

PLANNING FOR THE SOUTH BAY INDUSTRIAL AREA

Boston, Mass.

by

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Dear Sir:

In partial fulfillment of the requirements for the degree of Master of City Planning, I hereby submit the following thesis, entitled "Planning for the South Bay Industrial Area."

Respectfully,

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ACKNOWLEDGMENT

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I. INTRODUCTION

Our communities are dependent primarily upon their industries for life. The American standard of living has been achieved by high production of capital goods and utilization of natural resources. Wasteful methods of developing those resources and uncontrolled, haphazard growth in our cities have brought us to the point where the maintenance of our standards and new progress depend principally upon economies to be made through planning.

Such planning, consciously or otherwise, is an essential part of every operation. Tremendous progress has been made in industrial planning, but mostly through the combined efforts of the production engineer and the architect. Internal operations are more efficient, and the modern structures housing industries are functionally sound and aesthetically attractive. Plants need no longer belch smoke and grime, but can be as pleasant and attractive as homes.

In contrast to the progress made with the individual plant, most of our industrial areas have continued to deteriorate and to become more inefficient. Comprehensive planning provides the only answer; and the city planner is needed to coordinate the needs and facilities of the community. Certainly transportation companies and individual industries cannot be held solely responsible for the conditions that now exist, nor

can they alone provide remedies.

Major efforts in city planning are being directed toward alleviation of the pressing traffic and housing problems; but if we are to attain better living conditions in our communities, we must redesign our industrial areas for greater efficiency and eliminate their blighting effects.

In many cities the redevelopment of important residential areas is not possible because there are no new sites with strategic locational advantages available for the non-conforming industries. The solution must be found in better utilization of land already devoted to industry and in the development of land that is untenable in its present condition.

The manufacturer seeking a location for his new plant hesitates to build in the dirty, smoky atmosphere that is common in old industrial areas everywhere. Spending probably two-thirds of his waking hours at work, he prefers more agreeable surroundings and is willing to pay for them. In some cases his manufacturing product or process, requiring a clean site, will force him to select an outside location, with resulting higher production costs.

Unlike housing, the redesign of an industrial area may effect direct economies that will pay for the planning and construction. The cost of redeveloping central, blighted areas for industrial use is most often economically impossible

for private enterprise, without aid from the government.¹ However, there is every reason to hope that eventually this end will be accomplished to the mutual benefit of both industry and the community which is dependent upon industry for its basic well-being.

Taking cognizance of the need for comprehensive industrial planning, this thesis is directed to the study of an undeveloped industrial area in Boston - the South Bay. It is the aim of this study to investigate the potentialities of the South Bay industrial area for development as an organized district.

In approaching the study of a specific industrial area, one must turn to the comprehensive, over-all surveys of the region. Here he should find the basic information that will enable him to evaluate his site and provide a sound foundation for his survey and recommendations. Such comprehensive studies are not to be found in New England, despite the leading role that it plays in our national industrial economy. The need for an industrial survey in this region cannot be disregarded if the planner is to propose remedies for the problems that arise continually - problems that assume an ever increasing importance in the maintenance, operation, and growth of

¹ J. L. Hemery and Robert L. Wrigley, Jr., letters dated May 20, 1948, and March 22, 1948, respectively.

industry in New England, particularly in the Greater Boston area. The value of piecemeal solutions is often lost in the larger picture. One small area is assisted at the expense of others; gains in one direction are lost in another; and the primary responsibility and the burden of the resulting friction and inefficiency are borne by the whole community.

It is not possible, in this brief explanation, to set forth the details of such a regional survey.¹ Essentially, however, the regional industrial survey will define the geographical boundaries of the planning unit, classify its industries (as basic or service, grouping them according to relative rank in the community, number and skill of employees, types and value of products, and the relative importance of locational factors), show the geographical distribution, relation to railroads and other means of transportation, resources, climatic conditions, extent of local and regional markets, and a balance sheet of the advantages and disadvantages of the community as far as industry is concerned. Such a study will usually point to definite deficiencies, inherent or acquired, in the community - deficiencies that may threaten the economical structure if not corrected. It may well indicate the more obvious means of obtaining a more balanced industrial structure. In any case, it lays the foundation for specific planning in the area and supplies the background that

¹See Appendix A.

the planner needs if he is to make sound estimates and proposals.

Naturally, some small-scale surveys have been carried on in the Greater Boston area, as in any center of commerce and industry, but these have all been made by financial institutions or by individual concerns, either employing their own industrial engineers or bringing in consultants. With a very limited scope and the express needs and desires of a single firm in mind, such reports if published would not provide the basic information needed by the whole community or the interested concern which cannot afford such expensive services individually. This point is emphasized by Herbert Swan:

"Such servicing of plants as is performed by power companies, banks, manufacturers of machinery, or other organizations, does not meet the needs of the situation. In the first place, these agencies are primarily interested solely in advancing their own business; in the second place, such information as is obtained by them is their private property and is therefore not available as a basis for a general community improvement works program. The very fact that many industries are where they are shows that a much broader approach must be made to individual problems than any heretofore made."¹

¹Herbert S. Swan, Streamlining a City for Industry, N.Y., Dec. 1945, p. 1.

Statistical measurements often lead to definite conclusions, and any study of an industrial site would be simplified if the planner could safely predict that certain industries would need such a site, and then act to insure the desirability of that site on the basis of proper design. Unfortunately it is not that simple. " . . . the rational planning of locations is evidently complex, for the thing to be located is not a specific process with definite locational requirements but a bundle of associated processes, including more or fewer according to the type of location in view."¹

Too often statistics are constructed on a base that is not coincident with that of the problem being studied, and, for this reason, they are not suitable. It is submitted that this is the situation one often finds in the study of industry.

There are two primary sources of statistics for the planner in Massachusetts - the U.S. Census of Manufactures, and the State Bureau of Labor Statistics. Neither of these sources provides grouped statistics that are applicable to the area, nor is it possible to use their figures for industries on a comparable basis. The explanation for this is simple. The State bureau uses an entirely different set of definitions for their industries than that adopted by the Federal agency. Therefore, the grouping is different, and the

¹Edgar M. Hoover, "Size of Plant, Concern and Production Center," Industrial Location and National Resources, Chap.14, NRPB 1942, p. 276.

statistics cannot be compared any more than one can compare the qualities of an automobile with those of a fish.

A clear practical definition of the area studied is a prime requisite to obtaining pertinent statistics. This view is expressed well in the preface to the 1939 Census of Manufactures: "The industrial areas were established to permit the presentation of statistics for regions of industrial concentration. It is obvious that the boundaries of a city do not enclose the entire area of which the city is the business and industrial center and likewise that those concentrations of industry that overlap State boundaries are not adequately represented in the statistics for industrial States. The industrial areas as constituted for census purposes are not subject to these limitations and are given their proper places in the census statistics as coherent, integrated units of industrial activity."¹

After so stating the case for practical boundaries, they then proceed to delineate the "Greater Boston Industrial Area" as comprising the counties of Essex, Middlesex, Suffolk and Norfolk, i.e. most of the eastern portion of Massachusetts. How can the markets, resources, facilities, labor supply, transportation, and economic environment of industry in the Merrimac Valley be considered identical with that of industry in Central Boston?

The State bureau adopted the "42 cities" boundaries for

¹ U. S. Census of Manufactures, Vol. III, 1939, p. 7.

their Greater Boston Industrial Area. This selection is certainly better than that of the Federal agency, but it bears no exact relationship to the location, facilities, and needs of existing industry.

On Map A the writer has indicated the area that he considers to be the Greater Boston Industrial Area. It consists of the cities and towns of Boston, Cambridge, Revere, Somerville, Chelsea, Everett, Watertown, Malden, and Quincy.

If Hoyt's technique¹ were to be applied to each of these communities, using the new U. S. Census of Manufactures figures when they are released, we might have a better picture of the industry in this area. If a study were made using the census figures now available, even though they are lacking for much of the important growth period of the last war and do not account for changes in nature of product during this period, such a study would at least enable the planner to better understand the basic industrial structure and make him more appreciative of the needs of industry already located in Greater Boston.

"The fundamental conclusion is that no one can understand (to say nothing of guiding or planning) the location of an industry merely on the basis of its 'production requirements' of labor, materials, access to markets and

¹Dr. Homer Hoyt. See Appendix A for outline of technique.

the like. The variations in efficiency associated with size of plants, firms, and production centers are vital in determining location and must be taken into account. In practice they are taken into account, but rarely by the same people. An operating man thinks of location in terms of plants; an executive thinks of the firm; governmental and utility officials and 'planners' are more likely to think of a community or region as a unit. To each, 'efficiency' has a different meaning. The plant manager or engineer may be thinking of low production costs; the firm executive, of competitive strategy and security; while community or public interests are served by points of view transcending both of these and embracing the ultimate welfare of the local or national economy. Since all three points of view are essential parts of our present organization, all must be recognized in an over-all analysis of industrial location."¹

Thus, forewarned against making design commitments in anticipation of the needs of specific industries, and realizing the lack of comprehensive information for the region, the planner may still employ an inductive approach to his study. First, he must analyze the site in question

¹E. M. Hoover, op. cit. p. 261.

and estimate the comparative value of its characteristics. The results obtained may then be used in examining the general requirements of all industries. Where a correlation between the two is found, more exhaustive study may show that the site is decidedly desirable for specific industries. Armed with this information, promotional activities may be directed toward attracting those industries to the site. Such is the approach suggested in this thesis, which should lead to the eventual design of physical facilities in the South Bay area.

Historic Sketch

A fuller understanding of the characteristics of the South Bay area will be facilitated by a retrospective look at its origin and the salient changes that it has undergone.

When Boston Town was still only a young community on the peninsula, South Bay was part of the great tidewater flats adjoining the "Neck." That portion north of what is now Washington Street was grazing land; to the south lay a shallow estuary, about 360 acres in area, fed by Dorchester Brook, rising and falling with the tides. Most of this land surrounding Boston, including that portion which was filled to make Back Bay, was owned by the Boston Power Company.¹

In 1795 the Roxbury Canal was constructed from South Bay to Eustis Street to save a land carriage of two and a half miles. "By the middle of the seventies (this) canal served chiefly for the reception of sewage and had become such a nuisance that the Board of Health insisted upon steps being taken to fill it up."² This work was completed by 1880. Previous to that, in 1840, a basin had been excavated for turning ships, and the material used on the filling of Back Bay.

¹Interview, F. E. Hanson, Chief, Real Estate Div., N.Y., N.H. & H. RR.

²John Koren, 1822-Boston-1922. City of Boston, 1923, p. 129.

John Koren, reporting on the area in his history of Boston, described the first major filling thus:

"To meet the increasing demand for lands on the 'Neck,' the City Council had purchased some 237,000 feet bordering on the South Bay, as it was called. There a sea wall was built and a contract made for filling in the marsh. There was a great deal of trouble over the sea wall due to faulty construction, so that expenditures greatly exceeded the original estimates and finally amounted to more than a million dollars. This transaction proved a distinct loss to the city, for it entailed a heavy cost to grade the lands and lay out streets, especially because it was required that all streets should be raised to a grade of not less than 15 feet above low water mark. (Mayor Josiah Quincy, Jr. insisted that all lands should be placed on the market in a finished condition.)"¹

From time to time, the perimeter of the Bay was shortened to remove the polluted waters farther from the City Hospital and to improve the land utilized by the railroad. The latter had purchased the land from the South Cove Association, having the construction of freight classification yards in mind. These yards were never built, for those of the affiliate road, the Boston and Albany (Commonwealth-Armory yards) proved to be adequate.²

¹John Koren, *ibid.*, p. 129.

²F. E. Hanson, *op. cit.*

A passage in Fifty Years of Boston gives a clear and interesting picture of the area towards the end of the last century.

"In 1880 and much later it was the scene of rowing regattas and the Shawmut Rowing Club had its clubhouse on the north side of Dover Street Bridge. At that time the Albany Street frontage on South Bay was an active and important part of Boston's commercial waterfront. The half-century just passed has seen radical changes in marine transportation. Most of the barges, schooners, and other small craft which formerly came to these restricted waters have been displaced by larger carriers, vessels too large to navigate the narrow, shallow channel of South Bay and of Fort Point Channel above Dorchester Avenue Bridge. The water-borne commerce of the Albany Street frontage has become relatively insignificant, and the waterway is a barrier to rail access to this district from the extensive railroad yards which in recent years have been built on land reclaimed from the easterly side of South Bay. It is not unlikely that within the next half-century the remaining waters of South Bay and of Fort Point Channel south of Dorchester Avenue Bridge, some thirty-seven acres, will be filled in, and the Albany Street district rejuvenated as a thriving industrial and warehouse section, served by rail instead of by water."¹

¹Frederic H. Fay, Fifty Years of Boston, Subcommittee on Memorial History of the Boston Tercentenary Committee, 1930, p. 57.

Summary of Survey Data on South Bay Site

Reference is made to the set of survey maps accompanying the text of this study. The following comments are numbered to correspond to the map numbers, but each may contain relevant material not illustrated by the map.

1. Aerial photo Although the print is poor, it does show the magnitude of the area, its relation to the central city, and general character.

The South Bay industrial area is an unusual tract of land with about 400 vacant acres. The South Bay itself is connected to the Harbor by the Fort Point Channel. Except for the railroad tracks, it is essentially a wasteland - a derelict, blighted area that has lost its commercial value with changing times, but still retains tremendous potentialities as a central industrial site.

2. Location in relation to Boston region Strategic location is shown in this map, and the relative size of the area as compared with that of the central city itself. At the heart of the railroad transportation systems, direct access is available to Castle Island, Commonwealth Pier No. 5, U.S. Army Base, and New Haven Railroad Piers Nos. 1, 2, and 4.

3. Topography Originally attached to the Boston Mainland as tidal mudflats, the characteristics are typical of such a formation. The entire tract lies between sea level and 20 feet of elevation.

The question of the mechanical properties of the soil, in particular the capacity of the structure to bear weight, is an important one, and justifies some discussion:

The area has no "bottom" or solid strata that would carry unlimited loads. The soils are silty and clayey. Hard layers varying in thickness have been found at different levels. Clam shells have been brought up from as low as one hundred feet. Primarily, borings should be taken of the entire tract before one can make conclusions. However, the point to be emphasized here is this: any portion of the South Bay area will or could support light industrial buildings on inexpensive slab construction without the benefit of additional foundations. This contention is attacked by the New Haven's chief realtor, Mr. F. E. Hanson. In his opinion, it would be necessary to use pile or similar construction reaching a depth that would vary from 35 to 75 feet. Fortunately, the concensus of opinion and practice is against Mr. Hanson. An inspection of plants at or in the near vicinity

of the South Bay revealed that most of the one- and two-story structures were built on floating slabs. In some cases, the building had settled some, but the effects were not serious. It is not unusual for this phenomenon to occur on filled land. Heavier buildings are supported by piles or caissons.

An important factor to be weighed is the amount and properties of the fill used. In the past the filling has been to a level of about 12 feet above the low watermark, and unless a "soup" or quicksand is encountered, this depth alone with a good percentage of sand should support a one-story building with a slab floor.¹

A specific case may be cited of a new building erected in South Bay in the Southampton Street section. The Downes Lumber Company constructed a large warehouse for storage of building materials. In spite of the heavy floor load, a floating slab was proposed. Because the owner wanted more assurance, the final construction entailed the use of small, widely-spaced four-foot caissons and a six-inch slab.

The railroad itself has constructed its tracks on much less fill without the benefit of piles, and it is not likely that any future horizontal plants in the South

¹Corroboration on this view was obtained from Dr. A. T. Ippen, Dept. of Civil Engineering, M.I.T., Mr. A. O'Neill, Dept. of Building Construction, M.I.T. and several practicing civil engineers.

Bay development would command a floor load greater than that of a locomotive and loaded freight cars.

4. General location in relation to railroads From this map it is evident that the South Bay tract occupied a most favorable position with regard to rail service.

5. Railroad routes The lines indicated are the East-West railroad, which is the Boston & Albany, and the three sections of the New York, New Haven & Hartford - the Main Line, the Midland Division, and the Old Colony Division. The Midland Division is the most important freight carrier for the site. Present practice is to utilize the tracks through the South Station (Boston Terminal Co.) to move freight at night. Freight picked up on the site would, in most cases, be transferred to the Main Line to leave the region. The bridge at the throat of the Bay, crossed by only six tracks, constitutes a bottleneck that should be broken by proper development.

In considering the New England railroads, it should be remembered that the New York Central holds a controlling interest in all three - the New York, New Haven & Hartford, the Boston & Albany and the Boston & Maine.

