A GEOGRAPHICAL STUDY

OF

THE DEVELOPMENT OF HAMILTON HARBOUR

by

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INTRODUCTION

The St. Lawrence Great Lakes Waterway offers many advantages to the land through which it flows. The basic and most important of these is that it provides navigation into the interior of the Continent.

In some places where the water is either naturally or artificially protected, harbours develop, where ships may find shelter. At various points along the waterway, towns also become established. Where these locate at a harbour site, the town or city may become a port, that is a depot for the loading and discharging of water-borne cargo. Hence the City of Hamilton may be referred to as the Port of Hamilton because it is a commercial and industrial centre for ships. Hamilton Harbour however is that land-locked body of water otherwise known as Burlington Bay.

As a result of this inherent connection between the city and the harbour, the nature of the city is reflected in the activity along its waterfront, and any sizeable expansion of the city will generally result in a proportionate growth of waterfront activities. Conversely, an increase in the harbour's activities will create a larger and more prosperous community.

However, very often a city knows too little about its harbour. The unique characteristics of waterfront land, and the value which it holds for the community are overlooked and taken for granted. Often it requires some emergency or some dramatic

new development to shatter the complacency. This has been generally accomplished in Ontario by the initiation of the construction of The St. Lawrence Seaway, which, when completed, will enable larger ocean-going ships to penetrate farther into the Continent than ever before. Waterfront communities have become conscious and very proud of their harbours, and each port hopes for a great future. As an example of its own enthusiasm and interest, The Hamilton Harbour Commission has given its support to this thesis which deals with the formation, utilization and future potentialities of Hamilton Harbour and the adjacent lands. The study has three general objectives; to point out the factors, both physical and human, that influence the use of the land adjoining the water; to describe the land use pattern that has developed; to suggest a scheme for future land use.

Although geographers do not agree on a definition of their subject, most do agree that it deals with the way in which man, in seeking a livelihood, strives to establish a working relationship with the land or sea. For practical reasons, the world must be divided into convenient regions to which the geographical approach may be applied. These regions may be defined by several varying criteria, depending on the interests of the observer. But, whatever the basis for delimitation, a geographical study includes a discussion of the physical formation and present nature of the region and the activities of man therein.

In this report, the area under investigation is Hamilton Harbour and the adjacent lands. On the east and west, the two gravel and sand bars which form natural boundaries of the bay have been included. On the north, the limit has been set at Highway No. 2 and on the south, at Burlington Street-Beach Road. These boundaries have been chosen because of the nature and extent of riparian rights.

"Although water is public in navigable bodies, the owner of land bordering on a lake or stream acquires certain rights in the water by reason of his ownership of riparian land which non-riparians do not enjoy." [1] The Highway, and the Burlington Beach Road boundaries represent major stretches of publicly owned land across which riparian right will not likely be extended.

The first chapter of the report deals with the physical nature of the bay, including its formation, the physical characteristics resulting from its formation, and the subsequent modifications to the natural harbour by man.

The next section deals with the present use man is making of the harbour area. This survey of the present utilization indicates a pattern which is significant in establishing the direction in which future port development may be expected. Finally, the future development of the Harbour is discussed in relation to the country as a whole and, more specifically, to the City of Hamilton.

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[1] Ely & Wehrwein; Land Economics; (1952) page 367

CHAPTER I

PHYSICAL FORMATION OF THE HARBOUR

Burlington Bay is such a neat, clear-cut entity that it is difficult to imagine the long turbulent geologic history through which the area has passed. Through a period of many millions of years, a series of events has taken place to produce the bay at the western end of Lake Ontario. The results of five separate periods of construction may be seen in the topography of the area at the head of the lake. From the Precambrian era to the Miocene epoch (see Table 1) the rock structure was established. In the Pliocene epoch, streams eroded the rocks and were the dominant geomorphic agents in the area. During the Pleistocene epoch, or the Ice Age, there was erosion and deposition by various proglacial lakes. After the Pleistocene, streams once again became dominant. Finally, in more recent times, the area underwent erosion and deposition by Lake Ontario.

Because the structure is relatively simple and the present topography is a result mainly of immediately pre-glacial, glacial and post-glacial activity, relatively little space has been devoted to the very early geologic times. Processes of the Pliocene, Pleistocene and Recent epochs will be dealt with in more detail.

1. Rock Structure:

The oldest rocks of the Continent are Archean crystalline

TABLE I

GEOLOGIC COLUMN & TIME SEALE (as recognized by the U.S. Geologic Survey) [1]

ERA	SYSTEM OR PERIOD	EPOCH	APPROXIMATE AGE IN 1,000,000 yea
		Recent	
	Quaternary	Pleistocene	
		Pliocene	
Cenozoic		Miocene	17
		Oligocene	
	Tertiary	Eocene	
		Paleocene	58
	Cretaceous		
Mesozoic	Jurassic		
	Triassic		
	Permian		
	Carboniferous		214
	Devonian		255
Paleozoic	Silurian		
	Ordovician		350
	Cambrian		440
PreCambrian			600
			1600
			1800

[1] Gilluly, Waters & Woodford, Principles of Geology, (1953) Page 163

igneous formations. During the Precambrian era, these were worn down to form a gently rolling peneplain. The weathering of this upland continued until Palaeozoic times when a vast sea flooded the area. In the shallow waters of this sea, sand, mud and shells were accumulated. With time, these became consolidated into sandstone, shale and limestone, and covered the old Shield.

Towards the end of the Palaeozoic era the region was uplifted and tilted, and stood above the level of the surrounding sea.

Less resistant rocks, like the shales, were readily worn away, but the harder sandstone and dolomitic limestone resisted the weathering agents. By this process of differential erosion, a series of limestone cliffs were formed. The most important of these was the Niagara Escarpment, to the north and east of which lay the broad, unsymmetrical erosional valley which we now call The Ontario Basin.

Continued uplift in the central part of the Continent caused the rejuvenation of rivers which radiated from the centre toward the south, east and north. The concomitant formation of mountains on the west coast precluded rivers flowing in that direction. As the rivers continued to erode, the sedimentary rocks, the drainage system became more complex, and the Escarpment became more pronounced. There were no Great Lakes.

Erosional agents tend to work toward an equilibrium which, in topography, is represented by a relatively flatter landscape called a peneplain. Hence, as the rivers continued their process

of erosion, relief became more subdued. With gentler slopes, the eroding power of the rivers was diminished and streams came to be sluggish. The once great valley carvers had become relatively impotent. The cycle was nearing completion. But processes within the earth's crust caused the land to be uplifted and the equilibrium was upset. Gradients were once again steepened and the eroding process was resumed with great intensity.

A series of alternating peneplanations and elevations continued until the middle of the Palaeozoic era. In the Hamilton area, the latest rocks are those of the Devonian period, hence it is unlikely that any major geologic movements occured from the middle Palaeozoic to the late Cenozoic.

2. Pre-Glacial Stream Activity:

From Devonian times up to the Pleistocene streams were the major erosional agents in this section of Southern Ontario. The downcutting of streams was more rapid on the weaker rocks forming valleys or lowlands between the ridges or uplands of more resistant rocks. This structural control of the drainage system created a trellis stream pattern and a vale and cuesta type of topography.

There are two conflicting theories regarding the nature of the pre-glacial stream system in the region of the present Great Lakes. The two men whose work shall be discussed below, agreed on the most important fact, that the basins of the Great Lakes were fundamentally features formed by the

erosion produced by the pre-glacial streams; that the basins were not scoured by glaciers, but that the ice flowed along the valleys of these rivers because they afforded the paths of least resistance. Both men also agreed that the Dundas Valley was carved by a great pre-glacial river, but from here their views differ.

