8,939
Total construction cost of other facilities	180,253
Other costs: 3/	
Architectural and engineering fees	59,621
Soil borings, foundation analyses and surveys	11,356
Financing, legal, and administrative fees	136,277
Contingency allowance	134,290
Total other costs	341,544
Total construction cost of buildings, other facilities, and other costs	1,477,185

Fish and Shellfish

Multiple-occupancy facilities:	
Buildings (9 units, 30 by 100 ft), 27,000 sq ft of first-floor space @ $16.46 per sq ft and 5,400 sq ft of mezzanine space @ $9.72 per sq ft	496,908
Coolers, 2,800 sq ft @ $30.27 per sq ft	84,756
Freezers, 5,000 sq ft @ $36.49 per sq ft	182,450
Sprinkler system	25,830
Total construction cost of buildings	789,944
Other facilities: 2/	
Paving and curbing (street and parking areas)	136,366
Railroad trackage, switches, and stops	8,613
Sewers (storm and sanitary)	23,491

Street lighting	9,194
Total construction cost of other facilities	177,664
Other costs: 3/	
Architectural and engineering fees	50,799
Soil borings, foundation analyses and surveys	9,676
Financing, legal, and administrative fees	116,113
Contingency allowance	114,420
Total other costs	291,008
Total construction cost of buildings, other facilities, and other costs	1,258,616

Bakery Products

Multiple-occupancy facilities:	
Buildings (10 units, 30 by 100 ft), 30,000 sq ft of first-floor space @ $16.46 per sq ft and 6,000 sq ft of mezzanine space @ $9.72 per sq ft	552,120
Coolers, 400 sq ft @ $30.27 per sq ft	12,108
Freezers, 400 sq ft @ $36.49 per sq ft	14,596
Sprinkler system	36,960
Total construction cost of buildings	615,784
Other facilities: 2/	
Paving and curbing (street and parking areas)	122,777
Railroad trackage, switches, and stops	4,974
Sewers (storm and sanitary)	13,622
Street lighting	6,896
Total construction cost of other facilities	148,269
Other costs: 3/	
Architectural and engineering fees	40,113
Soil borings, foundation analyses and surveys	7,641
Financing, legal, and administrative fees	91,686
Contingency allowance	90,349
Total other costs	229,789
Total construction cost of buildings, other facilities, and other costs	993,842
Single-occupancy facilities:	
Buildings (5) totaling 318,300 sq ft of first-floor space @ $15.41 per sq ft	4,905,003
Coolers, 750 sq ft @ $30.27 per sq ft	22,703
Freezers, 1,450 sq ft @ $36.49 per sq ft	52,911
Sprinkler system	331,905
Total construction cost of buildings	5,312,522
Other facilities: 2/	
Paving and curbing (street and parking areas)	695,894
Railroad trackage, switches, and stops	121,074
Sewers (storm and sanitary)	195,511
Street lighting	37,033
Total construction cost of other facilities	1,049,512
Other costs: 3/	
Architectural and engineering fees	334,007
Soil borings, foundation analyses and surveys	63,620
Financing, legal, and administrative fees	763,444
Contingency allowance	752,311
Total other costs	1,913,382
Total construction cost of buildings, other facilities, and other costs	8,275,416

Beverages

Multiple-occupancy facilities:	
Buildings (1 unit, 30 by 100 ft), 3,000 sq ft of first-floor space @ $16.46 per sq ft and 600 sq ft of mezzanine space @ $9.72 per sq ft	55,212
Sprinkler system	3,780
Total construction cost of building	58,992
Other facilities: 2/	
Paving and curbing (street and parking areas)	12,259

Railroad trackage, switches, and stops	5,221
Sewers (storm and sanitary)	1,368
Street lighting	3,831
Total construction cost of other facilities	22,679
Other costs: 3/	
Architectural and engineering fees	4,288
Soil borings, foundation analyses and surveys	817
Financing, legal, and administrative fees	9,800
Contingency allowance	9,658
Total other costs	24,563
Total construction cost of buildings, other facilities, and other costs	106,234
Single-occupancy facilities:	
Buildings (5) totaling 221,800 sq ft of first-floor space @ $15.41 per sq ft	3,417,938
Sprinkler system	232,890
Total construction cost of buildings	3,650,828
Other facilities: 2/	
Paving and curbing (street and parking areas)	537,021
Railroad trackage, switches, and stops	105,458
Sewers (storm and sanitary)	166,560
Street lighting	39,587
Total construction cost of other facilities	848,626
Other costs: 3/	
Architectural and engineering fees	236,221
Soil borings, foundation analyses and surveys	44,996
Financing, legal, and administrative fees	539,934
Contingency allowance	532,060
Total other costs	1,353,211
Total construction cost of buildings, other facilities, and other costs	5,852,665