6. Location in relation to rapid transit The area is serviced on all sides by rapid transit and surface buses.

Subway entrances are located at Andrew Square (on the Cambridge-Dorchester line), Massachusetts Avenue at Washington Street, and Broadway at Dorchester Avenue. A bus line crosses the area on Southampton Street. This can be more easily seen on the following map.

7. Local transportation and institutions In addition to transportation, the location of the schools, churches and the City Hospital are factors pertinent to planning for the area.

8. Location in relation to existing and proposed major highways The traffic congestion is a serious problem, even more acute in this area than in other parts of the central city. Although the map does not indicate the routes contemplated in the Master Highway Plan, recently proposed and defeated, it does show the main flow along Massachusetts Avenue and up the Old Colony Parkway, which, incidentally, is closed to commercial vehicles.

If the Master Highway Plan were revived and the Central Artery constructed, the South Bay would profit by having an elevated expressway directly from the site to the heart of the city or across to Cambridge. An interchange on Southampton Street would also provide a focal point of traffic flow, which should be an important consideration in the design of the area.

9. Vehicular traffic flow The 1938 Traffic Survey figures were increased by 60% to obtain estimates of the present traffic flow. The flow chart serves also to emphasize the importance of the streets bounding the South Bay area.
10. Present use zones The "unrestricted" classification of the zone in the center of the area may reflect a negative approach to enticing any type of activity that might bring an economic return. On the fact of it this is ridiculous and also dangerous; for the latter removal of non-conforming uses would be costly. The area is industrial by inherent characteristics, use, and surroundings. It should all be zoned as such. However, a word of caution may be appropriate in regard to the protective value of the zone classification. The courts have ruled that an area zoned for industry may be used for other "higher" uses. In Chicago the right to construct houses in an industrial zone was upheld.¹ Apparently, complete ownership of an area by those interested in the development is the only positive protection. In the case of the South Bay, the proper use should be assured to the limit of the local zoning powers.

¹Walter N. Blucher, in ASPO Newsletter, Jan. 1948, p. 8.

11. Present land use This map presents a simplified picture of the mixed uses found in the area adjoining South Bay. It should be remembered that most of the fringes, which contain so much housing, are zoned for industry. Plans for the redevelopment of the South End have been drawn and redrawn. Housing projects have been erected. Without space to work in, suitable sites into which to move industry, the blighting effect of such incongruous mixing cannot be mitigated. Naturally, many of the existing industries are of a marginal nature, and would not be considered proper tenants for a new industrial development. Others, which are valuable enterprises, could be easily moved to a nearby location where they would profit by the change and thereby increase their returns to the community.

Seldom is an industrial tract such as the South Bay found, still vacant, with surroundings that contain churches, schools, transportation and housing for workers. The "South End" most assuredly needs extensive rehabilitation and redevelopment, but it also needs desirable places of employment for the workers who live there. In its present undeveloped condition, the South Bay constitutes a blighting rather than beneficial influence upon the surrounding areas. If put to better economic uses,

the adjoining areas would also reflect an increased valuation, thus making better housing and community facilities possible.

12. Principal vacant industrial acreage The areas indicated in solid black are idle; those crossmarked are covered by water and should be filled. The tract east of the Midland Division tracks (about 200 acres) needs only minor grading to place it in prime condition for building.

13. Property ownership - major tracts The time and expense involved in consolidating tracts of land for desirable developments usually constitutes a serious problem. However, an ideal situation for a unified development exists in the South Bay site. The New York, New Haven & Hartford Railroad, logical beneficiary of any improvements, owns all of the vacant land up to the legal channel line. Lands covered by water are the property of the Commonwealth, which is certainly interested in and amenable to changes in the right direction.

14. Distribution of industry in Boston While the relative values of the industries are not indicated by the shading, the strategic location of the South Bay site in the general pattern of existing concentrations is graphically illustrated.

15. Industrial buildings The decided lack of buildings on Albany Street, abutting the foul waters of the Bay is shown in contrast to the fairly valuable cluster of steel fabricating plants on Dorchester Avenue, contiguous to the filled land used by the railroad.

16. Land and building values South Boston and Roxbury once were fairly balanced neighborhoods with well built structures, adequate housing, and local industries within walking distance of all of the workers. With new growth in other parts of the city and with a general deterioration from loss of value, old age, and congestion, the pattern of living changed and the "South End" fell into disrepute.

The Income and Cost Survey conducted by the City showed that the area is not paying enough taxes to support the adjacent residential areas. Naturally, this method of assigning responsibility for service charges to neighboring industries is very arbitrary. It does serve, however, as a comparative index to the value of areas.

One feature of the South Bay which, even more than the idle lands, lowers the value of adjoining property is the obnoxious odors arising from the sewage in the Bay itself and from the City Garbage Wharf. Elimination

of these nuisances would influence values long before any new development were started. The vacant land in South Bay is assessed at about \$.80 per square foot.¹ Even though this seems high for vacant land of this sort, it is lower than for other vacant sites with less potential. By referring also to the Land Use Map (No. 11), one may note a vacant site owned by the Boston Wharf Company (in upper right-hand corner of maps). This particular site has not been developed because the poor design of the area prevents installation of rail facilities for heavy buildings.² Apparently, land is assessed on possible capacity as indicated by the contiguous parcels, regardless of individual handicaps.

17. Depths of water in South Bay Very little of the water is over 13 feet in depth, until it reaches Fort Point Channel.

18. Water terminal facilities now in use There are now eight interests using the water facilities of the Channel and Bay. The only important one, the American Sugar Refinery Company, will soon move to Central Wharf. The railroad maintains a lumber yard there for convenience, but could transfer to one of many other sites without difficulty. The lumber and coal concerns are all small

¹Interview, F. E. Hanson, op. cit.

²Interview, Mr. Nason, President, Boston Wharf Co.

and appear to be definitely submarginal. Other larger coal and lumber dealers in the area are supplied by truck and rail.

The City of Boston maintains a loading platform on the west side of the Bay. Here the municipal trucks bring the daily garbage collection to be loaded on barges. When a barge is full, it is towed out to sea and emptied. The whole procedure is wasteful, inconvenient, highly unaesthetic, and unduly dangerous from a public health viewpoint.

19. Area contributing storm water runoff to South Bay

Over 2,286 acres of the City of Boston are drained by the South Bay and the Fort Point Channel. This drainage, which is a combination of storm runoff and sanitary flow, constitutes the greatest problem to be solved in the area.

The main interceptor sewer lines shown on the map carry the normal sanitary flow from the Metropolitan Sewer District.

The drainage area is made up as follows:

South End	444.40	acres
Hampden and Albany Streets	382.10	"
Dorchester Brook and Mass. Ave.	970.90	"
South Boston	513.70	"
Water area inside harbor lines of 1921	38.00	"
	<u>2,286.10</u>	acres =
	3.57	square miles. ¹

¹City Document No. 10, op. cit., p. 98.

20. Sewer service areas and outfalls The sizes of the local sewer lines and the location of the outfalls are indicated. There are sixteen outfalls discharging highly polluted water into the Bay. Reference to Map 17 will show that the foul discharges are made into very shallow parts of the Bay. Most of the sludge naturally settles out because the water moves so slowly.

21. Water service areas The size and location of water mains indicate almost unlimited capacity. Normally, pressure districts of 150 lbs./sq. inch are maintained in the city's industrial areas. The water, from the Metropolitan Water Supply, is probably the best afforded any large city in the country and could be used for any processing without treatment.

22. Average dwelling unit rent by blocks The average rent in the areas surrounding the South Bay is about \$19 a month. There are a few small frame houses, but for the most part the housing is old brick tenement.

Analysis of Location

The regional aspects of the South Bay location may be summed up briefly as follows:

1. Boston, if not the "Hub of the Universe," continues to be the heart of the New England region with a hinterland containing strong communities, a well-established population, sound, diversified industries, skilled labor, and valuable resources.
2. This region alone provides extensive markets for all forms of capital goods. The New York market is readily accessible by direct line from the South Bay.
3. The South Bay is located at the heart of the railroad net that serves the entire New England region.
4. The Port of Boston offers a valuable convenient outlet for exporting goods and importing materials at a very favorable rate. This applies to the domestic as well as the foreign trade.
5. New England retains its popularity as a place to live and work

Considerations respective to the central location of the site are those found in most centers of industrial concentration. Where suitable sites are available the central location usually offers substantially more

advantages to industry than any other.

Industries sometimes seek peripheral sites because they offer large, unbroken tracts at fairly low prices, less congestion, better rail and highway access, lower taxes, fewer onerous regulations.¹ Of these reasons, the first is certainly the most important. Large concerns need large tracts and can draw workers to an outside location. Few cities have available sites large enough to meet such needs.

In the case of the South Bay, traffic congestion is the only serious problem beyond the control of the industrial developer. It enjoys rail service that cannot be equaled in New England, and strategic location with regard to highways.

Regulations are not bothersome, if reasonable. Few industries object to sound building codes, fire regulations, and nuisance laws.

Taxes remain a relatively unimportant factor in industrial location.² "A special analysis of nine states upon the basis of their purported tax burdens, their geographical contiguity, and their industrialization, shows little correlation between the relative industrial development and the relative level of taxation

¹Erling Holland, Industrial Location in Greater Boston, Master's thesis, M.I.T., Cambridge, 1947.

²See Appendix B for tabulated results of studies on relative importance of basic locational factors.

TABLE A
TAX RATE, CITY OF BOSTON, MASS.

1883	-	14.50	1905	-	16.00	1927	-	30.00
1884	-	17.00	1906	-	15.90	1928	-	28.80
1885	-	12.80	1907	-	15.90	1929	-	28.00
1886	-	12.70	1908	-	16.50	1930	-	30.80
1887	-	13.40	1909	-	16.50	1931	-	31.50
1888	-	13.40	1910	-	16.40	1932	-	35.50
1889	-	12.90	1911	-	16.40	1933	-	32.80
1890	-	13.30	1912	-	16.40	1934	-	37.10
1891	-	12.60	1913	-	17.20	1935	-	37.00
1892	-	12.90	1914	-	17.50	1936	-	38.00
1893	-	12.80	1915	-	18.00	1937	-	38.70
1894	-	12.80	1916	-	17.80	1938	-	41.30
1895	-	12.80	1917	-	17.70	1939	-	39.40
1896	-	12.90	1918	-	21.20	1940	-	40.60
1897	-	13.00	1919	-	23.60	1941	-	39.60
1898	-	13.60	1920	-	24.10	1942	-	41.00
1899	-	13.10	1921	-	24.70	1943	-	41.00
1900	-	14.70	1922	-	24.70	1944	-	39.90
1901	-	14.90	1923	-	24.70	1945	-	42.50
1902	-	14.80	1924	-	24.70	1946	-	42.00
1903	-	14.80	1925	-	26.70	1947	-	46.50
1904	-	15.20	1926	-	31.80	1948	-	Not 53.40 Declared

Source: Board of Assessors, City of Boston.

in the various states in the period 1922-29.

"A comparison of all tests in the period 1929-35 shows that the four states in which industry declined the least, namely, Michigan, Minnesota, Massachusetts, and New York, imposed heaviest taxes."

"In a study of thirty individual industries, chosen upon the basis of the economic importance and the volume and significance of their plant relocations among different States, the most common factors which appear to influence plant location are markets, labor, and transportation. Other locational factors of importance were found to be power and fuel costs, available factory buildings, mergers and consolidation and rents. Taxes were, on the whole, very much subordinated to other considerations."¹

"The final measure of acceptability of a location depends upon the net of its advantages and disadvantages as related to those of other localities. The advantages and disadvantages of location must be translated into annual cost influences as applied to a specific enterprise. Generalities are not always significant in specific application; nor do the advantages derived from a given locality, as applicable to one enterprise, always

¹George Steiner, "The Tax System and Industrial Development," American City, May, 1938, p. 83.

show as favorable influences on other enterprises."¹

An appraisal of the locational advantages and disadvantages of the South Bay site follows in tabular form. Those advantages that would be particularly enhanced by development of the area as an organized district are indicated by an asterisk before the number.

¹McDonald, How to Promote Community and Industrial Development, N.Y., Harpers, 1938.

An Appraisal of Locational Advantages and
Advantages

1. Strategic location in region that is favorable for living conditions and industry in general.
2. Markets - New England, New York, and local.
- *3. Indicated needs for new facilities of industries already in central location. Close enough to commercial center for style products.
- *4. Direct access to port facilities. Cheaper materials, power, and fuel.
- *5. Excellent rail facilities.
6. Good labor supply - skilled, deep pool, both seasonal and steady.
- *7. Good municipal services - fire, police, educational.
8. Good water and adequate utilities.
- *9. Plentiful capital.
10. Living conditions - desirable in most respects. Cultural center, favorable climate, fair housing.
- *11. Related industries - diversification in Greater Boston's concentration of industry.
- *12. Professional and specialized services - almost all types of professional counsel and service shops available.
- *13. Single ownership and vacant condition - makes proper development possible.

Disadvantages of the South Bay Site

Disadvantages

1. High cost of area land improvements.
2. High taxes.
3. Traffic congestion. (The traffic situation would be converted into an advantage with construction of the Central Belt or Artery.)
4. Poor political administration.
5. Apathetic community viewpoint toward any form of planning for the future.

Impediments to Previous Development

The impediments to the successful development of the South Bay, prior to this date, are essentially those existing today. However, as late as 1926, two arguments not apropos at this time were presented against the filling of South Bay and Fort Point Channel.¹ These were: (1) that the water-borne commerce equaled that of many substantial ports, and (2) that, as navigable waters, they could not be filled without the sanction of the Federal Government, and that the expediency of closing a navigable waterway having such a volume of business is doubtful.

Clearly these objections can be dismissed if one remembers that the water-borne commerce has been substantially reduced to the municipal garbage barges and a few lighters of coal. Other users of the original waterfront have found the channel too narrow and shallow to accommodate the modern freight carriers, the drawbridges too slow and costly, and the blighted, odorous surroundings too unpleasant. Accordingly they have moved to better waterfront locations. The latest and most important tenant is the American Sugar Refinery, which having long been an opponent of any new development out of fear of increased taxes or a benefit assessment, plans to move soon to Central Wharf.

¹Page 90, City Document No. 10, 13th Annual Report of the City Planning Board, Dec. 31, 1926. Boston, Mass.

Despite the fact that some thirty-odd reports have been submitted on the South Bay area, there has never been a comprehensive proposal encompassing proper development of the entire area. Its inherent locational advantages have kept it in the foreground of all site surveys conducted by individual concerns; but lacking the proper improvements, it has remained undeveloped.

A typical proposal for a multi-storied warehouse district, with an estimated construction cost of 17 million dollars, was made in 1934 by a realtor, C. E. Camp, but the project was abandoned when the railroad insisted that the area (already filled, near Southampton St.) could not be serviced by more than one double lead track.¹

Rather than touch on other proposals, it should suffice to note that none of them was comprehensive enough to make the proposed benefits commensurate with the land improvement costs. Individually, each may have some merit, and an attempt has been made to incorporate those that are suitable into the general, over-all development scheme proposed in this study.

The other impediments to development have been:

1. Condition of the land. Without considerable improvement, most of the area cannot be built upon. Part of it is covered by the Bay itself, which is highly polluted with sewage.

¹Interview, F. E. Hanson, op. cit.

2. Blighted surroundings South Bay is ringed with the blight that is the inevitable result of old age, overcrowding, improperly mixed uses, and other excesses of land speculation that Thomas Adams might term "expressions of a spirit of license rather than of true liberty."¹

3. Poor circulation The waterway, although fallen into disuse as a commercial route, serves to block construction of adequate means of circulation. The surrounding streets are choked with local traffic. Other Boston sites, though congested, offer better means of ingress and egress.

4. High taxes Table A shows the tax rate for the City of Boston since 1883, based on a 100% valuation. Even in its present poor condition, the land is assessed at a valuation of eighty cents per square foot, and would be much higher if filled properly. Taxes on industry in the central city have been abnormally high.

5. Unfavorable political climate The political administration of Boston has been and is notoriously poor, and tax policies have not been consistent. Industrialists are wary of making large capital investments in a community that lacks sympathetic, competent public officials.

6. Soil-bearing properties This is more fully discussed in the survey section. Without fairly complete information on the actual structure and mechanical properties of the soil,

¹Thomas Adams, Outline of Town and City Planning, New York, Russell Sage Foundation, 1935, p. 145.

the prospective builder may fear exorbitant foundation costs. In the past, firms interested in locating in South Bay have decided against doing so without first making scientific soil tests. Of course, this subject is closely linked with that of improving the land prior to building construction.