Professor J. W. Spencer believed that the Dundas Valley was the gorge of an eastward flowing river (see figure 1). He said "The Dundas Valley is not of glacial origin for a river has been found capable of excavating it, and also, the walls are perpendicular, not characteristic of glacial erosioned features. Striae are not parallel to the axis of the valley."[1] The river to which he referred was called by him The Erigan. It flowed along part of the course now occupied by the Grand River and emerged through the Escarpment via the Dundas Valley. Before the Niagara River existed, drainage from the Erie Basin to the western end of Lake Ontario followed this path. According to Spencer, the Erigan joined the Laurentian River, the ancestor of the St. Lawrence, in the western end of the Lake Ontario Basin. "Borings in the vicinity (of the Great Lakes) reveal buried valleys as deep as 470 feet. These determine the channel of the ancient Laurentian River from Lake Michigan through Lake Huron, Georgian Bay and Lake Ontario. Between Georgian Bay and Lake Ontario, it is buried beneath drift deposits."[2]

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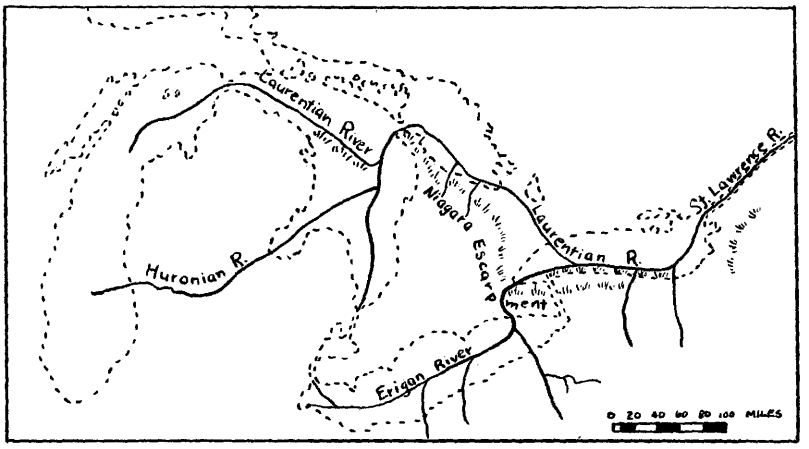
[1]Spencer, J.W.; An Ancient River; (1881) page 3

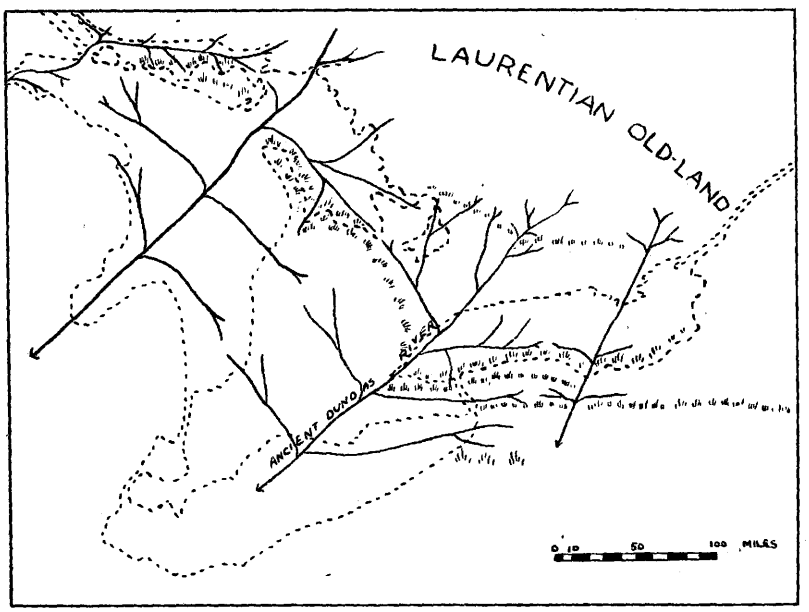
[2]Spencer, J.W.; The Duration of Niagara Falls and The History of the Great Lakes; (1895) page 19



PREGLACIAL DRAINAGE OF THE GREAT LAKES REGION

AFTER J. W. SPENCER

FIGURE 1



DRAINAGE OF THE EASTERN GREAT LAKE REGION IN TERTIARY TIME

AFTER A. W. GRABAU

FIGURE 2

There is also a buried valley, between Lakes Michigan and Huron, which Spencer called The Huronian River.

Professor A. W. Grabau reversed Spencer's theory. He said that the Niagara Cuesta was breached by a westward flowing river which he called the Dundas River (see figure 2). He said that it was a great master consequent stream flowing from the Old Land on the north east, in a manner consequent to the original slope of the surface. During the process of drainage development, subsequent branches to the main stream were established. These met the consequent stream acutely or at right angles. Also common in an area of slightly dipping sedimentary rocks of alternating hardness, are obsequent streams, which flow in an opposite direction to consequent streams. That is, in this section of Ontario, according to Grabau, the obsequent streams flow in a northeasterly direction toward the old land of the Shield. Applying these principles to the section of Southern Ontario with which we are concerned here, Grabau said "Subsequent streams continued to widen the east-west lowland areas while the transverse valleys of the consequent remained narrow." [1]

He considered the Dundas Valley too broad and continuous to be an obsequent valley and therefore flow northeastward. Rather, he said, that "its position at the elbow of the Escarpment is suggestive of consequent

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[1] Grabau, A.W., Guide to the Geology and Palaeontology of Niagara Falls and Vicinity; Albany, N.Y. (1901) page 43

origin, for we would expect the face of the cuesta to make a reentrant where the master stream gathers its converging tributaries and flows out through a breach in the cuesta" [1] Grabau said that the Dundas River undoubtedly became tributary to the Mississippi.

It is not the purpose of this study to determine which of these two drainage patterns is correct, or in fact, if either one is correct, or if both are correct. Neither theory is unquestionably accepted by geologists. We may conclude, nevertheless, that the head-of-the-lake area was under the influence of river action from as early as Devonian times, and that these streams carved the valleys which were much later to be occupied by the Great Lakes.

3. Pro-Glacial Lake Erosion and Deposition:

As far as we know, the Pleistocene in this area may be divided into four separate glacial periods. Only the last of these, the Wisconsin glaciation, which covered all of Ontario and extended to Southern Ohio [2] is relevant to this study.

Although the land surface was irregular, the surface of the ice which covered the land, was smooth. Hence the ice varied in thickness. As the climate began to grow warmer, the ice melted. Land ridges which were relatively close to the surface of the ice cover were the first to be exposed, leaving isolated patches of ice, known

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[1] Ibid, Page 43

[2] Chapman & Putnam; The Physiography of Southern Ontario,

as lobes, in the valleys.

As the melting proceeded, the southernmost parts of the various lobes gave way to crescent-shaped lakes. These were "pro-glacial lakes", that is, they were formed in front of the ice by melt waters of the lobe. They were dammed up on one side by the restriction offered by the ice remaining in the lobe, and on the other by moraines of glacial debris which the ice had deposited on the land. For a time, this process continued in the basins of all the present Great Lakes except Ontario. While the Ontario basin was still covered with ice, Niagara Falls did not exist (see figure 3) and drainage from the pro-glacial lakes proceeded into the Mississippi.

A number of pro-glacial lakes occupied part of the Dundas Valley but the most important of these in the physicial formation of Hamilton Harbour was Lake Iroquois. The ice in the Ontario basin began to melt and the lobe "withdrew to the eastern end of the Lake Ontario Basin, uncovering the entrance to the Mohawk Valley at Rome, New York, thus initiating Lake Iroquois" [1] (see figure 4) When this outlet was uncovered, water level in the lake dropped.

Then there was a halt in the climatic change, and, as a result, the ice barrier stood relatively stationary in the region of the Thousand Islands. This dam of ice persisted for seven to eight thousand years, during which

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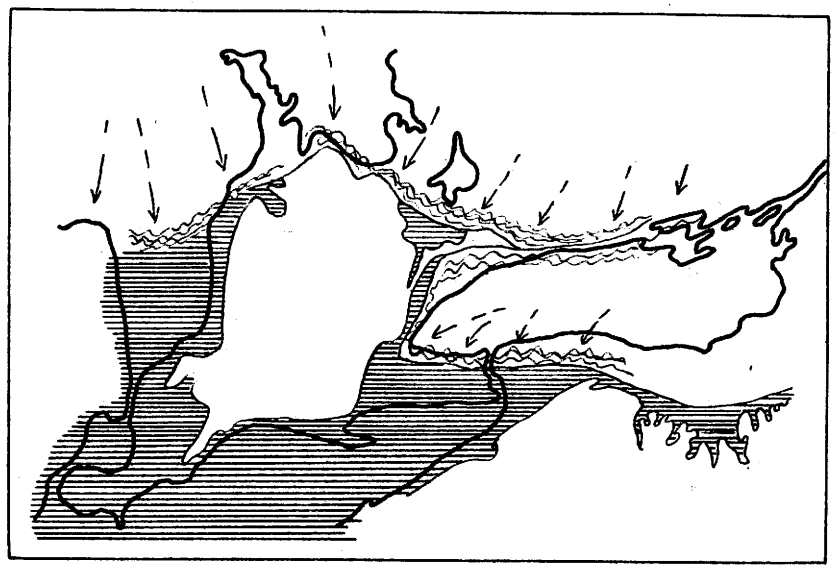
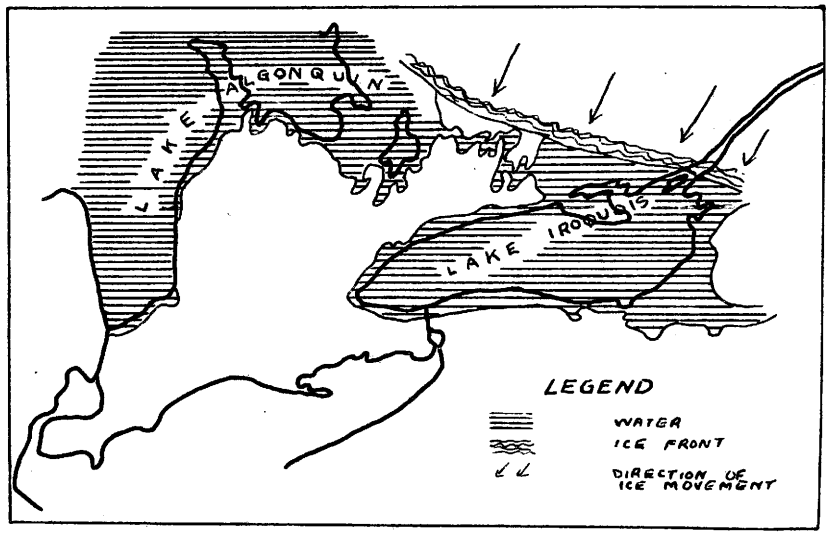
[1] Ibid, Page 33



THE TIME PRECEEDING LAKES IROQUOIS AND ALGONQUIN

FIGURE 3



THE TIME OF LAKES IROQUOIS AND ALGONQUIN

FIGURE 4

After Chapman & Putnam.

time, the lake developed a well-defined shoreline. In the shallow waters of Lake Iroqois, a flat sandy lake plain was formed. This plain has since been exposed. It is extensive along the south shore of the bay and is the site for most of the City of Hamilton. Along the north shore, however, it is much steeper and narrower.