Candy and Confectionery

Multiple-occupancy facilities:	
Buildings (17 units, 30 by 100 ft), 51,000 sq ft of first-floor space @ $16.46 per sq ft and 10,200 sq ft of mezzanine space @ $9.72 per sq ft	938,604
Sprinkler system	64,260
Total construction cost of buildings	1,002,864
Other facilities: 2/	
Paving and curbing (street and parking areas)	208,754
Railroad trackage, switches, and stops	8,480
Sewers (storm and sanitary)	23,172
Street lighting	12,898
Total construction cost of other facilities	253,304
Other costs: 3/	
Architectural and engineering fees	65,949
Soil borings, foundation analyses and surveys	12,562
Financing, legal, and administrative fees	150,740
Contingency allowance	148,542
Total other costs	377,793
Total construction cost of buildings, other facilities, and other costs	1,633,961
Single-occupancy facilities:	
Buildings (5) totaling 156,000 sq ft of first-floor space @ $15.41 per sq ft	2,403,960
Coolers, 5,000 sq ft @ $30.27 per sq ft	151,350
Sprinkler system	158,550
Total construction cost of buildings	2,713,860
Other facilities: 2/	
Paving and curbing (street and parking areas)	341,786
Railroad trackage, switches, and stops	16,426
Sewers (storm and sanitary)	89,623
Street lighting	20,432
Total construction cost of other facilities	408,267

Other costs: 3/	
Architectural and engineering fees	167,062
Soil borings, foundation analyses and surveys	31,821
Financing, legal, and administrative fees	381,855
Contingency allowance	376,287
Total other costs	957,025
Total construction cost of buildings, other facilities, and other costs	4,139,152

Other Foods

Multiple-occupancy facilities:	
Building (1 unit, 30 by 100 ft), 3,000 sq ft of first-floor space @ $16.46 per sq ft and 600 sq ft of mezzanine space @ $9.72 per sq ft	55,212
Sprinkler system	3,780
Total construction cost of buildings	58,992
Other facilities: 2/	
Paving and curbing (street and parking areas)	12,259
Railroad trackage, switches, and stops	5,184
Sewers (storm and sanitary)	1,368
Street lighting	1,532
Total construction cost of other facilities	20,343
Other costs: 3/	
Architectural and engineering fees	4,165
Soil borings, foundation analyses and surveys	794
Financing, legal, and administrative fees	9,520
Contingency allowance	9,381
Total other costs	23,860
Total construction cost of buildings, other facilities, and other costs	103,195
Single-occupancy facilities:	
Buildings (5) totaling 149,600 sq ft of first-floor space @ $15.41 per sq ft	2,305,336
Coolers, 1,500 sq ft @ $30.27 per sq ft	45,405
Freezers, 6,000 sq ft @ $36.49 per sq ft	218,940
Sprinkler system	149,205
Total construction cost of buildings	2,718,886
Other facilities: 2/	
Paving and curbing (street and parking areas)	333,061
Railroad trackage, switches, and stops	76,498
Sewers (storm and sanitary)	87,138
Street lighting	21,709
Total construction cost of other facilities	518,406
Other costs: 3/	
Architectural and engineering fees	169,958
Soil borings, foundation analyses and surveys	32,373
Financing, legal, and administrative fees	388,475
Contingency allowance	382,810
Total other costs	973,616
Total construction cost of buildings, other facilities, and other costs	4,210,908

Offices and Restaurants

Multiple-occupancy facilities:	
Buildings (4 units, 30 by 100 ft), 12,000 sq ft of first-floor space @ $16.46 per sq ft and 2,400 sq ft of mezzanine space @ $9.72 per sq ft	220,848
Sprinkler system	15,120
Total construction cost of buildings	235,968
Other facilities: 2/	
Paving and curbing (street and parking areas)	49,142
Railroad trackage, switches, and stops	2,740
Sewers (storm and sanitary)	5,456
Street lighting	3,831
Total construction cost of other facilities	61,169

Other costs: 3/	
Architectural and engineering fees	15,600
Soil borings, foundation analyses and surveys	2,971
Financing, legal, and administrative fees	35,656
Contingency allowance	35,136
Total other costs	89,363
Total construction cost of buildings, other facilities, and other costs	386,500
Single-occupancy facilities:	
Buildings (2) totaling 5,000 sq ft of first-floor space @ $43.69 per sq ft	218,450
Sprinkler system	5,250
Total construction cost of buildings	223,700
Other facilities: 2/	
Paving and curbing (street and parking areas)	248,512
Railroad trackage, switches, and stops	8,213
Sewers (storm and sanitary)	42,326
Street lighting	20,432
Total construction cost of other facilities	319,483
Other costs: 3/	
Architectural and engineering fees	28,517
Soil borings, foundation analyses and surveys	5,432
Financing, legal, and administrative fees	65,182
Contingency allowance	64,231
Total other costs	163,362
Total construction cost of buildings, other facilities, and other costs	706,545
Future Refrigerated-Storage Area 4/	
Other facilities: 2/	
Paving and curbing (street and parking areas)	258,485
Railroad trackage, switches, and stops	41,064
Sewers (storm and sanitary)	112,211
Street lighting	25,440
Total construction cost of other facilities	437,200
Other costs: 3/	
Architectural and engineering fees	22,953
Soil borings, foundation analyses and surveys	4,372
Financing, legal, and administrative fees	52,464
Contingency allowance	51,699
Total other costs	131,488
Total construction cost of other facilities and other costs	568,688

1/ See text for methodology for accelerating detailed construction costs.