7. Lack of capital and initiative The New York, New Haven, & Hartford Railroad, owners of the land and logical beneficiaries of a successful development, are known to be insolvent at the present time. This condition plus a longstanding apathy on the part of the Railroad constituted the greatest impediment to development. Their industrial development office, charged with promoting industrial growth that would benefit the Railroad, had not as much as contemplated a study of the site with a view towards its development.

8. Lack of a comprehensive proposal or plan It has been the contention of the writer that the South Bay area cannot and will not be developed without adequate planning and a proposal broad enough in scope to cover the entire tract. There have been no exhaustive surveys; nor has any real attempt been made to achieve a coordinated solution.

Improvements Needed Prior to Building Construction

Before the South Bay can be profitably developed, basic improvements are needed to eliminate the dangerous nuisances and to improve the condition of the land and the circulation facilities so that actual building construction might begin. The following projects are suggested in an appropriate order for effectuation:

1. Condemnation of the Channel and the Bay as a properly constituted public nuisance is the initial step. Riparian rights would have to be investigated and permission obtained from the Federal Government to close a navigable water, but, essentially, both of these procedures are formalities. Condemnation of this ground leaves the payment of any compensation to present users very questionable. In all probability, those of value could be induced to relocate where they would have better waterfront facilities or rail service.

The construction of a municipal incinerator to dispose of the garbage now dumped at sea is touched upon in a later section of this writing. It is absolutely essential that the garbage-disposal problem be eliminated before any other steps are feasible.

2. Closed channels must be constructed to conduct to the harbor the storm-runoff and sewage that drains

into South Bay.¹ The low water gradient would necessitate a large size conduit and make the next two items essential.

3. A sea wall on the harbor line, closing the entrance to the Fort Point Channel near South Station, and flood gates on the conduits, will prevent the tidal flow from backing up into the latter and give the needed protection against flooding of the lower interior lands.

4. The flow in the large channels would be so slow that periodic flushing and an artificial current would have to be supplied. This would entail the locating of a pumping station in the southern end of the area, probably on Dorchester Brook, near Southampton Street, with an intake pipe extending well out into the harbor proper.

5. Replacement of the railroad trestle bridge that crosses the Channel to South Station, by solid fill, would remove a serious and expensive bottleneck to rail transportation.

6. At the same time, the draw spans of the Dorchester, Broadway and Fourth Street bridges could be permanently closed. Eventually all of these bridges would be dispensed with.

¹A comprehensive explanation of the evolution of Boston's sewerage and the specific details of the origin of this problem of the area by E. S. Dorr may be found in the 13th Annual Report of the City Planning Board, Boston, Printing Dept., 1927, pp. 95-102.

7. The filling and grading of the entire area could be initiated in several points at once. It has already been noted that very little filling and shaping would be needed to finish off the large tract bounded by the Midland Division, Southampton Street, Boston Street, and Massachusetts Avenue. There is no need to continue to fill at a level of 12 or more feet above the present grade. Rail lines are laid on good material, about 5 feet above the water line.

8. Major internal service roads should be built, lead tracks installed and utility mains extended into the area according to the basic design pattern.

III. GENERAL THEORY OF ORGANIZED INDUSTRIAL DISTRICTS

Organized districts differ distinctly from the usual industrial developments, both in principle and in practice.

The initiation and continued development of industrial tracts, according to a sound plan, is the major premise upon which organized districts are predicated, rather than the haphazard method which has produced the chaotic jumble that is so common in our cities. The ordinary industrial real estate operator is interested only in the turnover of land, and gambles that he can convert his liabilities into assets. Facing the specter of paying taxes on unimproved land that he cannot sell, he will sell lots of almost any size, shape, or description, to any concern that is willing to buy, regardless of the use to which they will put that land. Time is of the essence, and if sales drop off after he has made a profit, the chances are that he will hurry to dispose of the remaining land in one piece. If he cannot do so, he is likely to permit the land to become tax delinquent. His is a purely speculative venture in land.

In contrast to this, we have the organized district, in which the administrative organization, extensive

investment in improvements and services, and the development policies all point toward a long-range point of view. Cognizance is taken of the slower growth of industry and the difficulties that lie in attempting to buy and sell land profitably. Other aims are encompassed and steps taken to protect investment and to place the entire development on a sound economic basis.

By combining the possible gains to be made in real estate with the profits of sound mortgaging, renting, building construction, provision of services for plant operation and maintenance, and the increased utilization of transportation facilities that are already owned by the enterprise, the organized district merely follows a logical procedure that results in a more economical use of the land. In a highly competitive market, it offers not only a good site but also assurance that that site will continue to be good. In addition there is the lure of more convenient services. There can be no question of the advantages of this approach, as compared with that of the ordinary land speculator.

In practice we find this contrast in principle accentuated strongly. The ordinary industrial realtor

will not invest in land unless it is already in salable condition, and cheap enough to make possible high profits justifying the risk. In all probability he will not be able to successfully market that land unless he has secured a very good location, or unless no other sites are available in that area. This latter condition prevails at the present time in Greater Boston, and one may see many new plants being erected on small, crowded, sites in neighborhoods of mixed land uses, where the existing industry is already severely penalized.

The group considering the development of an organized district takes a broader viewpoint. Sites that are otherwise untenable may be improved and serviced until they become very desirable locations. In some cases the profit from the venture may not come primarily from the sale of land, but from the provision of services or the increment supplied to values of adjoining properties. Naturally, the site that they select must be a good location, or they will not succeed in attracting industry to it. However, they are prepared to make a large investment in the land, and in turn expect a more assured, though slower, return. If they represent a railroad, they may well envisage the development in twenty years time, with a large number of concerns leasing their land, buying special services, and supplying valuable tonnage

for their freight carriers. The venture may be practical if it but increases the general efficiency of one of their trunk lines.

By providing all of the facilities needed by a tenant to operate and maintain his plant and capitalizing the bulk of the plants themselves, the development may be promoted along lines set by pre-determined policies. Essentially, the site will be open only to those industries that make compatible neighbors and represent sound operations and management.

It might be convenient to compare the ordinary development with that of an organized district from the viewpoint of a manufacturer who is looking for a new location. (For the purposes of this comparison, we must assume that all factors determining industrial location are equal at the onset.)

A prospect makes a tour of two possible sites which meet the general requirements of his industrial concern. At the ordinary site he inspects the land, confers with the owner, and makes an appraisal of general appearance, condition of roads, if any, price of the land, cost of utilities, and convenience of services. He considers his prospective neighbors or wonders what kind he is likely to have during the years

to come. He speculates about the availability of capital, professional services, speed of distribution of goods, and the eventual effect of development on circulation.

His opinion of the organized district will vary radically with the nature of his product, the size of his plant, and his personal tastes. He will probably find that, initially, land is more costly, for it will be ready for construction; that is, the land will be graded, major roads built, utility mains established, and rail tracks laid. As soon as he discovers that he may build his own plant, but that it must meet set standards in design and materials, that he will be restricted in the use to which he puts the land, and that he must pay for the elms planted outside his office window, he may balk and return to buy or lease the less restricted ordinary site. If that site is in a favorable location, he may find in a few years that he is actually more restricted, this time in a disagreeable manner that will cost money without furnishing trees.

For our purposes, it may be assumed that the prospect will not be setting up a plant large enough to dictate establishment on cheap open land, out of the

normal location, where he could attract workers regardless of traveling time, but that he desires a small or medium-sized plant. This is the rule, rather than the exception.

The organized district offers him not only a number of sites which vary in size, price, and proximity to other plants, but also a choice of buildings, to rent, lease, or purchase. He may desire loft space or a small standardized plant. If a new plant is preferred, the management's own technical staff will design it to his specifications and construct it at reasonable cost. He may even be shown a building already constructed except for the fourth wall.¹

He may finance up to 80% of his capital investment in land and buildings by borrowing it directly from the district, which offers a variety of payment plans. If he later outgrows the plant, he may expand onto contiguous land or turn it back to the District and move to another section, where a larger plant will be constructed. In the Chicago districts, there are numerous cases of industries that have expanded several times, following such a procedure.²

¹Mr. D. P. Wells, in his letter of April 2, 1948, stated that this practice has proven to be very sound for the Clearing District of Chicago.

²Richard Hackett, "The District in Perspective," Central Manufacturing District Magazine. Jan. 1946, p. 29. Also Casper Tin Plate Co. described in letter by H. L. Hemery.

Both land and buildings may be leased on a short- or long-term basis. Many industries subscribe to the practice of building on long-term leases of land, retaining option for renewal of the lease at the terminal date. The convenient shorter leases lend a flexibility that is desired by some companies.

Turning from buildings and land to surroundings, the prospect will be pleased by the wide (60-80') paved streets bordered by trees and, quite possibly, supplied with ornamental street lights. He may even find a recreation center included in the scheme of things. Such districts usually maintain an emergency medical unit with personnel and equipment on call at all times. On a fee basis, extra police and fire protection are available. A further consideration which he does not overlook is the lower fire insurance rate which applies where buildings are well constructed and spaced in an area that affords good protection. Other important features will be central distribution centers for truck and rail traffic, and communal storage facilities. Then, too, there are the equally important intangibles, such as the congeniality among neighboring industries who may possibly be engaged in related manufactures.

The organized district offers him all the services needed to free his capital for manufacturing operations;

more convenient facilities with which to carry on these operations; and protection against incompatible neighbors and property devaluation, which are eventual effects of poor planning. Location in the district may enhance the reputation of the concern and offer new flexibility to his capital.

On the basis of amenities, economics, and common sense, the prospect will almost invariably choose the organized district as the better location for his new plant.

The organized district is not a common phenomenon in this country. The reasons for this are fairly obvious when one lists the requirements that might be considered fundamental to initiation of such an organization:

1. A suitable tract of land must be available. It must be cheap enough to make investment feasible, and must possess all of the potential qualities of a good location. It should be possible to obtain title to it without too much expense or delay. Briefly, this is the prime requirement that is the most difficult to meet.

2. Assuming that a site meets the criteria for a good competitive location, it must have a characteristic which can be developed into a definite advantage. In

most districts, this item has been faster, more efficient distribution of goods. The railroads, usually taking the leading roles in the American districts, seldom experience difficulty in supplying this transportation advantage; for most of their developments have been on fast freight lines and near freight classification yards.

3. There must be a well-founded need for an industrial area of the organized district type - one that offers "extras," and provides for the smaller specialized and "clustered" industries. A definite minimum volume of business must exist before communal services can be established, and the probability of obtaining a profit increment rests largely upon the economies effected through use of such facilities.

Planned industrial areas have been the usual thing in many European countries for a long time; but there is little to be learned from them about operation and theory, for they are predicated under ideologies that contrast with our democratic ways. Even technical design information is not readily transferable to American usage because of the differences between American and European equipment.

Naturally, the British Trading Estates invoke interest and speculation. However, government promoted, financed, and controlled on a socialistic basis, they do not meet our ideals; nor can we safely evaluate their results in terms of American industry. The British are attempting to achieve primary goals with their Estates, goals that are much broader than those considered in designing industrial areas in America. Even if one admires the aims of British industrial planners, the inadequacy of their research and inflexibility of method raise a serious question as to their probable success.

American districts retain all of the aspects of free enterprise, but provide protection for the group from the action of the selfish individual. A communal attitude is promoted and enforced, but individual plant operations are strictly private.

From the viewpoint of the community, the success attained by organized districts is an encouraging sign. For the first time large industrial tracts have been developed in a manner that is both pleasing to the eye and sound in economic principle. When such areas are not so developed, they eventually become blighted. When this occurs, the manufacturer moves to a more

desirable site, and the community retains the depressing and increasingly costly blot on its landscape.

The organized industrial district appears to be the closest we have come, under our system of free enterprise, to the city planner's concept of area development that is beneficial to both industry and the community as a whole.

IV. WHY SUCH A FORM OF ORGANIZATION WOULD BE DESIRABLE FOR THIS SITE

Granted that district organization has proved to be successful elsewhere, the examples are rare when we consider the myriads of industrial areas in America, and a question might be raised as to the desirability of employing it in developing the South Bay Site. The answer lies in a comparison of the attributes of the site with those required for an organized district, (as set forth in the preceding section), and criteria for successful development.

From the discussion of the required land improvements¹ and the brief insight into the general theory of organized districts, two related points arise: (1) The procedure of investing heavily in improvements and buildings, inherent with the District form, demands an almost unlimited capital reserve and offers a return which is really too slow to be considered a speculative profit. (2) The land improvements needed for the South Bay Site are so costly that the work could only be performed by an organization that held a long-range viewpoint, and was prepared to wait a number of years before realizing any returns on their investment.

¹See Section II.

The expense of the initial land improvements for the site obviates the possibility of a quick turnover of capital. The investment may be sound, but the investor must take a full measure of interest in the development and be patient in awaiting realization of profits. Such sums are hardly invested on a long-range basis without considerable administrative participation at least on the policy-making level.

It may be argued soundly that financial institutions are justified in requiring an active interest in the administration of the capital that they extend, such an interest varying in extent with the nature and magnitude of the risk involved. Many financial institutions, assisted by professional staffs, have entered new fields of investment, but naturally they require adequate assurances of sound administrative practices. This role of capital has undoubtedly put many businesses on a firmer footing and shows promise of adding more flexibility and scope to our credit system. Hermann Levy emphasizes this change on the part of capital in his book, The New Industrial System, "The financial 'aid' which is today required either from banks or other organizations lending capital to industrial concerns is much too heavy and much too much coupled with specific financial tasks and

programmes to allow capitalists to remain in the position of just an interested onlooker and advisor."¹

It is submitted that the nature and magnitude of the capital investments needed to develop South Bay require an organization that can offer assurances and active participation to a large financial institution.

It has already been pointed out in this study that natural locational advantages may be enhanced by adding convenient facilities and services that are essential to the operation and maintenance of plants. From our theory of organized districts, it is obvious that the very large concern may not desire such additional features but that the small and medium-sized plants usually prefer such an arrangement and make full use of it. The day of tremendous growth in heavy industries appears to be past and communities are discovering that the real opportunities for further industrial development lie in caring for the smaller firm. (This subject is enlarged upon in the following section.)

The provision of such special services and the operation of communal facilities calls for a permanent organization and planned procedures. These are inherent in the organized district.

¹Herman Levy, The New Industrial System. London, G. Routledge & Sons, 1936.

It should not be necessary to elaborate upon the need for attracting desirable industries to a site - industries that are both an asset to the whole community and compatible neighbors for other industries which might locate there. The selection or screening of industries for a given site cannot be done in an uncertain manner or on an undefined basis. Such a procedure calls for a comprehensive plan, entailing policies that set the character of the entire development and the means of promotion. Even though the Chamber of Commerce and the local government could be expected to interest prospects in the South Bay site, they cannot in all fairness promote the development of that site in competition with other local sites; nor can they exercise the administrative functions of screening applicants and assisting new tenants. It is not enough to have a good plan; it must be continually implemented and augmented by shrewd, alert administration. Efficient, hard-driving promotional work must be carried on if the desired prospects for the site are to be reached. It is common practice for organized districts to employ most of the known methods of advertising, including their own publications, direct-mail, and personal contact. Communal facilities and the provision of special services require constant

supervision and coordination. Such requirements are met only by a well-rounded staff of competent professionals, the administrative corps of an organized district.

It has already been noted that the South Bay has all of the essential prerequisites for an ideal industrial site, and that chief among its potential virtues is good transportation by rail. With the exception of the Addison-Kedzie Tract, a small site, located in the heart of Chicago and holding ten plants, all but one serviced by truck carriers, all of the districts depend upon superior positioning with one or more railroads. Combining this advantage of position with special facilities and schedules for more rapid distribution, a decided economy may obtain. With its location on the approach yards of the Midland freight division of the New York, New Haven & Hartford Railroad, and an acreage that will permit a development large enough to warrant construction of special communal rail facilities, the South Bay site possesses the greatest potential for this form of arrangement in the Greater Boston area. However, without a definite organization, such as that provided by the District form, this advantage cannot be realized.