The broader shore development on the south may be explained by the Coriolis force - that force which causes moving bodies in the northern hemisphere to be diverted to the right, and in the southern hemisphere to the left. Hence, in Lake Iroquois, moving particles of gravel and sand would tend to be diverted toward the right. The particles were carried by the force of waves caused by easterly winds. On the north of the lake, this diversion would cause a steep piling up of sand along the land of the north shore. On the south however, the particles would be diverted toward the interior of the lake rather than toward the land, thereby allowing a more extensive area for sand deposition. On the north, the shore tended to be steep, whereas on the south, it developed into a broad flat plain.

This explanation is valid only if the sand particles are being carried by currents from the east. "Wave energy is proportional to the square of wind velocity, the length of the fetch, and the water depth." [1] Hence despite the tendency for prevailing winds from the west in this latitude,

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[1] Wood, H.A., Erosion on the Shore of Lake Erie-Point Aux Pins to Long Point (1951) Page 19

the most powerful and destructive winds in the Burlington Bay area came from the east. Similarly, in Lake Iroquois, the great fetch of water to the east was the dominant factor in the formation of the lake plain; sand particles were carried mainly by easterly currents.

However, some sand and gravel particles were also carried by the waves caused by the westerly winds. Where the waves from the east and west met, the particles of sand and gravel were deposited. These deposits built up until they appeared above the surface of the lake. Thus the Iroquois Bar was formed. It is of fundamental importance in Hamilton Harbour since it forms the western boundary of the bay. In figure 5, the shoreline of the lake has been drawn following the general trend of the present 325 foot contour line which marks roughly the elevation of the top of the Iroquois Bar. Water occupied higher levels, but it remained at this stage for a longer time than the others, because of the many bars and wave-cut cliffs found at this elevation. The term coined for this level is Lake Iroqois.

Actually the Iroqois "Bar" consists of two spits. The southern branch extends in a north-westerly direction from the escarpment in the area now occupied by the western end of the City of Hamilton, to Grindstone Creek which flows from Waterdown into the bay, (See figure 6). The northern spit, extends from an area just north of Aldershot, trending in a south-westerly direction, as far as The Woodland Cemetery. The two spits were not continuous at the surface because

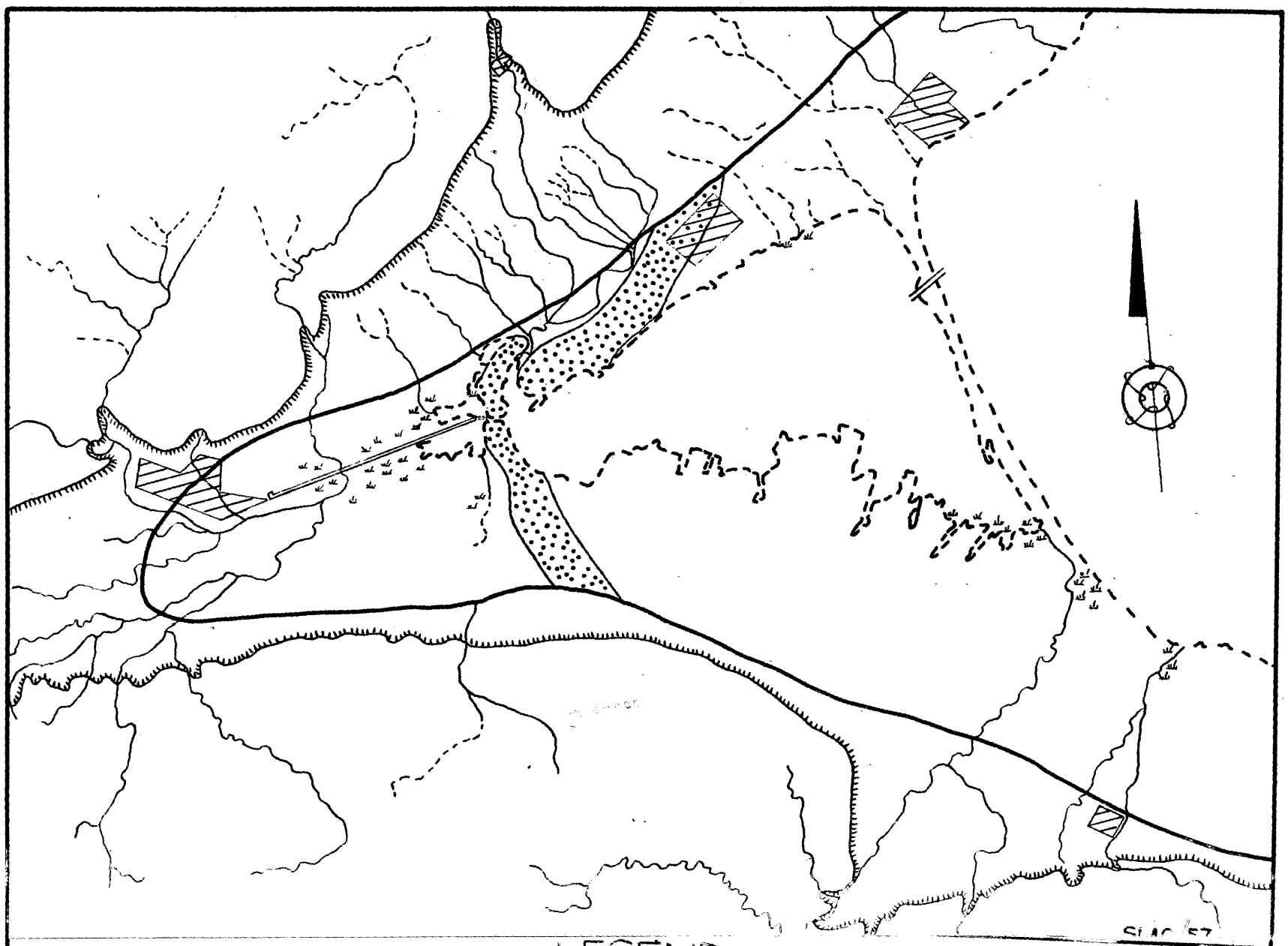
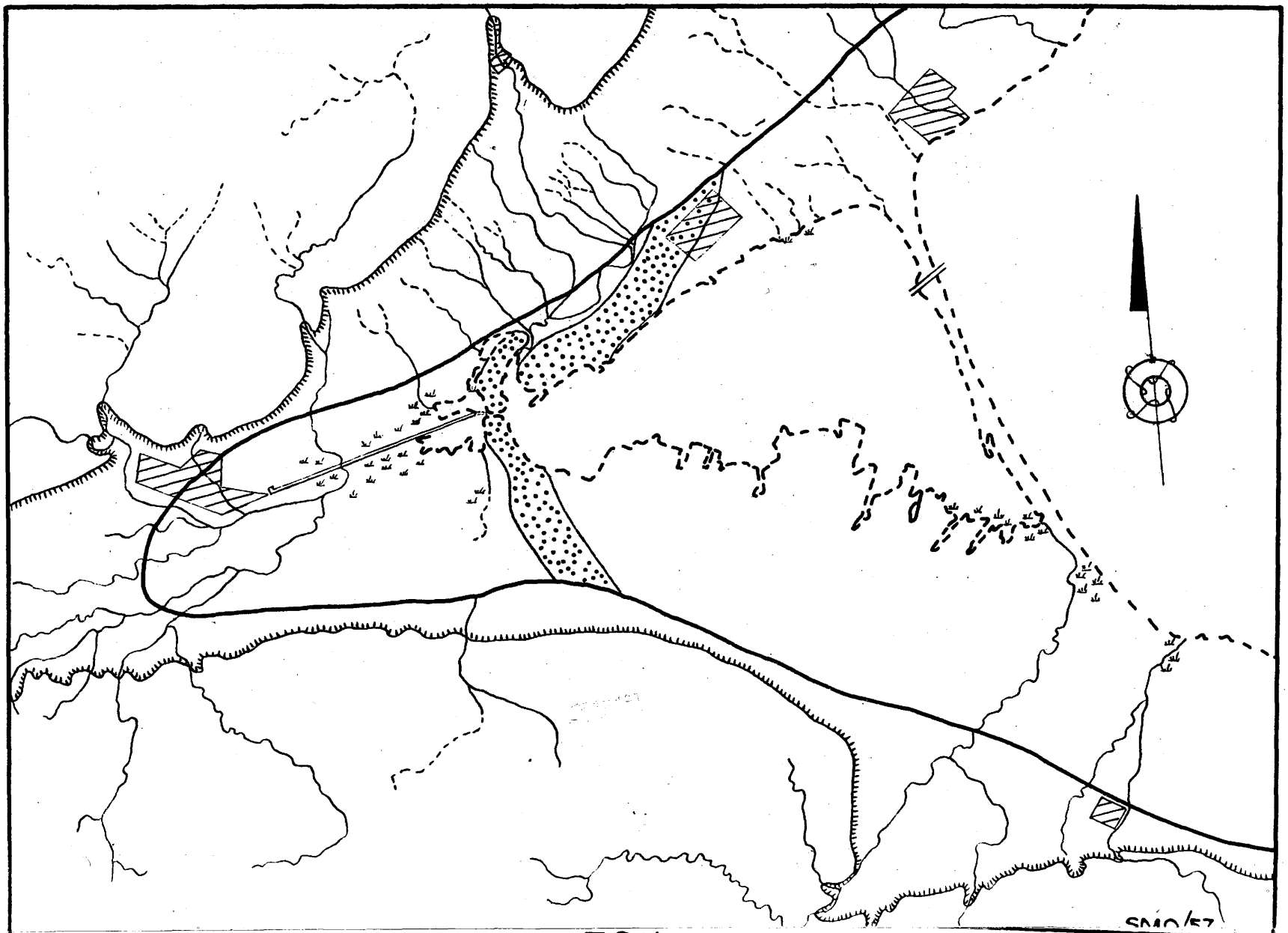