2/ Includes allocated share of streets, parking, rail, sewers, and street lighting. Allocations were calculated on the basis of the percentage of total land occupied.

3/ Architectural and engineering fees total 5.25 percent of the total construction cost of buildings and other facilities. Soil borings and foundation analyses and surveys total 1 percent of the total construction cost of buildings and other facilities. Financing and legal and administrative fees total 12 percent of the total construction cost of buildings and other facilities. The contingency allowance equals 10 percent of the sum of the total construction cost of buildings and other facilities, the architectural and engineering fees, soil borings, foundation analyses and surveys, and financing, legal, and administrative fees.

4/ Estimated charges for site improvement.

Revenue Required

The total revenue required to support the food distribution center illustrated in the master plan is based on the total investment in land and facilities shown in appendix II, table 3. Calculated total-revenue requirements are outlined in total in appendix II, tables 4 and 5 for different methods of financing and are outlined with similar assumptions on a square-foot basis in appendix II, tables 6 and 7.

Total revenue requirements for the proposed northeastern New Jersey wholesale food distribution center are comprised of (1) debt service, (2) insurance (fire and liability), (3) management, maintenance, security, and solid waste management, and (4) real estate taxes.

Table 3.--Total investment in facilities and land for the proposed northeastern New Jersey food distribution center, by site

Type of facility	Facility cost	Site									
		Edison		Kearny, Elizabeth City, Port Elizabeth, and Secaucus Road		Newark		North Brunswick		South Brunswick	
		Land 1/	Total	Land 2/	Total	Land 3/	Total	Land 4/	Total	Land 5/	Total
Fresh fruits and vegetables:											
Multiple occupancy---	$6,105,740	$732,000	$6,837,740	$1,464,000	$7,569,740	$585,600	$6,691,340	$292,800	$6,398,540	$190,320	$6,296,060
Single occupancy-----	12,541,092	1,177,500	13,718,592	2,355,000	14,896,092	942,000	13,483,092	471,000	13,012,092	306,150	12,847,242
Total----------	18,646,832	1,909,500	20,556,332	3,819,000	22,465,832	1,527,600	20,174,432	763,800	19,410,632	496,470	19,143,302
Meat and related products:											
Multiple occupancy---	5,303,700	481,500	5,785,200	963,000	6,266,700	385,200	5,688,900	192,600	5,496,300	125,190	5,428,890
Single occupancy-----	28,304,961	2,577,000	30,881,961	5,154,000	33,458,961	2,061,600	30,366,561	1,030,800	29,335,761	670,020	28,974,981
Total----------	33,608,661	3,058,500	36,667,161	6,117,000	39,725,661	2,446,800	36,055,461	1,223,400	34,832,061	795,210	34,403,871
Groceries:											
Multiple occupancy---	2,476,316	404,500	2,880,816	809,000	3,285,316	323,600	2,799,916	161,800	2,638,116	105,170	2,581,486
Single occupancy-----	29,710,700	4,343,500	34,054,200	8,687,000	38,397,700	3,474,800	33,185,500	1,737,400	31,448,100	1,129,310	30,840,010
Total----------	32,187,016	4,748,000	36,935,016	9,496,000	41,683,016	3,798,400	35,985,416	1,899,200	34,086,216	1,234,480	33,421,496
Dairy products:											
Multiple occupancy---	1,992,003	250,000	2,242,003	500,000	2,492,003	200,000	2,192,003	100,000	2,092,003	65,000	2,057,003
Single occupancy-----	3,763,371	695,000	4,458,371	1,390,000	5,153,371	556,000	4,319,371	278,000	4,041,371	180,700	3,944,071
Total----------	5,755,374	945,000	6,700,374	1,890,000	7,645,374	756,000	6,511,374	378,000	6,133,374	245,700	6,001,074
Poultry and eggs:											
Multiple occupancy---	1,490,754	173,000	1,663,754	346,000	1,836,754	138,400	1,629,154	69,200	1,559,954	44,980	1,535,734
Single occupancy-----	3,457,349	367,000	3,824,349	734,000	4,191,349	293,600	3,750,949	146,800	3,604,149	95,420	3,552,769
Total----------	4,948,103	540,000	5,488,103	1,080,000	6,028,103	432,000	5,380,103	216,000	5,164,103	140,400	5,088,503
Frozen foods:											
Multiple occupancy---	977,187	154,000	1,131,187	308,000	1,285,187	123,200	1,100,387	61,600	1,038,787	40,040	1,017,227
Single occupancy-----	1,477,185	289,000	1,766,185	578,000	2,055,185	231,200	1,708,385	115,600	1,592,785	75,140	1,552,325
Total----------	2,454,372	443,000	2,897,372	886,000	3,340,372	354,400	2,808,772	177,200	2,631,572	115,180	2,569,552
Fish and shellfish:											
Multiple occupancy---	1,258,616	246,000	1,504,616	492,000	1,750,616	196,800	1,455,416	98,400	1,357,016	63,960	1,322,576
Single occupancy-----	0	0	0	0	0	0	0	0	0	0	0
Total----------	1,258,616	246,000	1,504,616	492,000	1,750,616	196,800	1,455,416	98,400	1,357,016	63,960	1,322,576
Bakery products:											
Multiple occupancy---	993,842	192,500	1,186,342	385,000	1,378,842	154,000	1,148,842	77,000	1,070,842	50,050	1,043,892
Single occupancy-----	8,275,416	1,786,500	10,061,916	3,573,000	11,848,416	1,429,200	9,704,616	714,600	8,990,016	464,490	8,739,906
Total----------	9,269,258	1,979,000	11,248,258	3,958,000	13,227,258	1,583,200	10,853,458	791,600	10,060,858	514,540	9,783,798