The improvement of the South Bay site prior to construction of buildings would entail heavy investment

of public funds. A full discussion of this is made in Section VIII. It should suffice, at this point, to assume that such an investment would be made as an integral part of the development of the area. The securing of public appropriations and proper administration of public monies demands assurances of protection against waste, value loss, and achievement of purpose; i.e., if public funds are to be used to help provide proper drainage, sewerage, and a sea wall for South Bay (a very conservative estimated total is \$10,000,000), the legislative body is not likely to appropriate the money unless it can be shown: (1) that a public obligation will be discharged, and the best interest of the public served, (2) that once the improvements have been completed, the site will be developed according to a sound plan, utilizing to the fullest the advantages gained by those improvements, and (3) the industries attracted to the site will meet the aesthetic requirements of the location and provide enough taxes and indirect benefits to make them an asset to the community and justify the expenditure. It is submitted that any proposal that cannot meet these three requirements will be stillborn and doomed to failure.¹ It is hardly conceivable that

¹House Bill 1918, Commonwealth of Massachusetts, 1948. This bill is a prime example of a proposal which fails to meet any of the above requirements, and, as such, it cannot command serious consideration.

any group of public officials could even contemplate risking a public investment of this magnitude without such safeguards.

Not only a sound cause and a good plan must be provided, but it must also be demonstrated that the development will be promoted and protected by an administrative group with substantial experience and established practices. Only in this manner could a public investment be protected and the best interests of the public served.

V. ATTRACTION OF INDUSTRIES TO THE SOUTH BAY
INDUSTRIAL DISTRICT

The Role of the Community in Attracting Industry

"Competition for industries among United States cities is as old as the cities themselves. But the traditional competition of site against site, with local boosters shouting the lure of each, is yielding to something new. Today many municipalities are veering away from the simple arts of boosting to plan their economic futures in accord with carefully studied needs and resources."¹

With this harbinger of the change to more practical thinking on the part of civic groups, the following four-step program is suggested for promotion of industry in Greater Boston:

1. Conduction of an industrial survey. This point has been stressed previously in the thesis, but it can not be over-emphasized. Promotional activities should be based on the evaluation of all of the pertinent information that it is possible to obtain. This opinion is upheld in a fairly recent publication of the U. S. Department of Commerce:

¹"Cities Take Inventory," Business Week. January 4, 1947, pp. 21, 22.

"In order that an area, be it town, city, county, or a group of counties or other homogeneous areas, may offer adequate inducement to persuade industries to move into that area or to the creation of additional industries within the area, there must be presented to such prospective industrial residents factual evidence showing that the location offered is economically desirable. . . . With this information at hand, the area group can then direct its efforts to securing additional industries from those requiring most or all of the basic factors which the area has determined it can offer and avoid approaching or considering industries that require advantages the area cannot offer." ¹

In appraising its resources and capacities, the community might ask itself:

- "1. What products are now or are likely to be used or consumed in or near the area in large enough quantities to warrant interest in their possible local production?
2. Of the products that are or that can be used in the area, which ones are physically capable of local production?

¹Basic Industrial Location Factors - A Guide for Evaluating an Area's Resources for Industrial Development.
U. S. Dept. of Commerce, Office of Small Business, Area Development Division, no date.

3. Of the products which are or can be used in the area and which are physically capable of production there, which ones can be produced and sold at a profit?"¹

Another index which might be helpful is the assigning of numerical values to the basic locational advantages as found in the community. For this purpose, the following list has been suggested by Asa

Knowles:

1. Markets	800
2. Materials	700
3. Transportation	600
4. Labor	500
5. Living conditions	400
6. Available factory buildings	300
7. Power	200
8. Near related industries	100

3600 possible total²

2. Adoption of basic policies. Armed with the information and estimates of present conditions and future needs, the community must decide what path it

¹C. S. Logsdon, A Guide for Local Industrial Promotion, Department of Commerce, Ec. Series 47.

²Asa S. Knowles, "Getting the Industry Best Suited to the Community," American City. Jan. 1939, pp. 62-65.

is to follow. Practically speaking, it should first decide how much money it is willing to expend on promotional work. In this respect, "statutory limitations on promotional expenditures by the cities vary considerably." (From $\frac{1}{4}$ to 4 mills/dollar of taxable property.)¹

One policy that must be incorporated into every program is that of caring for the industry already located in the community. (The Boston Chamber of Commerce would do well to examine their record on this item.) "The strengthening of and, where necessary, the rehabilitation of existing factories is no less necessary than the attraction of new plants for the maintenance of a sound industrial structure."²

In close conjunction with caring for existing industry is a policy of taking cognizance of the increasingly important role played by the small plant and heeding their particular requirements.

The maturing of industry in America has led to a gradual slowing of growth. With the larger essential needs of the economy satisfied, most of the new growth is found in plants that result from greater specialization and the increasing public demand for more services and luxuries.

¹Public Adm. Clearing House, "Cities Spend to Attract Industry," Harvard Business. January, 1946.

²Herbert S. Swan, op. cit. p. 12.

"Certainly it is a surer and less expensive process to nurse little businesses into firmly anchored, local enterprises than it is to travel the highways and byways of industry to lure adult strangers into the community."¹

3. Organization of an active public development agency. This group, staffed by professional men, should assist other agencies, such as the local Chamber of Commerce, in promotional activities, particularly in the collecting of information, and should set up a clinic to serve the local industries. In the last capacity they may help to solve the problems of the firms smaller than 500 employees which cannot otherwise afford professional advice. The Worcester Chamber of Commerce, having adopted this policy, extends active aid to small firms.²

4. Establishment of a community revolving fund. The need for capital loan funds for the young industries is widely recognized. It has already been discussed in this writing in connection with the financial aid extended to tenants of organized districts by the district organization. It is hereby suggested that the Greater Boston community, as a whole, needs such service.

¹F. E. McDonald, op. cit., p. 147.

²Interview, Wendell MacDonald, Director, Boston Regional Bureau of Labor Statistics

The question is not merely one of subsidizing industry, for that is not necessary; rather it is one of sound public investment in enterprise that is outside the scope of most private financial institutions. Banks and insurance corporations, the largest and most commonly used sources of capital, must operate within fixed corporation rules. Clients either meet the minimum requirements for collateral or they cannot be granted the loan. Every city has had cases of reliable firms with sound operations that either failed or miss opportunities for expansion because they lacked operating capital. The young industry seldom has much reserve in its assets, and if freed from the burden of extensive fixed capitalization of equipment and plant, it has a stronger chance of succeeding.

Various forms of subsidies for industry have been employed by the less attractive communities, but the results have been disheartening. "In the majority of cases, bonuses, tax abatement and the like go hand-in-hand with weak management and the trend of thought is more and more toward so regarding them. Business-like assistance in financing new construction is in better understanding and ... may be sound and is usually economical."¹

¹Gerald W. Holmes, Plant Location. N. Y., McGraw-Hill, 1930.

The extension of liberal credit should go farther than merely to new construction. It should be available for any purpose that would seem to promise eventual benefits to the community. This might involve the financing of equipment, investments in materials, or the provision of needed communal facilities such as a transportation terminal. Many items, such as the last, are essential to maintenance of a favorable competitive position for the local industries, but they usually call for heavy investments and offer little or no return.

A revolving fund of a quasi-public nature, such as that operated as the Louisville Industrial Foundation,¹ seems to offer the most advantages. Other forms of credit organization, such as Credit Associations and Industrial Clearing Houses, might also serve the same ends. Primarily, the effectiveness of a community financial organization, for the most part, would depend upon whether or not the administration was enlightened. As a promotional tool it possesses interesting possibilities and could prove to be a controlling factor in the location of new enterprises.

¹Ernest J. Hopkins, The Louisville Industrial Foundation, Federal Reserve Bank of Atlanta, Feb. 1945, 65 pp.

What Types of Industries Might Be Attracted?

Before an organized industrial district can be planned on paper, the developers must have fairly clear concepts of what types of industry might be attracted to the site and, of those, which would be the most likely to meet the criteria for compatible, profitable tenants. Their opinion should be tempered by the needs and desires of the community. There is no reason to expect conflict on this point, for a plant that is an asset to a good industrial district will also meet all of the requirements of the community. It might be well to remember here that the services and basic operating costs and procedures in an organized district are not usually those desired by unsound, "fly-by-night" industries. In general this type seeks rather to find locations affording an opportunity to exploit cheap labor, tax exemptions, and rapidly changing markets.

The following list indicates the types of industries that might be attracted to the South Bay Industrial District. The categories are necessarily inclusive and the noticeable overlap between them is unavoidable. Essentially, they are based upon the general theory of industrial location and organized districts, the characteristics of the South Bay site, and the writer's appraisal of industrial conditions in the Greater Boston Area. Each

classification will be discussed in the subsequent paragraphs.

- A. Industries needing new plants because of obsolescence of present facilities or new growth.
- B. Industries displaced, or likely to be displaced, by public improvements.
- C. Industries that would profit by regrouping, better transportation, specialized services, etc.
- D. Industries that are young, the result of technological advances and new enterprise.
- E. Industries needed to help balance the local industrial economy.
- F. Industries that prefer to rent a "standard" plant or loft space.
- G. Branch plants to serve regional or local markets.
- H. Branch plants decentralized to increase efficiency by obtaining cheaper materials, better labor, proximity to related manufactures, closer markets, etc.
- I.
- I. Plants that are consolidating to expedite closer control, to take advantage of new processes, to reduce capital investment and overhead, etc.
- J. Industries that should be moved out of residential and business zones.

A. Industries needing new plants because of obsolescence of present facilities or new growth. Were it not for the high structural standards that have been maintained in Boston for many years, many of the industrial buildings would have fallen down from old age. Unfortunately, the aim of the building code

seems to have been solely one of fire prevention and structural safety rather than the broader goal of better and more efficient design.

The pattern taken by the city as it grew roughly followed the dictates of the topography, intensifying the value of certain central locations. These sites have been badly overbuilt; and, although some of them have changed owners and uses many times, very few are suitable for industry of any sort. It is not uncommon to find that buildings housing industries were designed as apartment buildings, then successively inherited by business and industry. Passenger elevators were converted to freight service, and casement windows replaced by the frame of a loading bay. Lighting is inadequate, the fire hazard costly, and the traffic congestion intolerable.

Concerns that have outgrown their present facilities cannot find a better central location, and by the nature of their product or process may be unable to move to the periphery. A change in the weight of materials may call for rail service, but few buildings not already so served can obtain it because there is no room for a spur track. In many cases, considerable economies could be effected in internal operations if

the plant were laid out in a horizontal pattern rather than multi-storied vertical. As the Chamber of Commerce proudly points out, industries continue to move into Boston, and most of them flourish there. It is submitted that they do so in spite of the obsolete facilities they must accept. Surely industries would not prefer to occupy "old multi-storied buildings long vacated by the original owner, bringing high rents and offering no advantages to the small struggling firm,"¹ if another central city location were available with well-designed industrial buildings. At the present time the desire of concerns now housed in obsolete buildings for new quarters is reflected in the continuing flow to sites on the periphery, by the extensive repair of old buildings, and by the requests made to the railroads and realtors. There can be little question of the attraction that a central organized district would hold for such industries.

- B. Industries displaced or likely to be displaced by public improvements. In the event, however remote, that public improvements might be made in the Greater Boston Area, industrial buildings would have to be

¹McDonald, op. cit. p. 147.

demolished to make room for the new construction. The concerns displaced in this manner, having already indicated their preference for a central location, might well be attracted to a new development. An estimate of the potentialities of this factor alone might be obtained from a comparison of the proposed Master Highway Plan for Greater Boston with a map indicating the location of industry. Lacking specific data at this time it would seem nevertheless safe to expect considerable displacement in the electrical, bedding, and clothing industries. An examination of the takings for any public improvement of magnitude in Greater Boston should reveal industries that will need a new location in a metropolitan area lacking in suitable sites. Information of this sort should play an important part in guiding the design characteristics in the South Bay.

C. Industries that would profit by regrouping, better transportation, specialized services, etc. Most of this classification is self-explanatory if one has in mind the type of industry that is served best by the organized district.

The writer attempted in vain to establish actual needs or desires for regrouping or clustering

among the various industries already located in Greater Boston. Although the advantages of clustering to many of these groups were more or less obvious, no serious consideration had been made by any group. There appear to be three reasons for this: (1) The lack of available sites has made such studies impractical. (2) The personnel in the logical positions for group coordination are not technically trained to make such studies. Their work is that of corresponding secretaries, disseminating information and arranging social affairs. In most cases they do not have any knowledge of the technical requirements or specifications for the plants in their industry. (3) The smug optimism and conservatism of the Chamber of Commerce viewpoint that permeates the Boston business world has lulled many groups into believing that they are now operating in the most efficient way possible. Experience shows that Massachusetts saves its planning work for times of recession, rather than attempt to avoid the serious effects of that recession by planning a stable economy.

The benefits of clustering cannot be evaluated quantitatively except for the individual plant. Essentially related manufacturers profit by close grouping through savings in transportation, coordination of

styling, and a single competitive location for buying and selling.

However, "it is clear that there is a certain cumulative aspect in the concentration of industries tied up with highly specialized ancillary establishments. The closeness of the geographic association can be measured - though of course not explained - by coefficients of linkage such as those described... Analysis of locational advantages on the basis of comparative costs is a complex matter when many types of auxiliary supply and service have to be taken into account."¹

The coefficients of linkage referred to and indications of their value are described in the following passages, taken from the NRPB report:

"The location quotient measures for a particular area the degree to which a given manufacturing industry is localized, as compared with manufacturing generally."

"The extent to which the distribution of an industry conforms to or deviates from the distribution of population is shown roughly by the coefficient of localization, since there is a somewhat close correspondence between the distribution of manufacturing

¹Hoover, op. cit. p. 276.

and that of population."

The "coefficient of specialization... gives a general picture of the deviation of the State's economic activities from those of the United States and thus shows how far that State specializes in certain activities. ..."

"The distribution of industry in general and of particular industries is, of course, continually changing, a fact that must be taken into account in planning location, since the plant to be located will be operating in the future, and it is the future conditions, so far as they may be computed, that are of greatest practical importance. This change can be measured by changes in regional densities of population, in the urbanization quotient, in the location quotient, and the coefficients of localization and geographic association."¹

A recent study, relative to the clustering of industry and based upon the statistical analysis of British and American industry, is summarized in the following arguments:

¹NRPB Industrial Location and National Resources, Washington, D. C., Government Printing Office, Dec. 1942. Chap. 5, "Measures of Industrial Distribution," P. S. Florence, W. G. Fritz, and R. C. Gilles. pp. 107, 121, 124.

"1. Localization is much closer than merely regional statistics show. An industry will concentrate within a single conurbation, a single town, or even some single quarter of a town. Several industries will localize in a geographical association.

"2. Within such an area 'goods-making' industries that specialize on specific products, 'wares' or processing industries such as tool-making and foundries catering widely for a variety of other industries were more ubiquitous within the area.

"3. This more or less extensive local coincidence, statistically measurable of a number of industries, is not necessarily due to any favorable natural conditions. More often it is simply the manifestation of economies in juxtaposing functionally related specialists within a given radius. Historically these special activities often split off from a general industry as that industry grew..."

"4. Plants that specialize on one process or service were found to be more ubiquitous and smaller on the average than integrated and assembling plants. In so far as specialization is facilitated by juxtaposition and localization, localized industry should therefore tend to be small-plant industry.

"5. But a local concentration of the plants of an industry in the midst of a concentration of linked industries provides services, markets and sources of supply for that industry. By the density effect already described (the concentration, resulting in more varied and intensified activity) its plants should be the larger.

"6. These opposing tendencies toward smaller and toward larger plants may well explain the fact that in localized industries medium-sized plants prevail."¹

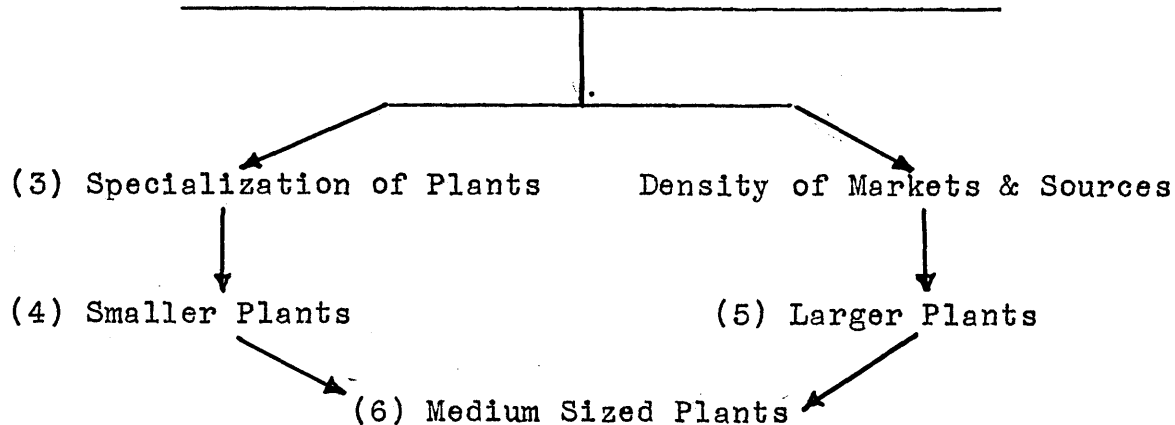
This theory of evolution of plant sizes is shown in schematic form on the next page.