LEGEND
TEMPORARY SHORELINE L. IROQUOIS
PRESENT SHORELINE
IROQUOIS BAR
PRESENT DRAINAGE - PERMANENT
PRESENT DRAINAGE - INTERMITTENT
ESCARPMENT
URBAN CENTRES
SCALE 1:100,000

FIGURE 5


LEGEND
TEMPORARY SHORELINE
PRESENT SHORELINE
IROQUOIS BAR
L. IROQUOIS
PRESENT DRAINAGE - PERMANENT
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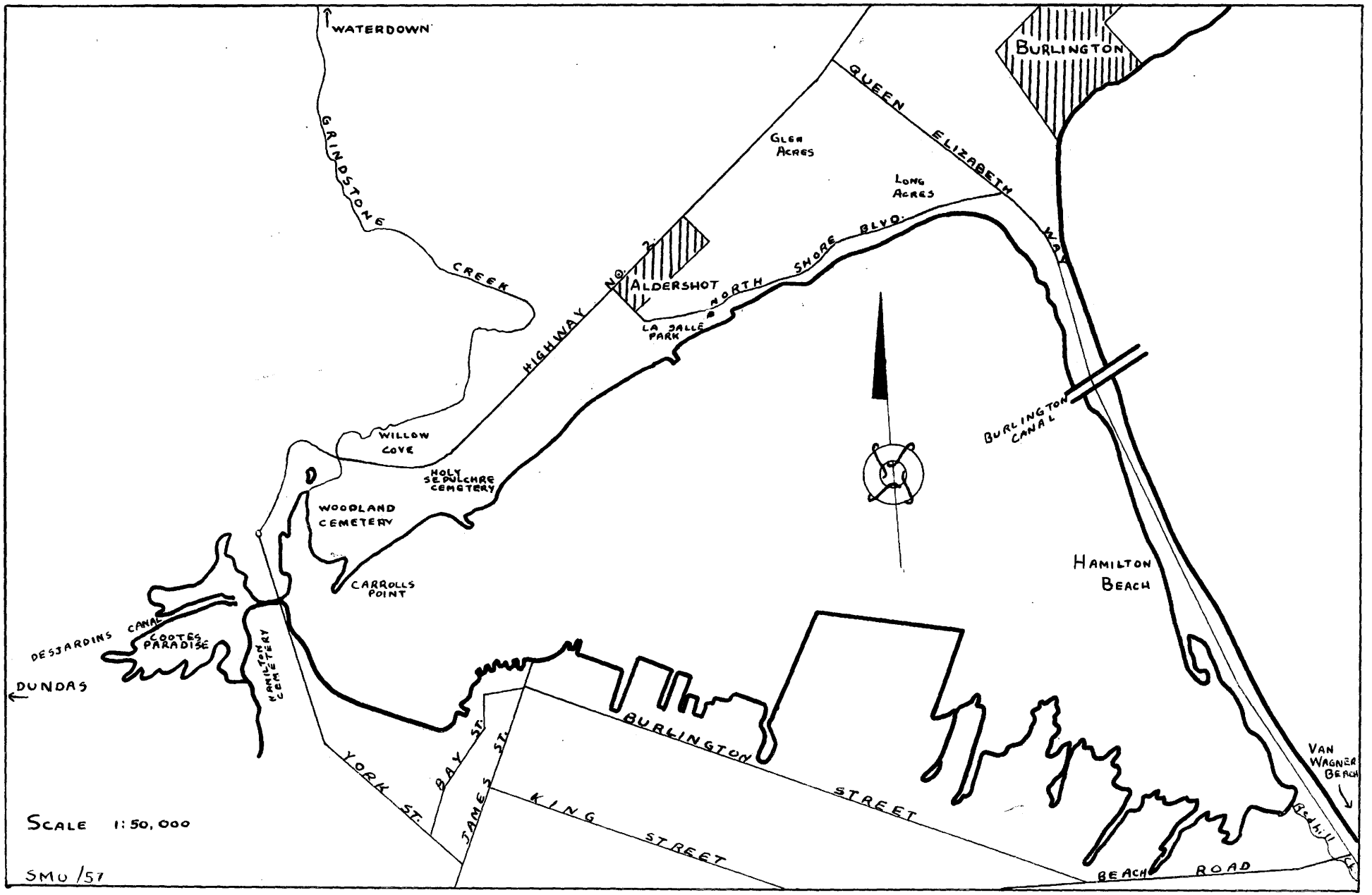
ESCARPMENT
URBAN CENTRES
SCALE 1:100,000

FIGURE 5



PLACE MAP

FIGURE 6

a channel was kept open by drainage from the Dundas Valley and from the north above the escarpment.

The lake plain built up most rapidly in the south-west where the amount of deposition was at a maximum. The trend of the present 275 foot and 300 foot contours in the vicinity of MacNab Street and Bay Street, and also the bluff which in some sections along Bay Street is twenty-five feet above the bay level, seem to indicate the possibility that another bar might have formed if Lake Iroquois had lasted longer.

"In the formation of beaches, there is a tendency to straighten crooked coast lines by the construction of bars in front of inlets, which are thus converted into bays or lagoons." [1] This occurred in Lake Iroquois. The southern arm of the Iroquois sand and gravel Bar separates the b ay, which is considered the eastern part of the Dundas Valley, from the western part in the vicinity of Cootes Paradise. This Valley, now filled with hundreds of feet of glacial drift, was a major avenue for drainage from the west. After the formation of the Iroquois Bar however, the free passage of silt and other sediments through the Valley was blocked, Cootes Paradise, or the "Marsh" began to take the place of the formerly open bay.

4. Post-Glacial Stream Activity:

Heretofore, Lake Iroqois had its outlet in the

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[1] Spencer, J. W., The Duration of Niagara Falls and The History of the Great Lakes, (1895) Page 29

vicinity of Rome, New York. Eventually, the ice lobe melted sufficiently to allow drainage to pass to the sea via the Lake Champlain - Hudson River route. Further melting of the ice opened the present route via the St. Lawrence River. Lake level dropped approximately 80 feet to 100 feet below the present level. This was an intermediate stage of lake development in the Ontario basin; it occurred between the times of Lake Iroquois and the more recent Lake Ontario. For ease of reference, the water at this stage may be referred to as Lake Kenilworth.