Table 3.--Total investment in facilities and land for the proposed northeastern New Jersey food distribution center, by site--continued

Type of facility	Site										
	Facility cost	Edison		Kearny, Elizabeth City, Port Elizabeth, and Secaucus Road		Newark		North Brunswick		South Brunswick	
		Land 1/	Total	Land 2/	Total	Land 3/	Total	Land 4/	Total	Land 5/	Total
Beverages:											
Multiple occupancy---	$106,234	$19,500	$125,734	$39,000	$145,234	$15,600	$121,834	$7,800	$114,034	$5,070	$111,304
Single occupancy-----	5,852,665	1,545,000	7,397,665	3,090,000	8,942,665	1,236,000	7,088,665	618,000	6,470,665	401,700	6,254,365
Total----------	5,958,899	1,564,500	7,523,399	3,129,000	9,087,899	1,251,600	7,210,499	625,800	6,584,699	406,770	6,365,669
Candy and confectionery:											
Multiple occupancy---	1,633,961	327,500	1,961,461	655,000	2,288,961	262,000	1,895,961	131,000	.1,764,961	85,150	1,719,111
Single occupancy-----	4,139,152	615,000	4,754,152	1,230,000	5,369,152	492,000	4,631,152	246,000	4,385,152	159,900	4,299,052
Total----------	5,773,113	942,500	6,715,613	1,885,000	7,658,113	754,000	6,527,113	377,000	6,150,113	245,050	6,018,163
Other foods:											
Multiple occupancy---	103,1956	19,500	122,695	39,000	142,195	15,600	118,795	7,800	110,995	5,070	108,265
Single occupancy-----	4,210,908	703,500	4,914,408	1,407,000	5,617,908	562,800	4,773,708	281,400	4,492,308	182,910	4,393,818
Total----------	4,314,103	723,000	5,037,103	1,446,000	5,760,103	578,400	4,892,503	289,200	4,603,303	187,980	4,502,083
Offices and restaurants:											
Multiple occupancy---	386,500	77,500	464,000	155,000	541,500	62,000	448,500	31,000	417,500	20,150	406,650
Single occupancy-----	706,545	259,500	966,045	519,000	1,225,545	207,600	914,145	103,800	810,345	67,470	774,015
Total----------	1,093,045	337,000	1,430,045	674,000	1,767,045	269,600	1,362,645	134,800	1,227,845	87,620	1,180,665
Future refrigerated-storage area:											
Multiple occupancy---	0	0	0	0	0	0	0	0	0	0	0
Single occupancy-----	568,688	1,647,500	2,216,188	3,295,000	3,863,688	1,318,000	1,886,688	659,000	1,227,688	428,350	997,038
Total----------	568,688	1,647,500	2,216,188	3,295,000	3,863,688	1,318,000	1,886,688	659,000	1,227,688	428,350	997,038
All facilities:											
Multiple occupancy---	22,828,048	3,077,500	25,905,548	6,155,000	28,983,048	2,462,000	25,290,048	1,231,000	24,059,048	800,150	23,628,198
Single occupancy-----	103,008,032	16,006,000	119,014,032	32,012,000	135,020,032	12,804,800	115,812,832	6,402,400	109,410,432	4,161,560	107,169,592
Total----------	125,836,080	19,083,500	144,919,580	38,167,000	164,003,080	15,266,800	141,102,880	7,633,400	133,469,480	4,961,710	130,797,790

1/ $50,000 per acre.
2/ $100,000 per acre.
3/ $40,000 per acre.
4/ $20,000 per acre.
5/ $13,000 per acre.

Table 4.--Annual total revenue required for the proposed northeastern New Jersey food distribution center, assuming private financing