The points of argument presented above seem to describe the existing tendencies toward specialization and clustering, but the conclusion is not necessarily valid. The question is too complex to be reduced to a simple formula. The size of a plant is determined directly by the nature of the internal operation, rather than the influence of grouping. Within the same industry a complete range of sizes is possible.

¹P. Sargent Florence, Investment, Location, and Size of Plant. Cambridge, University Press, 1948. N.I.E.S.R. p. 87.

FLORENCE'S THEORY ON PLANT SIZES

(1) Close and coincident localization of goods-making within a (2) wider localization of common service and processing ind.



Source: P. Sargent Florence. Investment Location, & Size of Plant. Cambridge, University Press, 1938. N.I.E.S.R., p. 87.

In regard to the clustering, induced artificially in Great Britain, Professor Florence recently emphasized the primary importance of basic locational factors. Benefits cannot accrue from such regrouping if a more basic need has been slighted.¹

- D. Industries that are young - the result of technological advances or new enterprise. The greatest potential for industrial expansion lies in providing adequate facilities for small new plants that offer new products, introduce more efficient processes, or meet the need for more specialized services. Almost all of the large companies started from a small capitalization. Under the conditions existing in Greater Boston, a new firm without extensive means cannot obtain adequate facilities. Instead, they must be content to occupy a portion of an obsolete building and to attempt to operate in a competitive market against larger well-established firms that have efficient plants.

Edna Sugihara, reporting on the factors that tend to weaken small firms, credits three as the most important - "cutthroat" competition, inadequate

¹P. S. Florence, ibid.

sources of capital and credit, and lack of research facilities.¹ Of these three, the district organization may help materially in capitalization and assist with technical counsel, but it has no influence upon the competitive practices of any industry.

Organized districts are particularly suitable for small firms, many of which, given a good location and financial backing, have expanded into large concerns.

E. Industries needed to help balance the local industrial economy. Greater Boston already has fairly well diversified industry, but its high production of style and luxury goods makes it very vulnerable in periods of depression. It was the first city in New England to feel the shock of the depression of the thirties. Style industries, such as the garment trade in Boston, usually pay high wages to skilled workers, but the employment is not steady. The work varies with the demand and seasons, most of it being done on a contract basis.

Industries are needed that will: (1) provide a more stable income; (Plants producing essential goods such as food are the best source of supply.) (2) absorb

¹NRPB, op. cit., pp. 398-400.

the slack in skilled labor on seasonal work; (Industries that require seasonal workers often locate plants solely on the basis of a good, skilled part-time labor force.) (3) supply the goods and services required by local industry and the community, which are now purchased from outside sources at an unfavorable cost.

F. Industries that prefer to rent a "standard" plant or loft space. Firms that fall into this category are usually either young enterprises, which have already been discussed, or concerns that are not likely to expand but still desire good accommodations. Into this latter group fall many industries that provide specialized services or products.

The "standard" or "incubator" plant is constructed by the District administration. It is usually one story in height, with possibly another floor over the office section. In Great Britain these plants are rented, and in this country short-term leases are available for the concern that expects rapid growth. If the industry prefers to buy the plant, it may be traded in later for a large model. "While such a plant may not be profitable in itself, it should enable an industry to get

started. After it becomes a 'going concern,' the district could build it a modern plant. At this point then the district is paid off for its investment in the incubator."¹

The Central Manufacturing District in Chicago has successfully used these "incubator" or "bungalow" plants, with some of their users expanding as much as eight times in floor space.

Loft buildings have long been popular in this country and continue to be valuable in the organized district. By improving the equipment and methods of distribution of goods for the tenants the loft or terminal building offers additional advantages to the small firm. Many of these concerns are dependent upon rapid delivery of their goods, and the communal handling within the building expedites this operation.

No exact figures could be obtained, but the majority of requests received by the Chamber of Commerce were for loft space.² This was corroborated by railroad industrial advisors who described a tremendous backlog of requests for leases in multiple tenant plants.³ If any standard or incubator

¹Wrigley letter, op. cit.

²Interview, Mr. Frank, Boston Chamber of Commerce.

³Mr. L. A. Corbett, Ind. Dev., N.Y., N.H. & Hartford RR.

plants were available in a good development, it is submitted that a similar backlog would also exist there.

G. Branch plants to serve regional or local markets.

If an industry produces goods made from heavy materials or adds considerable value to the material through processing, it may be more economical to serve its markets by setting up branch plants. A local example of this is found in the General Motors assembly plant established in Framingham. It is cheaper to ship the component parts from their manufacturing points in the Midwest and assemble the cars here on the Coast for the Northeastern market than it is to send the finished product.

In the case cited the plant was too large to be the type interested in a central organized district. It is easier and cheaper for them to locate on the periphery of the metropolitan area. However, very few branch plants are this large, and there is every reason to believe that the South Bay area, with excellent transportation and distribution facilities, would furnish ideal sites for them. The tract in its present condition has been considered for this purpose and options taken but abandoned.

- H. Branch plants decentralized to increase efficiency by obtaining cheaper materials, better labor, proximity to related manufactures, closer markets, etc.
and
- I. Plants that are consolidating to expedite closer control, to take advantage of new processes, to reduce overhead, etc.

These categories are self-explanatory, being common operations in all fields of industry. During the recession of the '30s, many plants left Massachusetts for three reasons: labor costs, taxation and consolidation.¹ Taken in order, labor costs in the skilled bracket are seldom out of scale with the value of the finished product. For industries largely dependent upon semiskilled and unskilled labor, such as textiles, the increasingly efficient Southern labor market has been enticing.

For the healthy going concern, it has been noted that taxation is of lesser importance (ranking about twelfth) in determining location. During the '30s, most cases were a combination of taxation and consolidation; i.e. industries with high capital investment

¹ New England Council, New England Today. p. 13.
Also, Commission on Interstate Cooperation, Migration of Industrial Establishments from Massachusetts, House Report 2495.

were forced to consolidate because of the high overhead on their extensive idle facilities. Taxation was only one item of that overhead - power, heat, and maintenance probably all being more important. In reporting to a community or to a legislative body, an industry naturally avails itself of the opportunity to complain of high taxes.¹

- J. Industries that should be moved out of residential and business districts. Boston, like so many other large cities, has zoned for business and residential uses areas already containing industries which are hastening the spread of blight and obviating rehabilitation by their presence. South Boston and Roxbury, adjoining the South Bay, are old sections of the city. Once fashionable neighborhoods, they have deteriorated with old age, and small industries have crept into buildings which could no longer command the same rent from residents. Even though the rent on such facilities may be low, they do not constitute good industrial quarters; and most concerns would not locate there, were other accommodations available.

If this "South End" of Boston is to be redeveloped, industries will have to be moved out of the

¹See Appendix B.

residential zones at least. Under existing conditions many of them would have to leave the city to find new quarters, with a resulting loss from the tax rolls. With the nearby South Bay developed as an organized district, facilities would be available for all those that were, at least potentially, an asset.

EXPLANATION FOR TABLE B

Table B is included in this study as a further guide toward the selection of industries to be attracted to the South Bay site. It consists of an appraisal of the industries as charted by the U. S. Department of Commerce in the publication, Basic Industrial Location Factors - A Guide for Evaluating an Area's Resources for Industrial Development. Their table entitled "Basic Factors Influencing Industry Location" has been reproduced herein, and those industries whose primary locational needs might be met by the South Bay site have been marked with an asterisk.

Assuming that South Bay, organized as a district, would appeal primarily to smaller concerns, all of the industries indicated by an asterisk also employ less than 250 workers on the average. Thus, this table eliminates those industries with undesirable inherent qualities, those too large to be interested in communal and special services, and those whose primary needs cannot be met by the site.

The grouping used in the table is very inclusive, and in some cases - such as numbers 6, 17, and 38- only part of the industries in that group would be desired or

interested. The differentiation of these cases is so obvious that it is not indicated.

It should be noted that because a scientific industrial survey of Greater Boston is lacking, the selections reflect primarily the personal opinion of the writer.

TABLE B INDUSTRIES THAT MIGHT BE ATTRACTED TO SOUTH BAY

INDUSTRY GROUPS	LOCATION OF PRODUCTION MATERIAL	LABOR	SITES	POWER	WATER	INDUSTRIAL FUEL	TRANSPORTATION FACILITIES	PROXIMITY TO MARKET	DISTRIBUTION FACILITIES	FAVORABLE COMPETITIVE POSITION	LIVING CONDITIONS	COMPATIBLE LAWS AND LAW TRENDS	REASONABLE TAX RATES	CLIMATE
<u>Food Products</u>														
1. Bakery products and ingredients, etc.					XXXX	XXXX		XXXX	XXXX	XXXX				
2. Dairy products, fruits, vegetables	XXXX	XXXX	XXXX		XXXX	XXXX			XXXX					
3. Flavoring extracts, poultry	XXXX				XXXX				XXXX					
4. Flour and grain products	XXXX							XXXX	XXXX	XXXX				
5. Ice cream, preserves, etc.	XXXX				XXXX			XXXX	XXXX	XXXX				
*6. Meat products, packing, beet sugar	XXXX	XXXX	XXXX		XXXX	XXXX	XXXX		XXXX	XXXX				
7. Vinegar, cider, wines	XXXX		XXXX		XXXX		XXXX		XXXX	XXXX				
8. Cane sugar	XXXX		XXXX		XXXX		XXXX			XXXX				
*9. Cereal preparations		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX		XXXX	XXXX		XXXX	XXXX	
10. Custom slaughtering	XXXX		XXXX		XXXX							XXXX	XXXX	
11. Blended liquors	XXXX	XXXX			XXXX		XXXX		XXXX	XXXX		XXXX	XXXX	
12. Frozen foods	XXXX		XXXX	XXXX	XXXX		XXXX	XXXX	XXXX	XXXX		XXXX	XXXX	
13. Rice cleaning	XXXX						XXXX						XXXX	
<u>Food Products - Lumber and Timber Products</u>														
14. Fish, oleomargarine, sawmills	XXXX	XXXX	XXXX				XXXX		XXXX	XXXX		XXXX	XXXX	
<u>Food Products - Finished Lumber Products</u>														
15. Liquors, wood preserving	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX		XXXX	XXXX		XXXX	XXXX	
<u>Iron, Steel & Products - Auto & Transportation Equipmt. - Machinery - Miscel. Indust. - Non-ferrous Metal Prod.</u>														
*16. Metal Products, transportation equipmt. Mchy. (except electrical) -Miscel. Industries		XXXX	XXXX	XXXX	XXXX		XXXX		XXXX		XXXX		XXXX	

LEGEND

XXXX

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
INDUSTRY GROUPS	LOCATION OF PRODUCTION MATERIAL	LABOR	SITES	POWER	WATER	INDUSTRIAL FUEL	TRANSPORTATION FACILITIES	PROXIMITY TO MARKET	DISTRIBUTION FACILITIES	FAVORABLE COMPETITIVE POSITION	LIVING CONDITIONS	COMPATIBLE LAWS AND LAW TRENDS	REASONABLE TAX RATES	CLIMATE
<u>Textile Mill Products & Other Fiber Manufacturers</u>														
17. Carpets, thread, cordage, linoleum Rayon and silk goods, etc.							XXXX			XXXX				XXXX
*18. Hosiery, knitted rayon and silk goods Cloth manufacturers, etc.		XXXX		XXXX			XXXX	XXXX	XXXX	XXXX				XXXX
*19. Fabric dyeing, cleaning and sponging					XXXX		XXXX	XXXX	XXXX	XXXX				XXXX
*20. Felt goods, hats		XXXX		XXXX	XXXX		XXXX							XXXX
<u>Apparel and Finished Fabric Products - Paper and Allied Products</u>														
*21. Apparel and finished fabric products Paper bags, paper board containers								XXXX	XXXX	XXXX				XXXX
<u>Lumber and Timber Products</u>														
22. Logging	XXXX	XXXX					XXXX	XXXX		XXXX		XXXX		XXXX
23. Planing mills	XXXX	XXXX	XXXX	XXXX			XXXX	XXXX		XXXX		XXXX		XXXX
<u>Lumber and Timber Products - Furniture and Finished Lumber Products</u>														
24. Matches, lasts, veneer, furniture	XXXX	XXXX	XXXX	XXXX			XXXX		XXXX	XXXX	XXXX	XXXX		XXXX
<u>Furniture & Finished Lumber Products - Paper and Allied Products</u>														
*25. Caskets, Cooperage, pulp goods		XXXX	XXXX					XXXX	XXXX	XXXX				XXXX
<u>Furniture & Finished Lumber Products - Miscel. Indust. - Printing & Publishing - Tobacco Manufacturing</u>														
*26. Window screens, shades, blinds, boxes, brooms Publishing & printing - cigars, tobacco		XXXX						XXXX		XXXX				
<u>Furniture & Finished Lumber Products</u>														
27. Wooden boxes	XXXX	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX		XXXX
*28. Mattresses and bedsprings		XXXX	XXXX				XXXX		XXXX	XXXX		XXXX		XXXX
29. Excelsior	XXXX	XXXX	XXXX	XXXX	XXXX		XXXX			XXXX		XXXX		XXXX

INDUSTRY GROUPS	A LOCATION OF PRODUCTION MATERIAL	B LABOR	C SITES	D POWER	E WATER	F INDUSTRIAL FUEL	G TRANSPOR- TATION FACILITIES	H PROXIMITY TO MARKET	I DISTRIBUTION FACILITIES	J FAVORABLE COMPETITIVE POSITION	K LIVING CONDITIONS	L COMPATIBLE LAWS AND LAW TRENDS	M REASONABLE TAX RATES	N CLIMATE
<u>Paper and Allied Products</u>														
*30. Wallpaper			XXXX					XXXX	XXXX	XXXX				
31. Pulp, paper and paperboard mills	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX				XXXX	XXXX	XXXX	
32. Coated & glazed paper, converted paper prod.	XXXX	XXXX	XXXX	XXXX			XXXX		XXXX		XXXX	XXXX	XXXX	
<u>Paper & Allied Products - Stone Clay & Glass Products - Non-ferrous Metal Products</u>														
*33. Die cut paper products, cans, mirrors Electroplating, sheet metal working shops								XXXX	XXXX	XXXX				
<u>Printing, Publishing and Allied Industries</u>														
*34. Photo-engraving, rotogravure, lithography		XXXX			XXXX			XXXX		XXXX		XXXX	XXXX	
<u>Chemicals and Allied Industries</u>														
*35. Drugs, insecticides, pigments, tanning material					XXXX		XXXX		XXXX			XXXX	XXXX	
36. Compressed gases, fertilizer, coal tar, cottonseed, linseed and soybean products, etc.	XXXX				XXXX		XXXX		XXXX			XXXX	XXXX	
37. Naval stores, explosives, hardwood distillation, charcoal	XXXX						XXXX		XXXX	XXXX		XXXX	XXXX	
*38. Greases, paints, soaps, perfume, adhesives				XXXX			XXXX		XXXX			XXXX	XXXX	
<u>Petroleum and Coal Products</u>														
39. Petroleum refining	XXXX		XXXX				XXXX	XXXX	XXXX	XXXX		XXXX	XXXX	
40. Asphalt paving blocks and mixtures, creosoted wood products	XXXX		XXXX			XXXX	XXXX	XXXX	XXXX	XXXX				
41. Beehive coke	XXXX		XXXX			XXXX	XXXX		XXXX					
42. Fuel briquettes	XXXX		XXXX				XXXX		XXXX					
<u>Petroleum & Coal Products - Stone Clay & Glass Products</u>														
43. Roofing, wallboard, composition floor, building insulation, etc.	XXXX	XXXX	XXXX				XXXX		XXXX	XXXX				