This lowering of the water level was sufficient to drain most of the water from the area now known as Burlington Bay, but there is no indication that it was completely drained. Swampy conditions were created in the Dundas Valley. Recent borings in the extreme south-east of the bay in the vicinity of Kenilworth Street have shown there to be varying thicknesses of peat found as low as 200 feet above sea level, or approximately 50 feet below the present bay level. [1]

Beginning in Iroquois times, the retreat of the ice lobe had exposed more and more of the Escarpment. Streams from the north, west and south flowed from the height of land into the Dundas Valley. This stream activity continued into the time of Lake Kenilworth. Streams from the south, though not sufficiently large to cut reentrants into the Escarpment, dissected the Iroquois Lake plain. Fewer and

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[1]Hurst, D., M. Sc. Thesis (In Preparation); McMaster University

shorter streams entered the valley from the north because of the blockade established by the northern arm of the Iroquois Bar. Grindstone Creek became the most important of these. An example of the transition from bay to lagoon or swamp is evident at the mouth of the Grindstone Creek. The water in the lower portions of the stream valley have become sluggish due to the deposition of materials near the mouth of the creek. Swamp conditions prevail now where once there was water continuous with the bay.

Farther west, Spencer Creek was the largest. These major streams flowed between the two arms of the bar into the swampy depression of the Dundas Valley. East of the bar, along the north shore, streams were smaller and the shore was steeper. Hence they were not effective in building deltas; they rather dug deep ravines in the fine-textured steep lands to the north.

5. Lake Ontario Erosion and Deposition

After the ice lobe withdrew from the eastern part of the Ontario Basin, the land which had been depressed by ice for long periods of time, began to rise. Since the eastern section of the Ontario basin had been subject to the ice load for the greatest length of time, it was uplifted to a greater extent that the western section at the head of the lake. By this process, the Frontenac Axis was uplifted, forming a partial dam for the surface waters to the west. The water of the lake began to rise toward that stage we now

recognize as Lake Ontario.

Finally, Hamilton Harbour was separated from the rest of the lake by the Ontario Bar. P. S. Van Wagner gives an interesting though inaccurate description of the formation of this bar. "Violent easterly storms would wear away the southern shore of the lake and drive forward before them the small stones, gravel and sand washed from the banks, and deposit them and also the drift, from the mouth of the Niagara, beyond a cape or projection in the shore immediately east of the present mouth of the Stoney Creek. The clay and other fine materials would be held in solution (suspension) by the motion of the water, and during a change of wind or a succeeding calm, be precipitated as silt on the bottom of the lake. As the stones, gravel and sand could not be returned by the comparatively feeble action of the north and north-west seas, they must have continued to accumulate, filling first the mouth of the lagoon directly behind the shore projection mentioned. Thence onward, along the mainland the deposit continued until it met the current at the mouth of the old Grand River (Redhill Creek). Here a struggle began between the accumulating sands, and the river's mouth is pushed aside westerly....." [1]

Actually, the Ontario Bar or the Burlington Beach Strip was formed in the same way as the Iroquois Bar had been, that is, the two major variables were the greater fetch of water to the east and the tendency for prevailing

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[1] Van Wagner, P.S., Formation of Hamilton Beach, (1882) Page 1

winds from the west. It is quite likely that this bar had its origins in Lake Kenilworth when the water level in the Ontario basin was lower than it is now. (As the level rose the bar moved farther west toward its present position.) It is probable, therefore, that had the bar development not begun in Kenilworth times, the present Ontario Bar would be farther west than it now is, and the Harbour would not be as large as it is.

In Ontario times, the beach grew in length and breadth until the completed bar enclosed the bay on its eastern side. A shallow channel at the surface was kept open by drainage from the Bay.

CHAPTER II

PHYSICAL CHARACTER OF THE HARBOUR

1. Nature of the Adjacent Land Areas and Shorelines:

The water level in Hamilton Harbour is at present approximately 246 feet above sea level. There are mean monthly fluctuations ranging from .71 feet to 6.57 feet.[1] In this report however, the elevation of the bay will be taken as 246 feet.

One of the most important physical features of Hamilton Harbour is its naturally landlocked character. The bay is confined on the east and the west by bay-mouth bars, the formation of which has been described.

On the west is the southern arm of the Iroquois sand and gravel Bar. It is approximately two miles long and lies eighty feet above the bay level. The surface of the bar is flat and the slopes to Cootes Paradise on the west and to Hamilton Harbour on the east are steep.

To the east is the younger Ontario Bar or Burlington Beach. It is a sand and gravel bar approximately five miles long and eight feet above the bay level. On the south-eastern side of the bar, in the vicinity of Van Wagner's Beach, high storm waves of Lake Ontario periodically cause much damage. This is because groins have been constructed farther east at Saltfleet to protect the shoreline in that area.

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1. Canadian Hydrographic Service, January 15, 1957 General Data of Lake Ontario

BLOCK DIAGRAM OF HAMILTON HARBOUR AREA

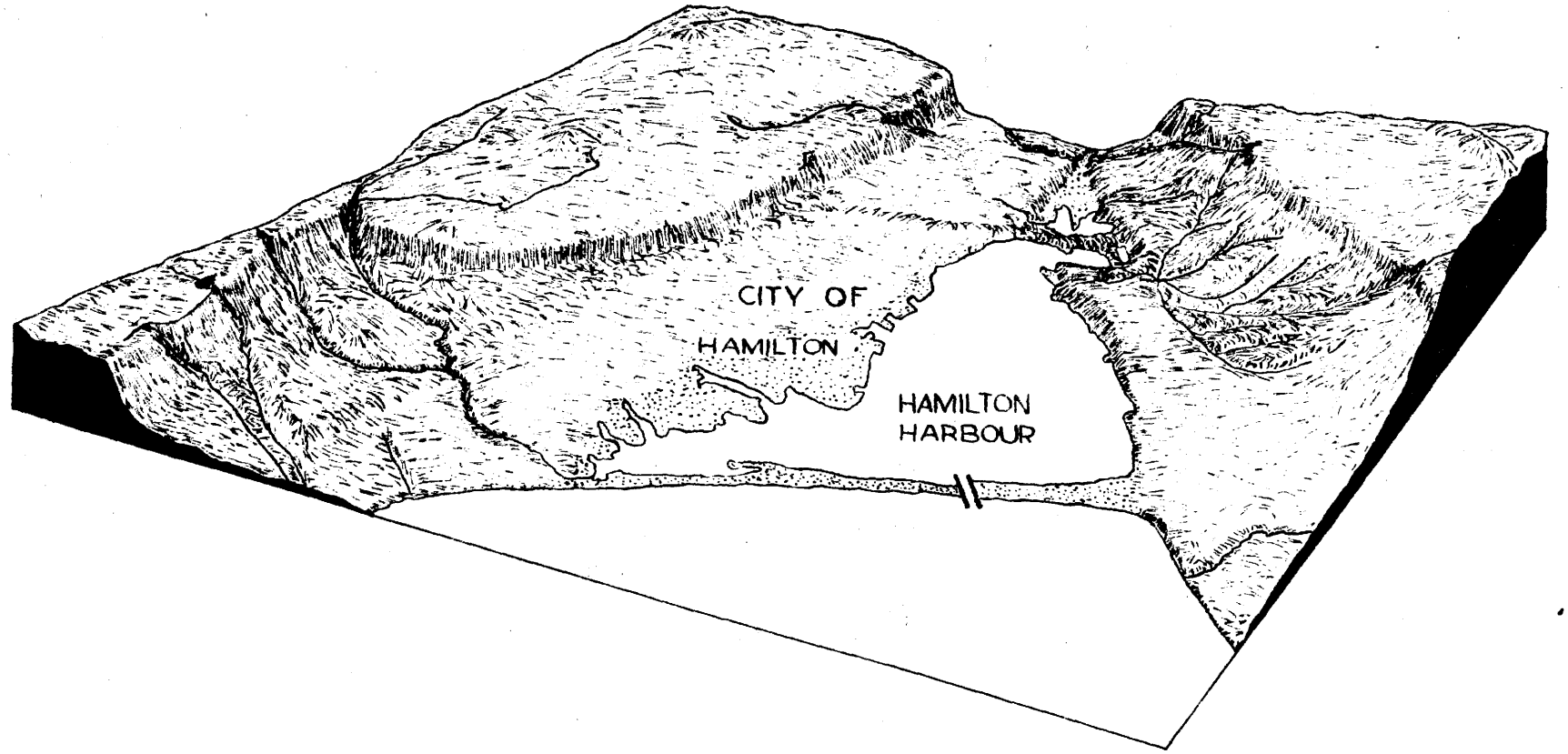

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FIGURE 7

Southern arm of the Iroquois Bar from the southwest. Note steepness of the sides and height of the bar above road level. On bar is located Hamilton Cemetery.

Northern arm of Iroquois Bar. On its western extremity is Woodland Cemetery. Shores are wooded.

"...the sand which a groin collects in front of it is prevented from moving further down the shore so that areas to the lee of the groin are robbed of the beach building material which would normally come to them, and are thus themselves exposed to more erosion than before." [1]
Hence the natural balance between wave erosion and sand deposition along the shoreline from Saltfleet to the Beach Strip is destroyed and Van Wagner's Beach suffers from periods of extreme erosion.