Type of facility	Edison site	Kearny site	Newark site	North Brunswick site	Port Elizabeth and Elizabeth City sites	Secaucus Road site	South Brunswick site
Fresh fruits and vegetables:							
Multiple occupancy	$1,138,960	$1,233,684	$1,378,204	$1,075,026	$1,339,433	$1,210,369	$1,091,627
Single occupancy	2,334,153	2,486,488	2,823,959	2,228,431	2,694,586	2,440,608	2,267,999
Total	3,473,113	3,720,172	4,202,163	3,303,457	4,034,019	3,650,977	3,359,626
Meat and related products:							
Multiple occupancy	941,001	1,003,307	1,148,079	897,670	1,090,853	984,006	914,680
Single occupancy	5,024,257	5,357,744	6,129,451	4,792,509	5,825,165	5,254,690	4,883,163
Total	5,965,258	6,361,051	7,277,530	5,690,179	6,916,018	6,238,696	5,797,843
Groceries:							
Multiple occupancy	469,442	521,785	566,987	435,001	567,681	511,666	439,928
Single occupancy	5,509,606	6,071,564	6,677,408	5,136,170	6,607,980	5,953,299	5,203,843
Total	5,979,048	6,593,349	7,244,395	5,571,171	7,175,661	6,464,965	5,643,771
Dairy products:							
Multiple occupancy	366,114	398,464	444,220	344,370	433,277	390,789	349,598
Single occupancy	735,309	825,284	883,977	676,818	897,276	809,411	682,961
Total	1,101,423	1,223,748	1,328,197	1,021,188	1,330,553	1,200,200	1,032,559
Poultry and eggs:							
Multiple occupancy	277,190	299,577	335,576	262,033	325,236	293,920	266,181
Single occupancy	629,900	677,402	765,153	597,508	735,954	664,492	607,703
Total	907,090	976,979	1,100,729	859,541	1,061,190	958,412	873,884
Frozen foods:							
Multiple occupancy	182,090	202,017	220,555	168,943	219,971	198,059	170,981
Single occupancy	281,712	319,126	340,146	257,476	347,837	312,797	259,615
Total	463,802	521,143	560,701	426,419	567,808	510,856	430,596
Fish and shellfish:							
Multiple occupancy	241,053	272,900	290,840	220,420	297,356	267,509	222,247
Single occupancy	0	0	0	0	0	0	0
Total	241,053	272,900	290,840	220,420	297,356	267,509	222,247
Bakery products:							
Multiple occupancy	188,960	213,870	228,253	172,752	233,132	209,623	174,222
Single occupancy	1,608,072	1,839,267	1,936,147	1,458,673	2,004,790	1,802,774	1,467,848
Total	1,797,032	2,053,137	2,164,400	1,631,425	2,237,922	2,012,397	1,642,070
Beverages:							
Multiple occupancy	21,025	23,549	25,220	19,377	25,577	23,101	19,552
Single occupancy	1,217,376	1,417,373	1,450,806	1,089,733	1,542,301	1,389,829	1,091,499
Total	1,238,401	1,440,922	1,476,026	1,109,110	1,567,878	1,412,930	1,111,051
Candy and confectionery:							
Multiple occupancy	312,618	354,998	377,272	285,101	386,975	347,948	287,336
Single occupancy	764,740	844,281	927,452	711,799	919,288	827,743	721,061
Total	1,077,358	1,199,279	1,304,724	996,900	1,306,263	1,175,691	1,008,397
Other foods:							
Multiple occupancy	19,580	22,103	23,657	17,935	24,090	21,666	18,096
Single occupancy	806,369	897,385	972,299	746,473	975,867	880,082	754,590
Total	825,949	919,488	995,956	764,408	999,957	901,748	772,686
Offices and restaurants:							
Multiple occupancy	73,622	83,650	88,915	67,110	91,214	81,982	67,638
Single occupancy	148,370	181,993	176,934	127,365	199,113	178,217	126,354
Total	221,992	265,643	265,849	194,475	290,327	260,199	193,992
Future refrigerated-storage area:							
Multiple occupancy	0	0	0	0	0	0	0
Single occupancy	304,869	118,369	335,014	175,555	572,345	506,469	150,609
Total	304,869	518,369	335,014	175,555	572,345	506,469	150,609
All facilities:							
Multiple occupancy	4,231,655	4,629,904	5,127,778	3,965,738	5,034,795	4,540,638	4,022,086
Single occupancy	19,364,733	21,436,276	23,418,746	17,998,510	23,322,502	21,020,411	18,217,245
Total	23,596,388	26,066,180	28,546,524	21,964,248	28,357,297	25,561,049	22,239,331

Table 5.--Annual total revenue required for the proposed northeastern New Jersey food distribution center, assuming public financing