LEGEND

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
INDUSTRY GROUPS	LOCATION OF PRODUCTION MATERIAL	LABOR	SITES	POWER	WATER	INDUSTRIAL FUEL	TRANSPORTATION FACILITIES	PROXIMITY TO MARKET	DISTRIBUTION FACILITIES	FAVORABLE COMPETITIVE POSITION	LIVING CONDITIONS	COMPATIBLE LAWS AND LAW TRENDS	REASONABLE TAX RATES	CLIMATE
<u>Rubber Products</u>														
44. Reclaimed rubber and miscel. rubber prod.		XXXX	XXXX	XXXX			XXXX		XXXX		XXXX	XXXX	XXXX	
<u>Leather and Leather Products</u>														
*45. Leather footwear, findings, belting, harness		XXXX		XXXX			XXXX		XXXX	XXXX		XXXX	XXXX	
*46. Leather luggage, gloves, pocketbooks, etc. tanned leather									XXXX	XXXX		XXXX	XXXX	
<u>Stone, Clay and Glass Products</u>														
47. Cement	XXXX	XXXX	XXXX	XXXX		XXXX	XXXX	XXXX		XXXX	XXXX		XXXX	
48. Porcelain electrical supplies, refractories	XXXX	XXXX	XXXX	XXXX		XXXX	XXXX		XXXX	XXXX			XXXX	
49. Asbestos products	XXXX	XXXX	XXXX	XXXX			XXXX		XXXX	XXXX			XXXX	
50. Abrasive wheels and related products	XXXX	XXXX	XXXX	XXXX			XXXX		XXXX				XXXX	
51. Vitreous china plumbing fixtures	XXXX	XXXX	XXXX			XXXX	XXXX		XXXX	XXXX	XXXX	XXXX	XXXX	
52. Terra cotta	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX		XXXX	XXXX		XXXX	
53. Sewer pipe and kindred products	XXXX	XXXX	XXXX			XXXX	XXXX	XXXX	XXXX	XXXX			XXXX	
54. Miscellaneous pottery products	XXXX	XXXX				XXXX			XXXX	XXXX	XXXX		XXXX	
55. Concrete and gypsum products, lime	XXXX		XXXX				XXXX		XXXX	XXXX		XXXX	XXXX	
56. Brick, hollow tile & miscel. clay prods.	XXXX		XXXX			XXXX	XXXX	XXXX		XXXX				
57. Ground and refined graphite	XXXX		XXXX	XXXX			XXXX		XXXX			XXXX	XXXX	
58. Sand-lime brick block tile, roofing tile	XXXX		XXXX				XXXX	XXXX	XXXX	XXXX			XXXX	
59. Clay refractories, floor and wall tile	XXXX		XXXX			XXXX	XXXX		XXXX	XXXX				
60. Non-metallic crushed, ground or treated minerals	XXXX		XXXX	XXXX			XXXX		XXXX	XXXX				
61. Cut-stone products, etc.	XXXX		XXXX				XXXX		XXXX	XXXX				
62. Steam packing, pipe and boiler covering			XXXX				XXXX	XXXX	XXXX	XXXX			XXXX	

A	B	C	D	E	F	G	H	I	J	K	L	M	N
INDUSTRY GROUPS	LOCATION OF PRODUCTION MATERIAL	SITES	POWER	WATER	INDUSTRIAL FUEL	TRANSPORTATION FACILITIES	PROXIMITY TO MARKET	DISTRIBUTION FACILITIES	FAVORABLE COMPETITIVE POSITION	LIVING CONDITIONS	COMPATIBLE LAWS AND LAW TRENDS	REASONABLE TAX RATES	CLIMATE
<u>Stone, Clay & Glass Products-Nonferrous Metal Products</u>													
*63. Statuary, art goods, silverware	XXXX					XXXX	XXXX	XXXX	XXXX	XXXX		XXXX	
<u>Machinery (except electrical)</u>													
*64. Construction and similar machinery	XXXX	XXXX	XXXX			XXXX				XXXX		XXXX	
*65. Pumps, mechanical measuring instruments	XXXX	XXXX				XXXX	XXXX		XXXX			XXXX	
<u>Transportation Equipment (except automobiles)</u>													
66. Boat and shipbuilding and repairs	XXXX	XXXX					XXXX		XXXX			XXXX	
<u>Non-ferrous Metal Products</u>													
67. Non-ferrous metal foundries and products, not elsewhere classified	XXXX	XXXX	XXXX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
68. Secondary refining of non-ferrous metals		XXXX	XXXX		XXXX	XXXX		XXXX	XXXX		XXXX	XXXX	
<u>Non-ferrous Metal Products-Electrical Machinery</u>													
*69. Electrical appliances and lamps, tin and other foils	XXXX	XXXX					XXXX	XXXX	XXXX	XXXX		XXXX	
<u>Electrical Machinery</u>													
*70. Electrical automotive and communication equipt. Industrial electrical machinery, etc.	XXXX	XXXX	XXXX			XXXX		XXXX	XXXX			XXXX	
*71. Electrical measuring instruments, radio and tubes, phonographs, x-ray apparatus, etc.	XXXX							XXXX	XXXX	XXXX		XXXX	
72. Carbon products for electrical industry		XXXX	XXXX					XXXX	XXXX			XXXX	
*73. Primary and storage batteries, miscellaneous electric products		XXXX						XXXX	XXXX			XXXX	

LEGEND

Primary Importance - XXXX
 Secondary Importance - left blank

EXPLANATION OF TABLE C

The types of industry which might be attracted to or prohibited from the South Bay Industrial District were discussed in Sections V and VI. Wishing to illustrate, the writer has utilized Arthur Bassin's chart of national industries. Herein he outlines the salient characteristics of the major industries and estimates the likelihood of new locations.¹

This table is in no respect a result of any scientific technique but merely indicates the writer's personal opinion of how some industries might be classified in relation to the site.

All of the industries that Mr. Bassin has marked as likely to need or desire new locations have been listed. When the particular industry was obviously unsuited for the site because of its dependence upon special resources, extractive processes, etc., it has not been classified. Industries that are undesirable for the site are noted, regardless of Mr. Bassin's estimate.

The writer has also listed industries with "little likelihood of new locations" because in his opinion these

¹Arthur S. Bassin, Industrial Location Analysis.
Master's Thesis, MIT, Cambridge, Mass., 1946.

particular industries, already located in the Greater Boston Area, would be attracted to South Bay for the reasons indicated.

There was not enough information on several industries to venture an appraisal of them. Others are listed although Mr. Bassin did not secure enough information to make his own estimate.

KEY TO SYMBOLS

Bassin's estimate on probability of new locations:

N = new locations likely

L = little likelihood of new locations.

Appraisal Symbols (Willemain)

A = Industries needing new plants because of obsolescence of present facilities or new growth

B = Industries displaced, or likely to be displaced, by public improvements

C = Industries that would profit by regrouping, better transportation, specialized services, etc.

D = Industries that are young - result of technological advances and new enterprise

E = Industries needed to help balance the local industrial economy

F = Industries that prefer to rent a "standard" plant or loft space

G = Branch plants to serve regional or local market

- H = Branch plants decentralized to increase efficiency by obtaining cheaper materials, better labor, proximity to related manufactures, closer markets, etc.
- I = Plants that are consolidating to expedite closer control, to take advantage of new processes, to reduce overhead, etc.
- J = Industries that should be moved out of residential and business zones
- U = Industries that are undesirable for this site because of qualities that are inherent in their materials, or processes.

TABLE C
AN APPRAISAL OF THE INDUSTRIES
THAT MIGHT BE ATTRACTED TO SOUTH BAY

<u>Industry</u>	<u>Bassin's Est.</u>	<u>Appraisal</u>
1. Meat Packing, wholesale	N	ABCGJ
2. Custom Slaughtering, wholesale	N	U
3. Sausages, Prepared Meats and Other Meat Products - not made in meat packing establishments	N	ABCFGJ
4. Poultry Dressing and Packing, wholesale	N	CFGJ
5. Creamery Butter	L	GH
6. Cheese	L	GH
7. Condensed and Evaporated Milk	N	H
8. Canned Fish, Crustacea, and Mollusks	L	CI
9. Canned and Dried Fruits and Vegetables	N	C
10. Preserves, Jams, Jellies and Fruit Butter	N	FC
11. Pickled Fruits and Vegetables, Vegetable Sauces and Seasonings	N	CF
12. Salad Dressings	N	CFG
13. Quick-frozen Foods	N	CFG
14. Rice Cleaning and Polishing	N	-
15. Cane Sugar, except refineries	N	-
16. Cane Sugar Refining	N	AC
17. Candy and Other Confectionery Products	N	ACGJ

18. Non-alcoholic Beverages	-	FJ
19. Malt Liquors	L	U
20. Misc. Food Prep.	N	ABCDF
21. Tobacco Manufactures	N	U
22. Cigars	L	U
23. Chewing Tobacco and Snuff	L	U
24. Cotton Manufactures	N	-
25. Rayon Manufactures	N	H
26. Woolen Manufactures	N	CH
27. Dyeing and Finishing Woolen and Worsted	N	CH
28. Hosiery	N	CH
29. Knitted Cloth	N	CH
30. Knitted Outerwear	N	ABF
31. Knitted Underwear	N	ABF
32. Knitted Gloves	N	ABF
33. Dyeing and Finishing Textiles Except Woolens	N	ABH
34. Wool Carpets and Rugs	N	H
35. Carpets and Rugs Made From Such Material as Paper, Grass, Jute, Flax, Cotton, Sisal, Cocoa Fibre, and Rags	N	CH
36. Hats, Except Cloth and Millinery	L	ACFHJ
37. Misc. Textile Goods	-	ABCF
38. Processed Waste and Recovered Wool Fibres	N	A
39. Artificial Leather and Oilcloth	-	U

40. Linen Goods	-	C
41. Jute Goods	L	AC
42. Men's and Boys' Tailored Clothing	N	ABCFJ
43. Men's and Boys' Furnishings, Work and Sport Garments	N	ABCFJ
44. Men's and Boys' Shirts, Collars and Nightwear	N	ABCFJ
45. Trousers, Wash Suits and Washable Service Apparel	N	ACFJ
46. Work Clothing	N	ABCFJ
47. Men's and Boys' Underwear	-	ABCFJ
48. Men's and Boys' Neckwear	N	ABCFJ
49. Women's and Misses' Outer Clothing	N	ABCFJ
50. Women's Undergarments and Accessories	-	ABCFJ
51. Corsets and Allied Garments	L	CH
52. Millinery	L	CJ
53. Children's and Infants' Outerwear	N	ABCFJ
54. Fur Goods	L	CJ
55. Misc. Apparel	N	ABCFJ
56. Robes, Lounging Garments, and Dressing Gowns	N	ABCFJ
57. Raincoats and Other Waterproof Garments	N	ABCFJ
58. Embroideries and Trimmings	N	ABCFJ
59. Curtains, Draperies and Bedspreads	N	ABCFJ
60. Household Furnishings	N	ABCFJ
61. Misc. Fabricated Textile Products	N	ACFJ

62. Planing and Plywood Mills	N	DFHI
63. Mattresses and Bedsprings	L	ABCFHJ
64. Upholstered Household Furniture	N	ABCFHJ
65. Household Furniture, Except Upholstered	N	ABDFH
66. Public Building and Professional Furniture	N	ADFHJ
67. Partitions, Shelving, Cabinet Work, Office and Store Fixtures	N	ADFHJ
68. Wooden Containers	L	G
69. Window and Door Screens, Shades and Venetian Blinds	N	DFG
70. Caskets, Coffins, Burial Cases, and Other Morticians' Goods	N	DG
71. Excelsior	-	-
72. Cork Products	-	H
73. Matches	-	U
74. Wood Preserving	L	D
75. Mirror Frames and Picture Frames	-	DFG
76. Paper Pulp Mills	-	-
77. Paper Bags, Except Those Made in Paper Mills	N	FGJ
78. Fiber Cans, Tubes and Similar Products	-	FG
79. Paperboard Containers and Boxes	N	FG
80. Wallpaper	-	DG
81. Converted Paper Products	N	DFG
82. Pulp Goods, Pressed and Molded	-	DFG

83. Books: Publishing and Printing	-	AFJ
84. Books: Printing Without Publishing	-	AFJ
85. Gen. Com. (Job) Printing	N	AFG
86. Lithographing	N	AFG
87. Greeting Cards	N	AFG
88. Bookbinding and Related Industries	N	AFG
89. Machine and Hand Typesetting	N	AFG
90. Engraving	N	AFG
91. Photoengraving	N	AFG
92. Electrotyping and Stereotyping	N	AFG
93. Paints, Varnishes and Colors	N	DJ
94. Soy Bean Oil, Cake and Meal	N	-
95. Fish and Other Marine Oils, Cake and Meal	-	U
96. Veg. and Animal Oils	N	Animal U Veg. DGH
97. Drugs and Medicines	L	AD
98. Insecticides, Fungicides, and Related Ind. and Household Chemical Products	N	U
99. Rayon and Allied Products	N	-
100. Hardwood Distillation, & Charcoal	L	U
101. Fertilizers	N	U
102. Tanning Materials, Natural Dyestuffs, Mordants, Assistants and Sizes		U
103. Coal Tar Products, Crude and Intermediate	N	U
104. Plastic Materials	N	U

105. Explosives	L	U
106. Compressed and Liquefied Gases	N	U
107. Chemicals, N.E.C.	N	U
108. Printing Ink	N	-
109. Ammunition	L	U
110. Cleaning and Polishing Prep., Blacking and Dressing	N	DF
111. Glue and Gelatine	-	U
112. Lubricating Oils and Greases (not made in petroleum refineries)	N	DFG
113. Fireworks	-	U
114. Petroleum Refining	L	U
115. Beehive Coke	L	U
116. Oven Coke and Coke-oven By-prods.	L	U
117. Paving Blocks and Paving Mixtures	N	U
118. Roofing, Built-up and Roll	N	U
119. Tires and Inner Tubes	N	U
120. Rubber Boots and Shoes	L	U
121. Reclaimed Rubber	N	U
122. Rubber Products	N	U
123. Leather: Tanned, Curried and Finished	L	ACH
124. Ind. Leather Belting and Packing Leather	-	ABCFGH
125. Boot and Shoe Cut Stock and Findings	N	ABCFGH
126. Footwear (except Rubber)	N	ABCFH
127. Suitcases, Briefcases, Bags, Trunks and Other Luggage	N	ABCDF

128. Women's Pocketbooks, Handbags and Purses	N	CDFGJ
129. Leather Goods, N.E.C.	-	CDFG
130. Flat Glass	N	-
131. Glass Containers	N	DEGH
132. Tableware, Pressed or Blown Glass and Glassware, N.E.C.	N	DEGH
133. Mirrors and Other Glass Products Made of Purchased Glass	N	DEGH
134. Structural Clay Products	N	-
135. Pottery, Vitreous China, Porcelain	N	-
136. Concrete	-	GH
137. Gypsum Products	N	GH
138. Mineral Wool	N	GH
139. Wall Board and Wall Plaster, Building Insulation, and Floor Composition	N	DGH
140. Lime	N	GH
141. Abrasive Wheels, Stones, Paper, Cloth, and Related Products	N	DI
142. Asbestos Products	N	DHI
143. Minerals and Earths, Ground or Otherwise Treated	N	DHI
144. Sand-Lime Brick, Block and Tile	-	G
145. Non-clay Refractories	-	GH
146. Blast Furnace Products	L	U
147. Steel Works and Rolling Mills	N	U
148. Iron and Steel Foundry Products	N	U
149. Hardware, N.E.C.	N	-
150. Enameled-iron Sanitary Ware and Other Plumbers Supplies	N	-

151. Oil Burners, Domestic and Ind.	N	GHI
152. Power Boilers and Ass. Products	N	GHI
153. Steam and Hot-water Heating Apparatus	N	GHI
154. Stoves, Ranges, Water-heaters and Hot-air Furnaces	N	GHI
155. Steam Fittings	N	GHI
156. Heating and Cooking Apparatus, Except Electrical	N	DGHI
157. Metal Stamping, Enameling, Galvanizing, Japaning and Lacquering	N	DGHI
158. Doors, Window Sash, Frames, Molding and Trim Made of Metal	N	DFGH
159. Steel Barrels, Kegs and Drums	-	GH
160. Primary Smelting and Refining of Non-ferrous Metals	L	U
161. Alloying, Rolling and Drawing of Non-ferrous Metals	N	U
162. Secondary Smelting and Refining of Non-ferrous Metals, N.E.C.	N	U
163. Jewelry	N	F
164. Electroplating, Plating and Polishing	N	ACF
165. Lighting Fixtures	L	ABCFH
166. Non-ferrous Metal Foundries (except aluminum)	N	U
167. Aluminum Ware, Kitchen, Hospital and Household	N	DFGH
168. Aluminum products (including rolling, drawing, and extruding)	N	U
169. Sheet-metal Work, not classified	L	DFGH