The north shore of the bay may be divided into two distinct sections. On the west, the north arm of the Iroquois Bar extends from Aldershot to Woodland Cemetery. The materials are of sand and gravel and reach as high as 100 feet above the bay level. Above the shore cliff, the surface of the bar is level. There are no gullies or permanent streams along the bar as far as La Salle Park, and, although there are some gullies in the vicinity of the park, they are not occupied by permanent streams. The bluff at La Salle is over 50 feet high.

East of Aldershot and of the Iroquois Bar, the slope to the water's edge is more gradual because this is a section of the sand plain of Lake Iroqois. The plain is interrupted by deep ravines which have been cut by the action of short intermittent streams flowing over the impervious sandy material.

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[1] Wood, H.A., Saltfleet Township, (1950) Page 151

The south shore is a low flat sand plain with an average elevation of 275 feet, or approximately 30 feet above the bay level. An early survey of the harbour (see figure 8) shows the greatly indented nature of this shore before the more recent reclamation.

2. Nature of the Harbour Bottom:

Information regarding the depths of water in the harbour and the type of material found at the harbour bottom, has been acquired from the Map of Hamilton Harbour, Number 2067, 1953, published by The Canadian Hydrographic Service. This data, as well as the pattern of circulation in the bay, are shown on figure 9. The 27 foot subsurface contour has been included because this depth is the limit of navigable water for the St. Lawrence Seaway.

The water level in the bay is 246 feet above the sea. The deepest section of the bay is 82 feet and is located approximately one and a half miles due north from the corner of Burlington Street and Sherman Avenue.

The water along the north shore is deep. The slope of the bottom of the bay from the shore to the 27 foot subsurface contour, is approximately 3.5%. From the shore to where the water is five to ten feet deep, the bottom material is sand. Farther out it is mud. In the northeastern bend of the bay and continuing along the Burlington Beach Strip, the bottom of the bay has a slope of approximately 1.2%. North of the canal, sand is found from the shore to where the water is 13 feet deep. This is the largest area

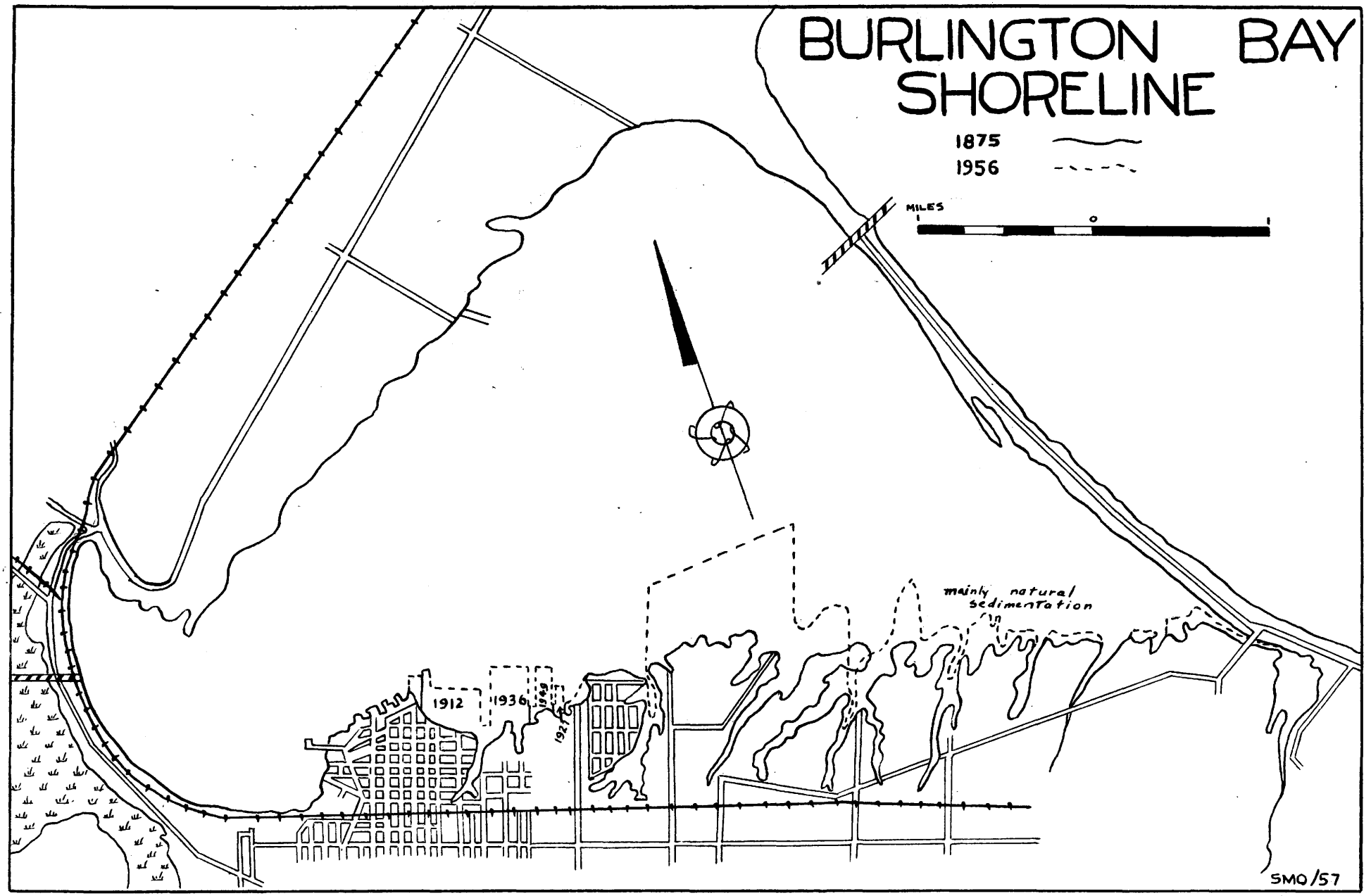

BURLINGTON BAY
SHORELINE
1875
1956
MILES
0
1
mainly natural sedimentation
1912
1936
SMO/57

FIGURE 8

One of the many ravines cut by intermittent streams on the north shore, east of Aldershot.

A section of the waterfront at Strathearne Avenue showing marshy, vacant land.

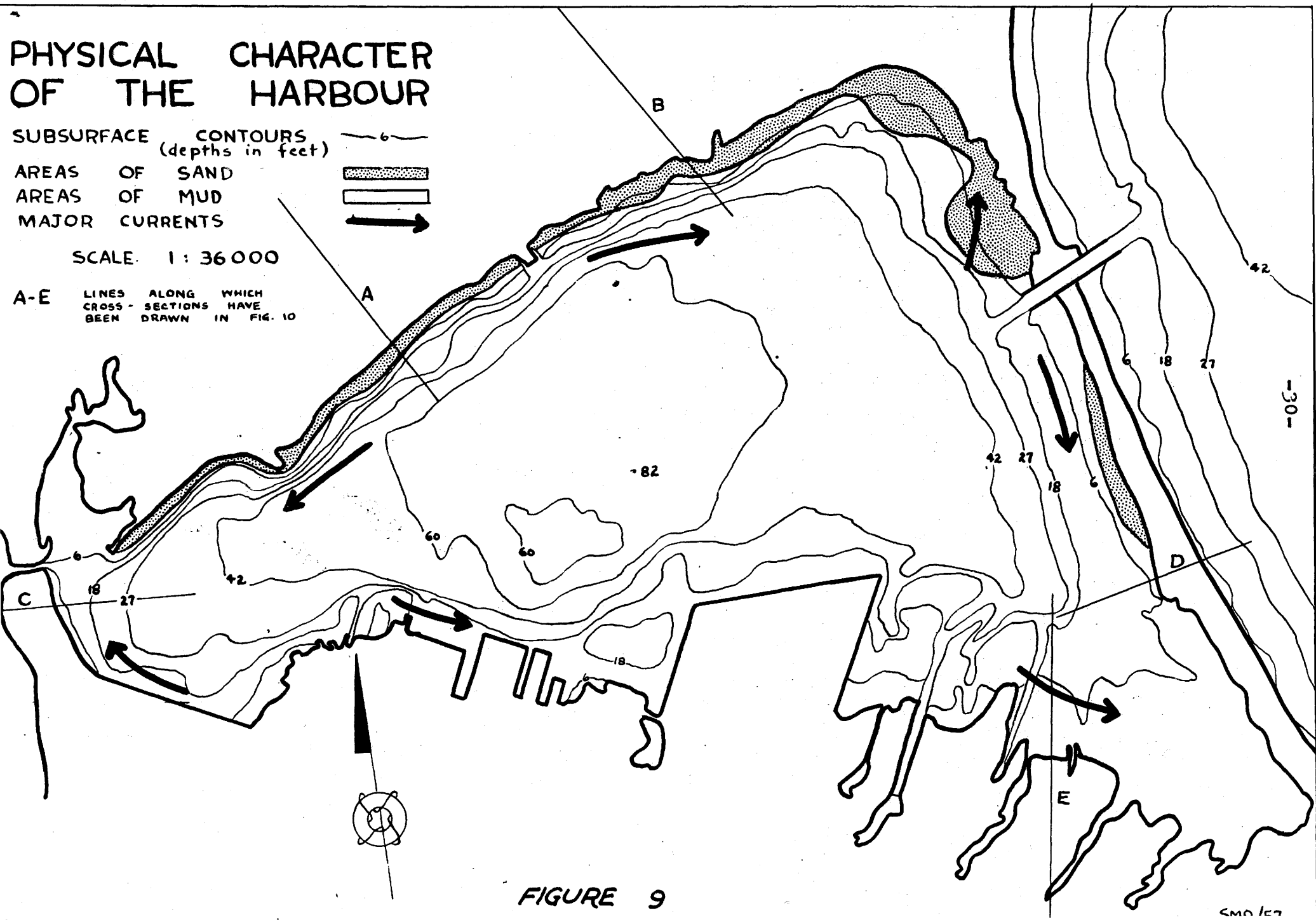


FIGURE 9

SMO/52

of sand deposition in the bay. It is due to the streams, east of Aldershot, along the north shore, which carry sand particles from the land into the bay. Where the water is deeper than 13 feet, mud is found. For a distance of one and one-half miles south of the Burlington Canal however, sand is less abundant and mud is found at shallow depths nearer the shore.