Type of facility	Edison site	Kearny site	Newark site	North Brunswick site	Port Elizabeth and Elizabeth City sites	Secaucus Road site	South Brunswick site
Fresh fruits and vegetables:							
Multiple occupancy	$780,696	$853,458	$788,589	$735,982	$873,910	$848,949	$726,778
Single occupancy	1,608,063	1,725,073	1,620,724	1,535,954	1,757,973	1,717,820	1,521,147
Total	2,388,759	2,578,531	2,409,313	2,271,936	2,631,883	2,566,769	2,247,925
Meat and related products:							
Multiple occupancy	634,428	682,289	639,619	605,016	695,742	679,323	598,960
Single occupancy	3,387,909	3,644,085	3,415,712	3,230,569	3,716,086	3,628,211	3,198,164
Total	4,022,337	4,326,374	4,055,331	3,835,585	4,411,828	4,307,534	3,797,124
Groceries:							
Multiple occupancy	320,911	361,119	325,272	296,203	372,420	358,626	291,116
Single occupancy	3,742,835	4,174,489	3,789,569	3,476,996	4,295,846	4,147,732	3,422,379
Total	4,063,746	4,535,608	4,114,841	3,773,199	4,668,266	4,506,358	3,713,495
Dairy products:							
Multiple occupancy	248,893	273,744	251,589	233,622	280,729	272,204	230,478
Single occupancy	507,172	576,298	514,707	464,919	595,716	572,016	456,179
Total	756,065	850,042	766,296	698,541	876,445	844,220	686,657
Poultry and eggs:							
Multiple occupancy	189,889	207,085	191,755	179,321	211,919	206,019	177,145
Single occupancy	428,459	464,950	432,427	406,096	475,204	462,689	401,480
Total	618,348	672,035	624,182	585,417	687,123	668,708	578,625
Frozen food:							
Multiple occupancy	123,645	138,953	125,306	114,239	143,255	138,004	112,301
Single occupancy	191,678	220,422	194,811	174,106	228,496	218,641	170,473
Total	315,323	359,375	320,117	288,345	371,751	356,645	282,774
Fish and shellfish:							
Multiple occupancy	164,348	188,814	167,014	149,389	195,688	187,299	146,296
Single occupancy	0	0	0	0	0	0	0
Total	164,348	188,814	167,014	149,389	195,688	187,299	146,296
Bakery products:							
Multiple occupancy	128,443	147,577	130,519	116,684	152,956	146,391	114,263
Single occupancy	1,098,668	1,276,266	1,117,947	989,618	1,326,181	1,265,261	967,153
Total	1,227,111	1,423,843	1,248,466	1,106,302	1,479,137	1,411,652	1,081,416
Beverages:							
Multiple occupancy	14,588	16,526	14,799	13,397	17,071	16,405	13,151
Single occupancy	848,661	1,002,307	865,389	754,622	1,045,474	992,789	735,194
Total	863,249	1,018,833	880,188	768,019	1,062,545	1,009,194	748,345
Candy and confectionery:							
Multiple occupancy	212,794	245,348	216,326	192,790	254,499	243,331	188,672
Single occupancy	518,304	579,396	524,895	480,533	596,579	575,608	472,798
Total	731,098	824,744	741,221	673,323	851,078	818,939	661,470
Other foods:							
Multiple occupancy	13,310	15,248	13,521	12,119	15,793	15,127	11,874
Single occupancy	553,326	623,238	560,895	510,263	642,894	618,904	501,417
Total	566,636	638,486	574,416	522,382	658,687	634,031	513,291
Offices and restaurants:							
Multiple occupancy	50,008	57,710	50,843	45,275	59,876	57,233	44,299
Single occupancy	101,667	127,506	104,509	86,034	134,756	125,906	82,770
Total	151,675	185,216	155,352	131,309	194,632	183,139	127,069
Future refrigerated-storage area:							
Multiple occupancy	0	0	0	0	0	0	0
Single occupancy	224,122	388,195	242,195	125,024	434,227	378,046	104,308
Total	224,122	388,195	242,195	125,024	434,227	378,046	104,308
All facilities:							
Multiple occupancy	2,881,953	3,187,871	2,915,152	2,694,037	3,273,858	3,168,911	2,655,333
Single occupancy	13,210,864	14,802,225	13,383,780	12,234,734	15,249,432	14,703,623	12,033,462
Total	16,092,817	17,990,096	16,298,932	14,928,771	18,523,290	17,872,534	14,688,795

Table 6.--Annual total per-square-foot-revenue required for the proposed northeastern New Jersey food distribution center, assuming private financing 1/