170. Electrical Machinery	N	ABCDEFI
171. Wiring Devices and Supplies	N	BCDF
172. Carbon Prods. for the Electrical Industry	N	-
173. Electrical Measuring Instruments	N	DF
174. Generating, Distribution and Ind. Apparatus, and Apparatus for Incorp. in Manu. Prods. N.E.C.	N	ABCDH
175. Electrical Appliances	N	ABCDFGH
176. Insulated Wire and Cable	N	CFH
177. Automotive Electrical Equipment	N	CDFGH
178. Electrical Lamps	N	CDGH
179. Radios, Radio Tubes, and Phonographs	N	CGH
180. Communication Equipment	N	CGH
181. Batteries, Storage and Primary	N	GH
182. X-ray and Therapeutic Apparatus and Electronic Tubes	N	CDGHI
183. Electrical Products, N.E.C.	N	CDFGHI
184. Engines and Turbines	L	AGEH
185. Steam Engines, Turbines and Waterwheels	L	GH
186. Internal-combustion Engines	L	GH
187. Agricultural Machinery and Tractors	N	EGH
188. Construction and Similar Machinery	N	EGH
189. Oil-field Machinery	N	-
190. Mining Machinery and Equipment	N	-
191. Machine Tools	L	EGH
192. Machine-tool and other Metalworking-Machinery Accessories, Metal-cutting		

193. Food Products Machinery	N	DGH
194. Woodworking Machinery	N	GHI
195. Paper-mill, Pulp-mill, and Paper Prod. Machinery	N	-
196. Printing Trades Machinery	-	G
197. Special Industry Machinery, N.E.C.	N	GHI
198. Measuring and Dispensing Pumps	N	HI
199. Pumping Equipment and Air Compres- sors	N	HI
200. Elevators, Escalators, and Conveyors	N	GHI
201. Blowers: Exhaust and Ventilating Fans	N	GHI
202. Mechanical Power-transmission Equipment	N	GHI
203. Stokers, Mechanical, Domestic and Ind.	N	GHI
204. Machine Shop Products, N.E.C.	N	ABCFG
205. Office and Store Machines, N.E.C.	N	DG
206. Vending, Amusement, and Other Coin- operated Machines	L	DG
207. Scales and Balances	-	HI
208. Laundry Equipment, Domestic	N	GHI
209. Commercial Laundry, Dry-cleaning and Pressing Machinery	N	GHI
210. Refrigerators, Domestic (Mechanical and Adsorption), Refrigeration Machinery and Equipment, and Complete Air-conditioning Units	N	GHI
211. Motor Vehicles, Motor Vehicle Bodies, Parts and Accessories	N	GHI

212. Automobile Trailers (For attachment to passenger cars)	N	GHI
213. Cars and Car Equipment - Railroad, Street and Rapid Transit	N	GHI
214. Professional and Scientific Equipment (except medical)	N	CDFGH
215. Optical Instruments and Lenses	N	CDFH
216. Ophthalmic Goods: Lens and Fittings	N	FH
217. Surgical and Medical Instruments	L	ACDFH
218. Dental Equipment and Supplies	N	DGH
219. Games and Toys	N	DF
220. Sporting and Athletic Goods, N.E.C.	N	DF
221. Pens, Mechanical Pencils and Pen Points	N	DF
222. Pencils and Crayons	N	HI
223. Buttons	N	DFH
224. Costume Jewelry and Costume Novelties	N	DF
225. Feathers, Plumes, and Artificial Flowers	N	CDF
226. Fabricated Plastic Products, N.E.C.	N	U(?)
227. Needles, Pins, Hoods and Eyes, and Slide and Snap Fasteners	N	CDF

VI. WHAT TYPES OF INDUSTRIES SHOULD BE PROHIBITED?

Industries that should be classed as undesirable and "screened out" will fall into the following categories:

- (1) Those "nuisance" industries that inherently produce too much noise, unpleasant odors, smoke, or grime, making them incompatible with the character of the surroundings.
- (2) Those classed as unreasonable risks for the District administration. While the small firms should be encouraged and supported financially, industries of temporary nature or those not operated according to sound, recognized practices, should be prohibited.
- (3) Those with a locational factor of primary importance that cannot be supplied by the South Bay site. It is not likely that any applicants will fall into this group, but in such an event, they should be discouraged because the failure of a tenant injures the reputation of the entire development.
- (4) Those plants that are not, at least potentially, an asset to the community. In time they should directly benefit the public through payment of taxes, employment, and increases in consumer purchasing power.

VII. COMPLEMENTARY USES FOR THE AREA

The successful operation of an industrial area is, in part, dependent upon the services supplied to that area and the efficiency of the connective agency. Thus, the South Bay District would be dependent upon the New Haven railroad for good service; and the quality of such service, in turn, hinges upon the capacity and design of the rail facilities and the skill of the operators. The point to be made here is that the District must do more than just attract sound industries. It must assure those plants of more than adequate services. Where possible they should bring allied or complementary uses into the area, particularly those facilities that will add an advantage to the location and bring more contentment and profit to the industries. Several such uses are suggested here for the South Bay area.

Trucking Terminal One has but to drive through the narrow streets of downtown Boston to gain some appreciation of the extent of traffic congestion and to notice that a large percentage of the stoppage is caused by trucks loading or unloading. The problem is made more acute by the almost total lack of recessed loading bays that would permit the trucks to move off the streets.

A survey conducted by the Boston City Planning Board last year revealed that the trucks are operating at 44% of their capacity. It is the contention of the City Board that this figure could easily be doubled through the use of one or more trucking terminals. If it were located on a tract served by a railroad, it would be a junction between the two services and a transfer point for consolidating truck loads.

The South Bay was selected as the most favorable site serving the southern part of the city and a point in Charleston the most favorable for a northern terminal. If better road connections were constructed between these two points (as contemplated in the Master Highway Plan), one larger terminal at South Bay could serve the entire city. Such a terminal would expedite the distribution by truck carrier of goods for the industries of the District - thus definitely adding to the value of the area.

The general specifications for this truck terminal to handle about 2,800 tons daily would be:

"A site of at least 9 acres.

An administration and storage building with a floor area of approximately 90,000 sq. ft.

A platform, or platforms, totalling 1,250 ft. in length, with back-up spaces for 200 trucks, and equipped with mechanical conveyor system.

Access roadways and parking areas.

A cost, including site, of at least \$2,500,000."¹

Irrespective of the indicated need for such a terminal in Boston to increase general trucking efficiency and to lessen the traffic congestion, the South Bay District would find it desirable to erect a terminal in the interests of their tenant industries.

Warehousing The average plant is designed for the manufacturing operation and seldom has much room for storage of materials or finished products. Working space is at a premium and, unless quick shipment is expected, suitable storage space must be found. The warehouse meets the need with safe and efficient handling. A warehouse section served by rapid distributing equipment in the South Bay would be a valuable adjunct and fill another deficiency in the community.

Food Distribution Center Studies are now being made of the Faneuil Hall market section of Boston with a view toward planning a redevelopment that will serve both the city and the food industries located in that section. Under the present arrangements, local and regional wholesale and retail distributing activities are carried on at the same congested point. Facilities are unsanitary and inadequate for the proper handling of perishable

¹City Planning Board, Report on a Union Motor Truck Terminal for Boston. Boston, Oct. 1947, 44 pp.

goods. Refrigerator cars loaded with fresh meats must be slowly humped through the streets of Boston to the packers and wholesalers, losing at least a day in transit. Estimates of food spoilage and the effects of such inefficient methods upon prices in New England run very high. The results of the current studies on this spoilage may reveal exact figures indicating the economies of redevelopment.

Twenty-five years ago the meat-packing industry was clustered in Central Boston, but it moved to the periphery because of the increasing transportation costs inherent with congestion. Those peripheral sites (in Somerville and Cambridge) were swamped by the continuing growth, and the meat packing industry is once again ripe for movement to a more advantageous location. It is submitted that the South Bay District would provide an ideal site, not only for a food distributing center, but for related manufactures such as meat packing. This industry requires rail services and must be close to the heart of the commercial market for its products. The solution lies not in further decentralization, "but rather in streamlined recentralization."¹

¹Arthur Bassin, "Where Can Industry Flourish Best?" American City, June, 1940, pp. 83.

Parking Areas House Bill No. 1918, referred to previously in a footnote, proposes that parking areas be constructed in the South Bay area, in connection with the effectuation of the Master Highway Plan. This may be a sound use if the Central Artery is built, but eventually the area put to this use might be restricted if the land were desired for building construction. Naturally adequate parking areas must be provided for the tenant industries.

Municipal Incinerator This appears to be an ideal solution to the problem posed by the city garbage wharf. It is reported that such an incinerator, if located on Dorchester Avenue, across from the City Hospital, could supply power and heat to that institution. The resulting economies would lend overwhelming support to the removal of the unsightly garbage wharf.¹

Administrative, Recreational, and Sales Center Essentially this is not a complementary use. A central unit is needed to house the administrative activities of the District organization. Further expansion of this building or group of buildings would provide space for recreational activities, a restaurant or club, conference rooms, and lounges. If the District contains industries producing style products, such as clothing, this would also be the logical place to establish a sales center

¹Interview, Thomas McCormick, Dir. Boston City Planning Board.

for the displaying of products and the logical meeting place for buyer and seller.

Naturally, only a large development can support an extensive center of this sort, and the South Bay District would have to start with a small building. However, it has the capacity to obtain eventually all of the specialties featured by the most successful districts.

VIII. SUGGESTED ORGANIZATION

Corporation Form In organizing the parties engaged in the development of the South Bay Industrial District, almost any corporate form would be permissible. In the existing districts the common law trust, as defined by Massachusetts law of 1916, has proved to be convenient and effective. Under this form the Trustees enjoy all of the privileges of individual fee ownership. Any two of the three may consummate a contract without the signature of the third.

Whatever the formal structure adopted, flexibility must be maintained and authority kept strong if opportunities are to be seized when available. Of course, the organization should be of the profit type, for private enterprises with financial incentives have been the most successful in America.

Public Interest and Investment It is not the intent of the writer to submit any radical thinking in dealing with the subject of public participation in the development of South Bay. However, it should be pointed out that the community has definite responsibilities that should be met. In principle it should hold its elected representatives liable for the well-being of its industries.

In regard to the development of the South Bay area, there are several items that concern the community directly:

1. The City of Boston is directly accountable for the creation of two serious nuisances, the sewage that is discharged into the Bay and the operation of the garbage wharf. The site cannot be economically utilized until these handicaps have been eliminated. In the matter of the sewage, the Commonwealth must also bear some of the responsibility; for in failing to care for this problem when the main interceptors were built, they but postponed the solution. Current construction will extend the outfalls of the main interceptors from Moon Island out to President Roads, the approach channel to the harbor, in the continuing fight against contamination of the harbor. In the meantime, every rain brings foul effluence and sludge into the Old Harbor at the mouth of the Fort Point Channel.

Similarly, the disposal of the storm-runoff water that is drained by the Bay is, in part, the joint responsibility of the City and the Metropolitan Sewer Commission. The estuary is a natural body of water and as such the community has the right to use it for drainage purposes. However, in such a case, with a serious nuisance

to be cared for at the same time, it is only reasonable for both the municipality and the State to assist in installing closed conduits.

2. It is suggested that perhaps the City of Boston might do well to reappraise its valuation of vacant land, at least in areas designated as industrial. From one point of view high taxes lend the title holder added incentive toward developing the property; but those same high taxes also raise the price of land higher than that on the periphery or in nearby communities and it cannot be sold.

Almost any vacant land in central Boston is considered to be valuable, but the record of development in the South Bay speaks for itself. Each year there are fewer worth-while plants in the neighborhood, and the "South End" continues to decline. It is quite possible that the entire tract would have become tax delinquent if held by interests other than a railroad, which has quasi-public trusts to discharge.

From the other viewpoint, different interests might have shown more initiative in developing the land profitably.

It should be noted that no subsidy is asked for the area; for such a discriminatory practice cannot be

justified, nor can a community benefit by weakening its tax power. However, a reconsideration of tax policy might confirm the opinion of some Boston business men that a lowering of the taxes on vacant land would result in new construction, with the City collecting more taxes on the improved land in one year than they do in ten under the present system.

3. Finally, the public should take as active a part as possible in the promotional work of the District. By helping to attract sound industries to the site, the community helps itself, and may be more assured of influencing the screening of applicants.

Interest and Investment of Private Enterprise There would probably be two or more private parties involved in the development organization. Under the circumstances it would appear that at least two are essential in this particular area - the New York, New Haven & Hartford Railroad, and a bank or one of the insurance firms.

The railroad stands to gain by any development of the area. It is suggested that they assume the leading role, leasing the land to the District organization. A definite separation of corporations is needed to assure flexibility of action, but representation in

the District could be by directors or other stockholders of the railroad.

A bank or insurance firm would meet the indicated need for both capital and experience in financial matters. Most of the profit from the undertaking is likely to be made through the extension of credit to tenant industries. Thus, the combination of capital and land, of banking operations and transportation services, would form the main structure of the development agency.

Administrative Policies There is no need to treat the details of the operating policies to be followed. In general they will follow those previously discussed in this study.

The services offered to the industries that locate in the District should be as complete as possible, supplementing those offered by the community, compensating for any deficiencies in local services, and enlarging those specialties that are desired by the industries that move into the area. By nature they will be administrative, engineering, architectural, financial, operative, protective and maintenance. Many of them will be paid for on a fee basis and cannot be provided until a number of plants can share in the cost; however, the organization

is warned against starting without adequate service attractions. Initially, they must expect to operate at a deficit.

A development program must be adopted that will encompass the work to be done in the foreseeable future. Basic studies of industry and of the needs of particular industries must be carried on continuously in the search for new tenants and means of making the District a better location for industry. Above all, the concerns that move into the District must be kept satisfied. A good word from one industrialist using the site is worth a carload of promotional literature.

The reputation of the District and the amount of outside aid it receives are dependent for the most part upon the individuals in charge and upon the policies that they pursue. Close liaison should be maintained with management and labor organizations and with civic promotional groups or agencies. The district management and the local Chamber of Commerce can work together toward the common goal of securing desirable industries. As the District grows, the number of applicants will increase and the need for good "screening" policies will become even more acute. In this regard, the following questions have been suggested as an aid to proper selection of industries:

1. Will there be odors, harmful fumes, or distracting noises?
2. Is there already an unhealthy concentration of similar enterprises?
3. Will the new industries cause harmful local competition?
4. Will their labor policies conflict with local ones?
5. Do they have a low wage and labor exploitation record?
6. Will their labor requirement unbalance the local supply?
7. Do they employ seasonal labor?
8. Will the benefits balance the costs to the community?
9. What major purchases will they be making outside of the community?
10. What is the record of their business operations- do they have ethics?¹

In screening or selecting industries for the South Bay District, it would be interesting to find more definite guides for evaluating the applicants. Certainly statistical methods are not necessary. As has been pointed out previously, any firm meeting the requirements of the District administration for admittance would in all probability be at least a potential asset to the community. However, simple procedures could be established for comparative studies of industries in regard to their value to the enterprise or to the community.

¹McDonald, op. cit. p. 126.

Such a basis for evaluating the direct benefit of an industry to the municipality is projected by William Stanley Parker,¹ based on an Income and Cost Survey conducted in the city of Boston. Essentially, it is a balance sheet of debits and credits, with the taxes paid by the industry per employee and the percentage of payroll spent locally per employee compared with the cost of providing municipal services (schools, utilities, fire and police protection, etc.) to the plant and to the employee, over and above that paid for out of his rent. Knowing the tax rate and land assessment on the plant and assuming a labor force of 40 employees per acre (national average for centrally located industries - 30 per acre),² and figuring the costs to the community of the type of housing that corresponds with the income of the worker, a computation is possible. The following balance sheet is a composite of those suggested by Mr. Parker.

¹William Stanley Parker, The Economic Relation of An Industry to Its Community. Boston, Mass. State Planning Board, 1936.

²V. Roterus, S. Keyes, R. Van Schaack, "Future Industrial Land Requirements in the Cincinnati Area," Annals of Assoc. of Am. Geographers, Vol. XXXVI, June, 1946, #2, pp. 111-121.