In the southeastern bend the water is very shallow and the harbour bottom has a slope of only 0.4%. Along the south shore, normal slopes where there has been no land reclamation, average 0.66%. The entire southern shore of the harbour bottom is composed of mud. There is no sand because there are no streams entering the harbour in these sections. At one time, most of the south shore was marsh. The water was very shallow and the lake plain flat. Hence silting up proceeded continuously. Since that time, much of the south shore has been reclaimed, but a large marshy area still remains in the southeastern corner of the bay.

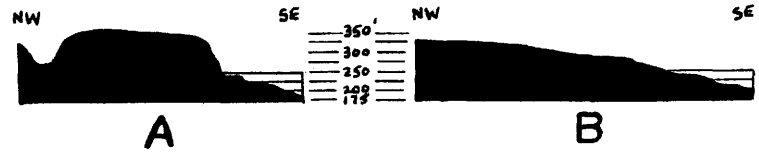
In the western end of the harbour, slopes taken from the Iroqois Bar to the 27 foot subsurface contour average 1.6%. Sand is found in the vicinity of Carroll's Point. North and west of this Point, mud is found - the result of silting up at the mouth of the Grindstone Creek.

3. Circulation of Water Within the Harbour:

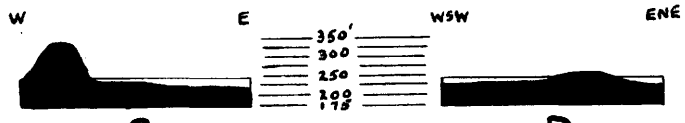
The circulation of water is, like wave energy, dependent on the wind, the length of the fetch and the water

CROSS SECTIONS ALONG LINES A-E SHOWN IN FIG. 9

HORIZONTAL SCALE 1: 50,000
VERTICAL SCALE 1: 6,000



A B



C D

E

SMO/57.

FIGURE 10

depth. In Hamilton Harbour the water depth is not significant because the area is so small. The wind and the fetch are the most important variables.

The pattern of circulation is shown on figure 9. Along any shore there is a zone of division where neither variable is dominant. Beyond this zone however, the dominance of one or other of the factors determines the direction of circulation Where the speed and direction of the wind are the dominant factors, the circulation is from west to east because the prevailing winds in this latitude are westerlies. Where length of fetch is sufficient to overcome the affect of the prevailing winds, circulation may proceed in any direction.

CHAPTER III

MODIFICATIONS TO THE HARBOUR

The first important modification to the harbour was the Desjardins Canal, begun in 1826. Its promoters hoped to attract lakes' trade to this area and make Dundas the leading port for the head of the lake. Their venture was successful for a time. All trade from the farming lands to the west passed down the Dundas roads and was loaded at the canal basin in Dundas for shipment to other points on the lake. Dundas grew as an important trading centre. The Burlington Canal, completed in 1833, was constructed as an aid to navigation for vessels whose destination was Dundas, not Hamilton.

Hamilton's impetus came in 1854 when the Great Western Railway was built, passing through the city. Goods were carried by rail to Hamilton, then transshipped by water. Because of a greater degree of relief in the lake plain at what is now the foot of James Street, marshy conditions were less extensive than in sections farther east. To the west of James Street is a bluff which in some places is 25 feet high (see page 18). The first docks were therefore constructed in the vicinity of James Street where relief and drainage conditions were the most suitable. James Street, therefore, became the main north-south thoroughfare in the city.

As early as 1836, there were two wharves.

MacNab's Wharf and Hughson's Wharf were also located in the area. In 1849 the MacKay Wharf was built at the foot of James Street to handle larger lake vessels. At the present site of The Royal Hamilton Yacht Club was the Zealand Wharf. Brown's Wharf at La Salle Park was, in the 1850's a transshipment point for primary products from the land north of the bay. These early wharves were almost entirely devoted to commercial shipping. There was little industry until the introduction of electricity in the 1890's. From that point on, greater modifications have been made to the shoreline.

The irregular shoreline of the south shore afforded miles of protected waterfront. This was very attractive to the lighter sailing vessels that carried the agricultural and forest products of the early nineteenth century. When the emphasis was placed on industry, the Steel Company of Canada and other large industries located along the waterfront. Larger steam ships were introduced, hence the shallow inlets were no longer an advantage and a long process of land reclamation and dredging was begun.

Until 1912 the Hamilton Civic Council controlled the bay waters. This control had been vested by the Crown in the Deeds of Incorporation of 1846. [1] Around the turn of the present century when electric power was brought to Hamilton and the city assumed a greater industrial importance than it had hitherto held, it became apparent that a continuing

---

[1] Hamilton Harbour Commission, The Port of Hamilton, Canada

executive should control Harbour policy. In 1912, by petition of the city, the Hamilton Harbour Commission was inaugurated by the Dominion Government. The Commission launched on a programme of land reclamation and dredging to help maintain the position of Hamilton Harbour in the rapidly growing industrial development of the country.

1. Land Reclamation:

The first great reclamation scheme was effected in 1912 (see figure 8) when the Harbour Commission built a revetment wall from its Catherine Street dock and warehouse, which had been constructed earlier, east to Wellington Street, and then south to Burlington Street. Behind this wall, land was reclaimed and to-day, H. M. C. S. "Star," Eastwood Park, and the Commission's Wellington Street docks and warehouses are located on this site.

Due to a growth in commerce, in 1927 Canada Steamship Lines built its own terminal on filled land at the foot of Wentworth Street.

When in 1932 the Welland Ship Canal was completed and the Burlington Canal had been widened and deepened, the harbour was opened to larger vessels. The Steel Company of Canada and Hamilton By-Product Coke Ovens constructed larger docks to accommodate the huge ore and coal carriers which had access to the harbour.

From 1936 to 1940 land was reclaimed between

Wellington Street and Emerald Street. Here was built the Harbour Commissions Terminal Number 1, adding 51 acres to waterfront lands. The land is now leased by the Commission to the Canadian Vegetable Oil and other companies.

In 1949, the Commission reclaimed 17 acres of land between Emerald Street and Wentworth Street. This is now Terminal Number 2, and is leased to private firms for the storage of coal and other bulky goods.

Private industry also did much land reclamation. A comparison of the two shorelines shown in figure 8 indicates the amount of reclamation along the waterfront between 1875 and 1956.

The Harbour Commission has begun to reclaim land north of Ship Street (see figure 12 D) between Wentworth Street and Hillyard Street. The new land will extend as far north as the Harbour Headline; a dock is to be constructed on it. The Harbour Headline, which is shown on figure 15 is the maximum extent to which reclaimed lands may reach in view primarily of the need of land for expansion and secondly of the laws and ease of navigation. The position of this line is established by the Department of Public Works and the Harbour Commission. The Harbour Commission Terminals Number 1 and 2, and the Canada Steamship Line dock coincide with the headline. It is conceivable that if the need should arise, the headline could be extended in that section of the harbour. At the Steel Company plant

at Wilcox Street reclamation to the headline is in progress, but there is much room for expansion by reclamation east of the Steel Company to the Beach Strip, and west of Bay Street to the Iroquois Bar. The docks at Catherine Street and Wellington Street may also be extended approximately 500 feet to the Harbour Headline.

2. Dredging:

Where land is being reclaimed, the water is shallow, hence, in order that ships be able to dock, dredging is necessary. The Harbour Commission docks for large ships have been dredged to 23 feet. These are at the James Street slip, Catherine Street dock, from Catherine Street to Wellington Street, the Wellington Street dock, Terminals Number 1 and 2, and the dock at La Salle. In order to accommodate the largest ocean going ships using the St. Lawrence, at least some of these depths will have to be increased. Whatever depths are maintained in Hamilton Harbour, it will still be necessary to dredge continuously because of constant silting up along the south shore.