Type of facility	Edison site	Kearny site	Newark site	North Brunswick site	Port Elizabeth and Elizabeth City sites	Secaucus Road site	South Brunswick site
Fresh fruits and vegetables:							
Multiple occupancy	$9.99	$10.82	$12.09	$9.43	$11.75	$10.61	$9.58
Single occupancy	9.09	9.68	11.00	8.67	10.49	9.50	8.83
Average	9.37	10.03	11.33	8.91	10.88	9.85	9.06
Meat and related products:							
Multiple occupancy	12.54	13.38	15.31	11.97	14.55	13.12	12.20
Single occupancy	10.77	11.48	13.14	10.27	12.48	11.26	10.64
Average	11.01	11.74	13.44	10.51	12.77	11.52	10.70
Groceries:							
Multiple occupancy	7.45	8.28	9.00	6.90	9.01	8.12	6.89
Single occupancy	6.17	6.80	7.48	5.75	7.40	6.67	5.83
Average	6.25	6.90	7.58	5.83	7.51	6.76	5.90
Dairy products:							
Multiple occupancy	9.39	10.22	11.39	8.83	11.11	10.02	8.96
Single occupancy	8.17	9.17	9.82	7.52	9.97	8.99	7.59
Average	8.54	9.49	10.30	7.92	10.31	9.30	8.00
Poultry and eggs:							
Multiple occupancy	10.57	11.09	12.43	9.70	12.05	10.89	9.86
Single occupancy	10.90	11.72	13.24	10.34	12.73	10.51	10.51
Average	10.70	11.52	12.98	10.14	12.51	11.30	10.30
Frozen foods:							
Multiple occupancy	7.59	8.42	9.19	7.04	9.17	8.25	7.12
Single occupancy	7.49	8.49	9.05	6.85	9.25	8.32	6.90
Average	7.53	8.46	9.10	6.92	9.22	8.29	6.99
Fish and shellfish:							
Multiple occupancy	8.93	10.11	10.77	8.16	11.01	9.91	8.23
Single occupancy	0	0	0	0	0	0	0
Average	8.93	10.11	10.77	8.16	11.01	9.91	8.23
Bakery products:							
Multiple occupancy	6.30	7.13	7.61	5.76	7.77	6.98	5.81
Single occupancy	5.05	5.78	6.08	4.58	6.30	5.66	4.61
Average	5.16	5.89	6.21	4.68	6.43	5.78	4.71
Beverages:							
Multiple occupancy	7.01	7.85	8.41	6.46	8.52	7.70	6.52
Single occupancy	5.49	6.39	6.54	4.91	6.95	6.27	4.92
Average	5.51	6.41	6.57	4.93	6.97	6.29	6.29
Candy and confectionery:							
Multiple occupancy	6.13	6.96	7.40	5.59	7.59	6.82	5.63
Single occupancy	4.90	5.41	5.95	4.56	5.89	5.31	4.62
Average	5.20	5.79	6.30	4.82	6.31	5.68	4.87
Other foods:							
Multiple occupancy	6.53	7.37	7.89	5.98	8.03	7.22	6.03
Single occupancy	5.39	6.00	6.50	4.99	6.52	5.88	5.04
Average	5.41	6.02	6.53	5.01	6.55	5.91	5.06
Offices and restaurants:							
Multiple occupancy	6.14	6.97	7.41	5.59	7.60	6.83	5.63
Single occupancy	29.67	36.40	35.39	25.47	39.82	35.64	25.27
Average	13.06	15.63	15.64	11.44	17.08	15.31	11.41
Future refrigerated-storage area:							
Multiple occupancy	0	0	0	0	0	0	0
Single occupancy	0	0	0	0	0	0	0
Average	0	0	0	0	0	0	0
All facilities:							
Multiple occupancy	9.04	9.89	10.96	8.47	10.76	9.70	8.59
Single occupancy	7.30	8.80	8.83	6.79	8.79	7.92	6.87
Average	7.56	8.35	9.15	7.04	9.90	8.19	7.12

1/ Table 23 and appendix II, table 3.

Table 7.--Annual total per-square-foot revenue required for the proposed northeastern New Jersey food distribution center, assuming public financing 1/

Type of facility	Edison site	Kearny site	Newark site	North Brunswick site	Port Elizabeth and Elizabeth City sites	Secaucus Road site	South Brunswick site
Fresh fruits and vegetables:							
Multiple occupancy	$6.85	$7.49	$6.92	$6.46	$7.67	$7.45	$6.37
Single occupancy	6.26	6.72	6.31	3.98	6.85	6.69	5.92
Average	6.44	6.95	6.50	6.13	7.10	6.92	6.60
Meat and related products:							
Multiple occupancy	8.46	9.10	8.53	8.07	9.28	9.06	7.98
Single occupancy	7.26	7.81	7.32	6.92	7.96	7.78	6.85
Average	7.42	7.99	7.49	7.08	8.14	7.95	7.01
Groceries:							
Multiple occupancy	5.09	5.73	5.16	4.70	5.91	5.69	4.62
Single occupancy	4.19	4.68	4.24	3.89	4.81	4.65	3.83
Average	4.25	4.74	4.30	3.95	4.88	4.71	3.88
Dairy products:							
Multiple occupancy	6.38	7.02	6.45	5.99	7.20	6.98	5.90
Single occupancy	5.64	6.40	5.72	5.17	6.62	6.36	5.06
Average	5.86	6.59	5.94	5.42	6.79	6.54	5.32
Poultry and eggs:							
Multiple occupancy	7.03	7.67	7.10	6.64	7.85	7.63	6.56
Single occupancy	7.41	8.04	7.48	7.03	8.22	8.01	6.94
Average	7.29	7.92	7.36	6.90	8.10	7.89	6.82
Frozen foods:							
Multiple occupancy	5.15	5.79	5.22	4.76	5.97	5.75	4.68
Single occupancy	5.10	5.86	5.18	4.63	6.08	5.81	4.53
Average	5.12	5.83	5.20	4.68	6.03	5.79	4.59
Fish and shellfish:							
Multiple occupancy	6.09	6.99	6.19	5.53	7.25	6.93	5.42
Single occupancy	0	0	0	0	0	0	0
Average	6.09	6.99	6.19	5.53	7.25	6.93	5.42
Bakery products:							
Multiple occupancy	4.28	4.92	4.35	3.89	5.10	4.88	3.81
Single occupancy	3.45	4.01	3.51	3.11	4.16	3.98	3.04
Average	3.52	4.09	3.58	3.18	4.25	4.05	3.10
Beverages:							
Multiple occupancy	4.86	5.51	4.93	4.47	5.69	5.47	4.38
Single occupancy	3.82	4.52	3.90	3.40	4.71	4.48	3.39
Average	3.84	4.53	3.92	3.42	4.73	4.49	3.41
Candy and confectionery:							
Multiple occupancy	4.17	4.81	4.24	3.78	4.99	4.77	3.70
Single occupancy	3.32	3.71	3.36	3.08	3.82	3.69	3.03
Average	3.53	3.98	3.58	3.25	4.11	3.96	3.20
Other foods:							
Multiple occupancy	4.44	5.08	4.51	4.40	5.26	5.04	3.96
Single occupancy	3.70	4.16	3.75	3.41	4.30	4.14	3.35
Average	3.71	4.18	3.76	3.42	4.32	4.15	3.36
Offices and restaurants:							
Multiple occupancy	4.17	4.81	4.24	3.77	4.99	4.77	3.69
Single occupancy	20.33	25.50	20.90	17.21	26.95	25.18	16.55
Average	8.92	9.14	9.14	7.72	11.45	10.77	7.47
Future refrigerated-storage area:							
Multiple occupancy	0	0	0	0	0	0	0
Single occupancy	0	0	0	0	0	0	0
Average	0	0	0	0	0	0	0
All facilities:							
Multiple occupancy	6.16	6.81	6.22	5.76	7.00	6.77	5.67
Single occupancy	4.98	5.58	5.50	4.61	5.57	5.54	4.54
Average	5.16	5.76	5.22	4.78	5.94	5.73	4.71