Composite Form of Balance Sheet

	<u>Credits</u>	<u>Debits</u>	<u>Net Credits</u>	<u>Net Debits</u>
Taxes on plant	X			
Cost of services to plant		X		
Net credit or debit			?	?
Taxes on residences of employees	X			
Cost of services to residences of employees		X		
Net credit or debit			?	?
Indirect taxes from spendable income	X		?	
			<hr/>	<hr/>
			?	?
			<hr/>	<hr/>
			?	?
Total profit or loss to community			?	?

The results obtained in this way would necessarily be modified by other more intangible factors, such as effect of a plant on surrounding land values, attraction of related or ancillary industries, effect on efficiency of municipal operations, effect on local employment and labor structure, and various types of social ramifications.

IX. SUGGESTED PROCEDURE FOR EVOLVING THE PHYSICAL PLAN

The drafting of a physical plan for an area should be preceded by the survey or fact-finding work. It must be an end-product - the interpreted factual studies and the estimates and policies of the entrepreneur, combined by the technical skill of the designer.

The following procedure is submitted for evolving a physical plan for the South Bay Industrial District:

1. Make complete studies of the engineering, economic, and social aspects of the site. Some of the possible items or subjects covered by these studies are:

(Engineering) - Borings to determine structure and mechanical properties of the soil; historic map studies to locate sunken wharfs or roadbeds; solutions to sewerage problems; traffic patterns and flow; condition of roads and bridges; pressures, depths and condition of utility mains; conformity with local building code; zoning and requirements of municipality for dedication of roads. (Economic) - Primarily toward the establishment of economic advantages for the District; comparison of attributes of the site with analyses of the requirements of specific industries and indices of movement; tendencies to cluster in industries already located in

Greater Boston; translation of factors influencing location and operation into monetary costs or economies; possible means of financing changes in the railroad track pattern; chart of comparative costs and economies for specific items in the region. (Social) - Characteristics of workers; improvement of housing and community facilities for the worker; kinds of recreation and shopping facilities that might be provided in the District; possibilities for medical clinic for workers' families; social effects of development upon the community.

2. Adopt a continuous study of the needs of industry and of the competitive position offered by the district.

A chart of the basic costs and economies of the District for specific services and materials might be used by the industrialist to compute the net balance for his plant and thus determine whether or not he desires to move to the District. (Example: Differentials may be obtained between water and rail transportation by location and by product.)

3. Locate and design such features or installation as may be definitely fixed. The municipal incinerator and pumping plant fall into this category with set locations.

4. Adopt basic design policies. Selection of type of rail pattern, size of blocks, building standards, whether plants will expand onto contiguous land or move to larger-plant section of tract, etc. (Development from several nuclei, by nature of use, is suggested here.)

As an aid to selection of specific design features, the following sections have been taken from an article by Walter Baumgarten:

"Curving tracks need to be kept within a maximum curve of 20 degrees (288-foot radius) or sometime 19 degrees (323-foot radius) for the operation of regular engines. To avoid complications at the cross-street intersections, tracks are usually kept at the ground level, thus necessitating the raising of the ground floor of the building or at least of the shipping platform (commonly 8 feet wide) to car-floor level, 3 feet 8 inches above the rail. Very rarely tracks are depressed so as to lower the car-floor level to the ground, because a horizontal distance of 200 feet at maximum grade and vertical curvature is required to reach the desired level, and street intersections are usually not far enough apart to make this practicable."¹

¹ Walter C. K. Baumgarten, "The Location and Planning of Industrial Areas," City Planning, Vol. 9, April, 1933, p. 63-64.

"The Chicago Clearing District, provides super-blocks of 40 acres each, on three sides bounded by streets and on the fourth by the classification yard of the Belt Railway of Chicago. From this side, lead tracks bisect each super-block diagonally, switches and sidings being branched off at 45 degrees, wherever needed, thereby resulting in small frontage for each property and relatively large depth. This tends to locate the larger industries requiring more railroad service closest to the yards, leaving the smaller properties toward the far end of the diagonal. Short dead-end streets give access to interior lots if required. This serving of the area in a diagonal manner provides railroad accessibility to all parts of the area and gives the greatest capacity of switch track with the least area of ground. It also permits subdivision of the property into parcels of practically any size needed."¹

5. Coordinate development and design policies with basic activities of the district. The relationship between warehousing, transportation terminals, loft buildings, "incubators," heavier industries, wholesale

¹Baumgarten, ibid. pp. 66-68.

trade and administration should be worked out schematically.

6. Adapt this schematic plan to the site. The relationships between activities should remain the same, but the pattern will vary with other influences.

7. Adjustment of the resulting plan with changes indicated by progress of the promotional work.

* * * * *

While this thesis has not produced a plan for the development of South Bay, it is hoped that it might stimulate interest in this goal and that it has indicated the potentialities of that site for development as an organized district.

* * *

APPENDIX A

This appendix contains an outline of Dr. Homer Hoyt's techniques for measuring the economic background of an area for an industrial analysis, and a primary tabulation of industry in the city of Boston, applying Hoyt's techniques to classify them as basic or service. The results point out the need for a statistical boundary for the Greater Boston Industrial Area. Studied alone, on the basis of employment, practically all of the industries in the city are basic. If this study were repeated for all of the other towns that make up the actual industrial area, a workable tabulation might be obtained.

Similarly, a consolidated study of employment trends for the Greater Boston Industrial Area might be of some value in planning facilities for new industrial growth.

To determine the amount of basic employment in any region:

1. Secure from the U. S. Census of Manufactures the total number employed in any given line, and then compute the percentage of the number employed nationally in that line.

2. If the total number employed is greater than that city's percentage of the U. S. population or purchasing power, the excess may be attributed to basic employment.
3. The percentage of total national buying power may be obtained from the Sales Management. This index is applicable for clothing, automobiles, luxury and semi-luxury goods. For food, the percentage of national population in the community should be used as a measure of local consumption.¹

Industrial Analysis

1. Determine the trend in employment for each basic industry.
2. Compare this with national trend.
3. Divide industries into 4 classes:
 - A. Increasing more rapidly than the national rate
 - B. Increasing but less rapidly than the national rate
 - C. Losing wage earners, but less rapidly than the national rate
 - D. Declining faster than the national rate.

Industries in "A" should continue to grow unless abnormal factors obtain. Those in "B" may decline because they are being carried by national movement.²

¹Homer Hoyt, Principles of City Growth & Structures.
Cambridge: mimeo. M.I.T.

²Hoyt, ibid.

APPENDIX A

Classification of Industry as Basic or Service¹ by Employment

The City of Boston

<u>Census Group</u>	<u>Industry</u>	<u>No. employed locally</u>	<u>No. employed nationally</u>	<u>Classification</u>
8	Books, Publishing, Printing	574 406 26	25,630 - -	B
20	Brushes	476	7,891	B
1	Candy	2,100	49,740	B
2	Cigars	182	54,262	S
9	Cleaning and Polishing Prep	100	9,978	B
4	Clothing, Women's	633 375 529	2,672 22,179 21,405	B
7	Paper Products	217	21,775	B
4	Curtains and Bedspreads	1,000	1,109	B
14	Cutlery	864	15,399	S
9	Drugs and Medicines	451	22,386	B
15	Electroplating	94	8,206	B
8	Electrotyping	104	4,412	B
4	Embroideries	128	84,189	B
14	Enameled Ironware	164	1,186	B
15	Metal Engraving	40	1,419	B
8	Engraving, Printing	112	5,353	B
14	Fabricated Steel	120	35,477	S

¹Basic industries defined as those producing goods for people living outside of the region.

Appendix A, continued

7	Fiber Cans and Containers	95	6,637	B
20	Fire Extinguishers	22	995	B
1	Flavoring Extracts	77	3,589	B
1	Food	107	13,120	B
17	Food Products Machinery	48	13,979	S
12	Footwear, Except Rubber	2,113	218,028	B
4	Fur Coats and Trimmings	69	13,111	B
8	General Commercial Printing	1,950	96,039	B
16	Generating Apparatus	560	70,401	B
8	Greeting Cards	885	7,522	B
20	Handstamp, Stencils, etc.	63	2,211	B
14	Hardware	132 791 202	35,645 10,961 27,833	S
6	Household Furniture	348	94,760	S
12	Leather Belting and Packing	25	2,337	B
17	Industrial Machinery	136	21,936	B
20	Jewelry Cases	342	5,127	B
15	Jewelry	32	-	S
3	Knit Underwear	220	38,536	B

Appendix A, continued

15	Lighting Fixtures	36	20,477	S
1	Liquors, Alcoholic	135	4,091	B
8	Lithographing	379	26,000	B
17	Machine Shop Prod.	512	60,717	B
1	Malt Liquors	360	36,088	B
6	Mattresses and Springs	368	18,342	B
1	Meat Packing	551	119,853	B
4	Hats and Caps	85	3,383	B
4	Suits, Mens' and Boys'	471 3,118	48,456 10,012	B
13	Mirrors	141	89,031	S
20	Misc. Fabricating	101	13,608	B
4	Misc. Textiles	121	5,852	B
20	Models and Patterns	116	5,566	B
1	Non-alcoholic Beverages	184	21,265	B
9	Paints	95	22,334	S
7	Paper Boxes	906	62,530	B
6	Store Fixtures	235	13,826	B
9	Cosmetics	23	10,363	S
1	Pickled Fruits	59	9,908	B
5	Planing Mills	40	-	S
1	Preserves	142	3,717	B

Appendix A, continued

4	Raincoats	553	2,323	B
4	Robes	41	7,377	B
11	Rubber Products	276	50,692	B
1	Sausages and Prepared Meats	353	11,277	B
15	Sheet Metal Work	252	18,749	B
	Signs	233	17,206	B
14	Steam Fittings	341	21,815	B
20	Surgical Supplies	71	8,468	B
9	Dyes, Tanning Materials, Mordants	22	2,716	B
17	Textile Machinery	108	21,904	S
4	Trimmings (dress)	191 113	5,553 3,728	B
6	Upholstered Furniture	319	29,948	B
4	Blouses	66	5,109	B
4	Dresses	888 1,540	49,742 53,996	B
4	Work clothing	733	56,959	B

APPENDIX B

Relative Importance of Basic Industrial Location Factors

(The results of several studies by indicated agencies)

This appendix is intended as a simple checklist for evaluating the relative importance of the basic factors influencing the location of industry. Naturally, it could be expanded many times but should suffice to indicate that: (1) seldom are two such lists exactly alike; (2) the same factors have approximately the same range or standing in each; (3) that the results obtained from questionnaires and interviews differed sharply with the opinions of production engineers and economists.

On the basis of these facts one might seriously question whether an analysis of locational factors was worth while and if the conclusions drawn from it would be valid. Regarding this, the following statement by Mr. E. M. Hoover indicates that, in spite of seeming contradictions, the material has definite value in organizing an industrial district.

"We must accept reluctantly the conclusion that no accurate statement of the relative importance of various locational factors for an industry or even an individual plant is possible. Fortunately, such a statement is not

necessary for the rational location of individual plants, Moreover, even the rough and qualified weightings of locational factors which the industry analyst can make are quite useful. In a particular case certain factors can be eliminated as of negligible importance and attention directed to the more significant items."¹

¹ Hoover, op. cit. p. 332.

Source: F. E. Lawrence. Is Tax Exemption Effective?
South Carolina State Bul. 9.

An interesting contrast between results of
experience and interviews.

<u>Experience</u>	<u>Interviews</u>
1. Raw materials	1. Attitude and record of local authorities
2. Markets	2. Industrial laws
3. Power and fuel	3. Taxes
4. Transportation	4. Suitable locations with respect to trans- portation, plant faci- lities, related industries, living conveniences, etc.
5. Labor	5. Financial aid (small ind.)
6. Climate	6. Personal reasons.

Source: Homer Hoyt, Principles of City Growth and Structure, M.I.T. mimeographed.

New plants are attracted by:

1. Low taxes
2. Lower cost of labor
3. Lower cost of power
4. Low cost of buildings or locations
5. Low cost of raw materials
6. Low cost of transportation to markets for finished products.

In the manufacture of textiles, labor is very important. Factors are weighed differently for each industry.

In any area where all other advantages are equal, any special site offering a single advantage will attract industries to it.

Source: Metropolitan Life Insurance Co. ibid.

Reasons for Plant Location

	Food	Textiles	Machinery	Leather	Chemicals
Markets	1	2	1	3	1
Labor	4	1	2	1	3
Transportation	3	4	3	6	2
Materials	2	6	6	4	4
Available Buildings	6	3	4	2	5
Power & Fuel	7	5	8	-	7
Near Related Industries	8	-	-	5	8
Living Cond.	5	7	7	7	6
Financial Aid	-	8	5	8	-

Source: Metropolitan Life Insurance Co. Industrial Development for a Community. Bul. 105. New York, 1937.

Based on a study of 1943 communities for the period of 1926-1927. Indicated the difference between the relative rank in New England as compared with the country as a whole.

<u>Factor</u>	<u>National</u>	<u>New England</u>
Markets	1	3
Labor	2	1
Transportation	3	4
Materials	4	5
Available factory buildings	5	2
Personal reasons	6	7
Power and fuel	7)	8
Cheap rent	8)	
Near related industries	9	6
Living conditions	10	-
Financial aid	11	-
Taxes	12	-
Mergers and consolidations	13	-
Cheap land	14	-
Near parent company	15	-
Bank facilities	16	-

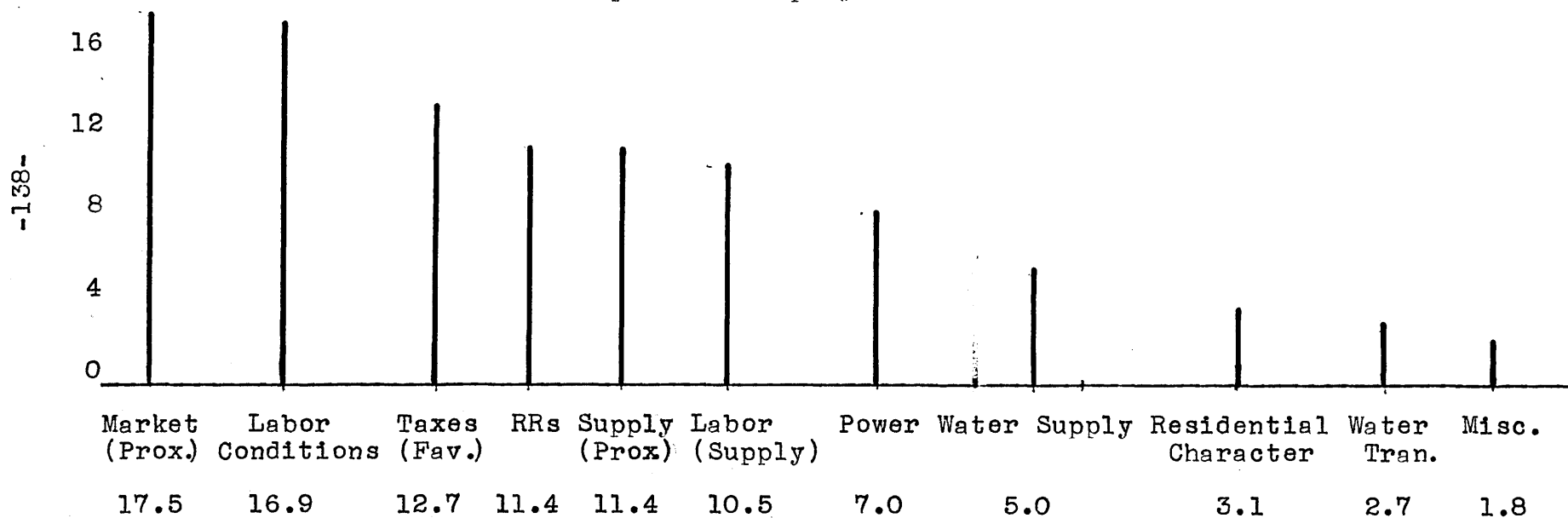
Source: Basic Industrial Factors, A Guide for Evaluating an Area's Resources for Industrial Development. U. S. Dept. of Commerce, C. S. Logsdon, p. 1.

Generally speaking, nationwide, there are fourteen basic factors governing industrial evaluation of plant location. They are as follows:

- A. Location of Production Materials
- B. Labor
- C. Sites
- D. Power
- E. Water
- F. Industrial Fuel
- G. Transportation Facilities
- H. Proximity to Market
- I. Distribution Facilities
- J. Favorable Competitive Position
- K. Living Conditions
- L. Compatible Laws and Law Trends
- M. Reasonable Tax Rates
- N. Climate

Source: Pictograph - Sales Management, Nov. 1946.

Based on interviews of several hundred important company heads.



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