1/ Table 23 and appendix II, table 4.

Debt Service

Debt service was calculated by determining the annual payment required to retire the investment in buildings and associated facilities and an annual land carrying charge. Mathematically, the expression required for calculating the annual debt service (P) is:

$$P = \frac{i}{1 - \frac{1}{(1 + i)^{30}}} F + i(L),$$

where i is the annual interest rate; F is the investment in the total construction cost of buildings, other facilities, and other costs; L is the land investment; and i(L) is the land-carrying charge. Private and public financing interest rates were estimated at 10 and 7 percent annually. Debt service is based on a 30-year period with one payment per year.

Fire and Liability Insurance

Insurance rates were obtained from local insurance companies and a national rating board. Liability insurance rates varied, depending on the site; fire insurance rates were assumed to be constant, regardless of location. The insurance costs included in tables 3 and 4, appendix II, are the total of liability and fire insurance costs for the cited facilities. Insurance costs (I) were calculated in the following manner:

$$I = \frac{.49854(C) + r\ (S)}{100},$$

where C is the total construction cost of buildings, r is the liability insurance rate ($2 for Newark, Kearny, Secaucus Road, Port Elizabeth, and Elizabeth City; $2.10 for Edison; and $1.60 for North Brunswick and South Brunswick); S is the number of square feet of enclosed space; and 100 is a constant derived from the cited insurance rates.

Management, Maintenance, Security, and Solid Waste Management

Annual management, maintenance, and security were calculated at 2.5 percent of the total construction cost of buildings, other facilities, and other costs.

Maintenance costs were based on the experiences of existing centers similar to the food distribution center proposed in this report. Security costs were based on information from a recent USDA publication on the subject. 7/

Solid waste management was calculated on the basis of trash generation of 20 pounds per ton of product handled and a disposal cost of $34.38 per ton of waste generated. This estimate was based on a recent USDA report on trash disposal on food distribution centers. 8/ Certain costs described in the cited report were updated to reflect price increases since the research was conducted. Mathematically, the solid waste management costs (C) were calculated in the following manner:

$$C = \frac{V\ (20)}{2{,}000}\ (34.38),$$

where V equals the annual volume handled through the particular facilities measured in tons.

Real Estate Taxes

The real estate taxes included in tables 3 and 4, appendix II, were directly affected both by site location and financing method. If the proposed center were privately financed, real estate taxes would apply to the total investment in land and facilities. Private real estate taxes, T_p are calculated in the following manner:

$$T_p = r\ (F + L),$$

where r is the tax rate, F is the total construction cost of buildings, other facilities, and other costs, and L is the land cost at a particular site. Tax rates were obtained from the tax authority governing the location of particular sites. These tax rates are shown in the following text table. Taxes paid on a publicly developed center would be calculated only on the basis of the value of the site prior to construction of the center. 9/

7/ Goulston, Charles L. Security for food distribution centers. ARS-NE-33, U.S. Dept. of Agric., Washington, D.C., 16 pp., ill., 1974.

8/ Stearns, Robert F., and Volz, Marvin D. Solid waste management in wholesale food distribution centers. U.S. Dept. of Agric., Washington, D.C., 57 pp., ill., 1973.

9/ State of New Jersey, Annual Report of the Division of Taxation in the Department of the Treasury for the Fiscal Year 1976, 401 pp., Trenton, N.J.

Site	Tax rate per $100 of taxable investment	Land cost per acre
Edison----------	$2.69	$50,000
Kearny----------	2.69	100,000
Newark----------	6.20	40,000
Port Elizabeth----	3.96	100,000
Elizabeth City----	3.96	100,000
North Brunswick---	2.60	20,000
Secaucus Road-----	2.41	100,000
South Brunswick---	3.03	13,000

These taxes, T_S, would be calculated in the following manner:

$$T_S = r\ (L).$$

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