3. Shoreline Modifications:

The Hamilton Harbour Commission had, as of April 1, 1955, 14,620 lineal feet of dock, (see appendix I). Of this 12,535 feet have been dredged to 23 feet. Small craft are accommodated at the docks of the Marine Dockyard and the Marine Garage near the foot of James Street, the Leander Boat Club and a section of the James Street slip. This totals 2085 lineal feet for smaller craft.

Land reclamation in progress between Wentworth and Hillyard Streets. This part of the Harbour Commission's project north of Ship Street. Sign reads "Dumping garbage prohibited - clean fill only."

The complicated dredging apparatus owned by J. P. Porter Co., Dredging contractors.

Also as of April 1, 1955, there were 21,462 lineal feet of privately owned docks. Of this, only 552 feet at the Royal Hamilton Yacht Club, are for small craft mooring. The remaining 20,910 lineal feet are for large vessels and are owned by Canada Steamship Lines, International Harvester, Steel Company of Canada, Dominion Foundries and Steel, Canadian Industries Limited and Hamilton By-Product and Coke Ovens. These privately owned docks offer an area of 126.18 acres (see appendix II). The Commission's owned docks offer an area of 77.5 acres, making a total dock acreage of 203.68.

4. Water Pollution:

Harbour modifications like land reclamation, dredging and dock building are essential characteristics of a progressive harbour. The most harmful and undesirable modification to any harbour is water pollution and this has progressed to a great extent in Hamilton Harbour.

Bacteriological tests have shown that the bay has been heavily polluted for years. As the city grew and as industry grew, pollution progressed. Bacteriological pollution from the city sewers is heavier than the chemical pollution of industrial wastes. [1] The degree of pollution at any period of time is dependent not only on the amount of waste discharged into the bay from public and industrial sewers, but also on the amount of rainfall which has fallen in that period of time. With greater rainfall, the amount of pollution will decrease. Ships entering the harbour contribute their share of pollution.

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[1] Private Interview, Department of Health, Hamilton, Ontario.

Local variations of pollution within the bay are produced from day to day by the wind direction. Because the bulk of movement in the bay is along the shore and because most of the pollution originates along the south shore, the north shore has a lower level of pollution.

As shipping increases, industry expands, and the city grows, pollution will increase. City officials anticipate this growth with the completion of the St. Lawrence Seaway. To counteract the increase in pollution which will result, the city is planning to construct a new sewage disposal plant which will do much to keep pollution down. This work must be begun soon in order that the disposal plant will be ready for use when the major increase comes. If the city takes steps against pollution, then industries, even now trying to keep contamination at a low level, may follow their example further.

CHAPTER IV

UTILIZATION OF THE HARBOUR AREA

Land utilization of the Hamilton Harbour area is characterized by distinct differences in emphasis between the north and south shores and the gravel and sand bars to the west and east. It is the purpose of this chapter to describe and analyse these land uses. The land boundaries of the area under discussion are shown in figure 12.

Maps produced by the City Planning Department from a 1950 survey have been used as a basis for the southern and eastern shores. The results of a more recent survey, made in 1956, were not complete at the time of writing, but portions of it have been incorporated in this report. The Planning Department's classification has not been followed. Whereas it distinguishes residential land on the basis of the number of family units, the classification in this report is based on the quality of the house. Also, there are fewer divisions in each major category in this report. Hence several types of industrial and commercial land have been grouped together. The small scale of these maps has necessitated a certain degree of generalization.

The mapping on the north shore was carried out by the author.

A:INDUSTRIAL LAND:

The early importance of industry in Hamilton, established around the turn of the present century, has increased. An observer's first visual impression of the

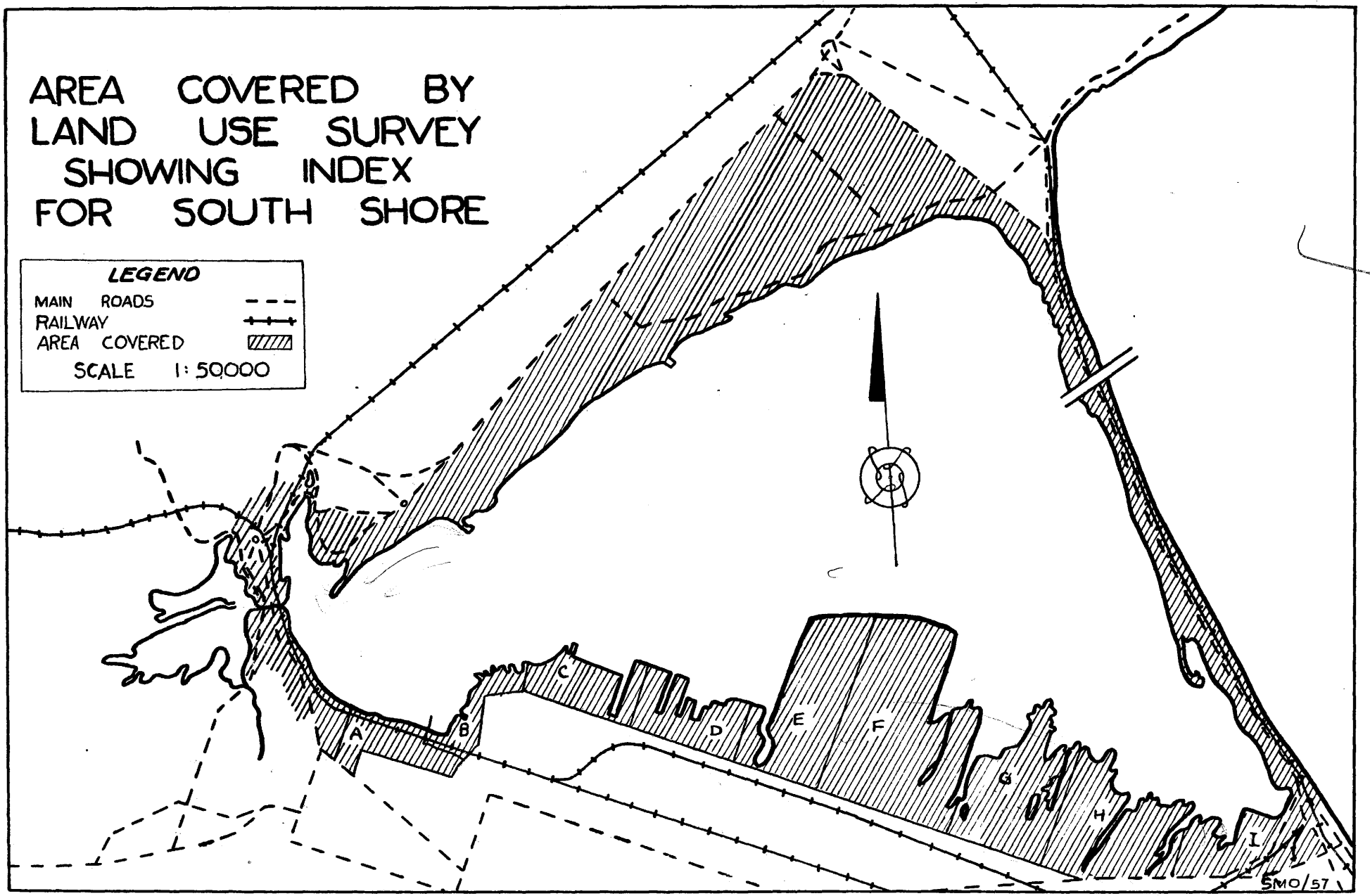
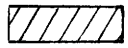

AREA COVERED BY LAND USE SURVEY SHOWING INDEX FOR SOUTH SHORE
LEGEND
MAIN ROADS
RAILWAY
AREA COVERED
SCALE 1:50000
A
B
C
D
E
F
G
H
I
SMO/57

FIGURE 11

DETAILED LAND USE

INDUSTRIAL

HEAVY 

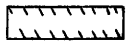
LIGHT & GENERAL 

COMMERCIAL

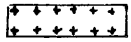
RETAIL CENTRES 

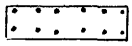
GAS STATIONS, TRANSPORTS 

COMMERCIAL DOCKS 

OFFICES, WHOLESALE DEPOTS 

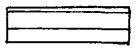
RESIDENTIAL

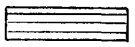
2nd CLASS 

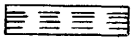
3rd CLASS 

4th CLASS 

PUBLIC & CIVIC

GOVERNMENT LAND 

WELFARE INSTITUTIONS 

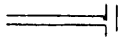
UTILITIES 

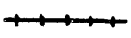
RECREATIONAL

PUBLIC OPEN SPACE 

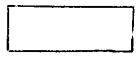
QUASI - PUBLIC 

TRANSPORTATIONAL

ROADS 

RAILWAYS 

VACANT LAND



SCALE 1" = 1460'

SMO/57

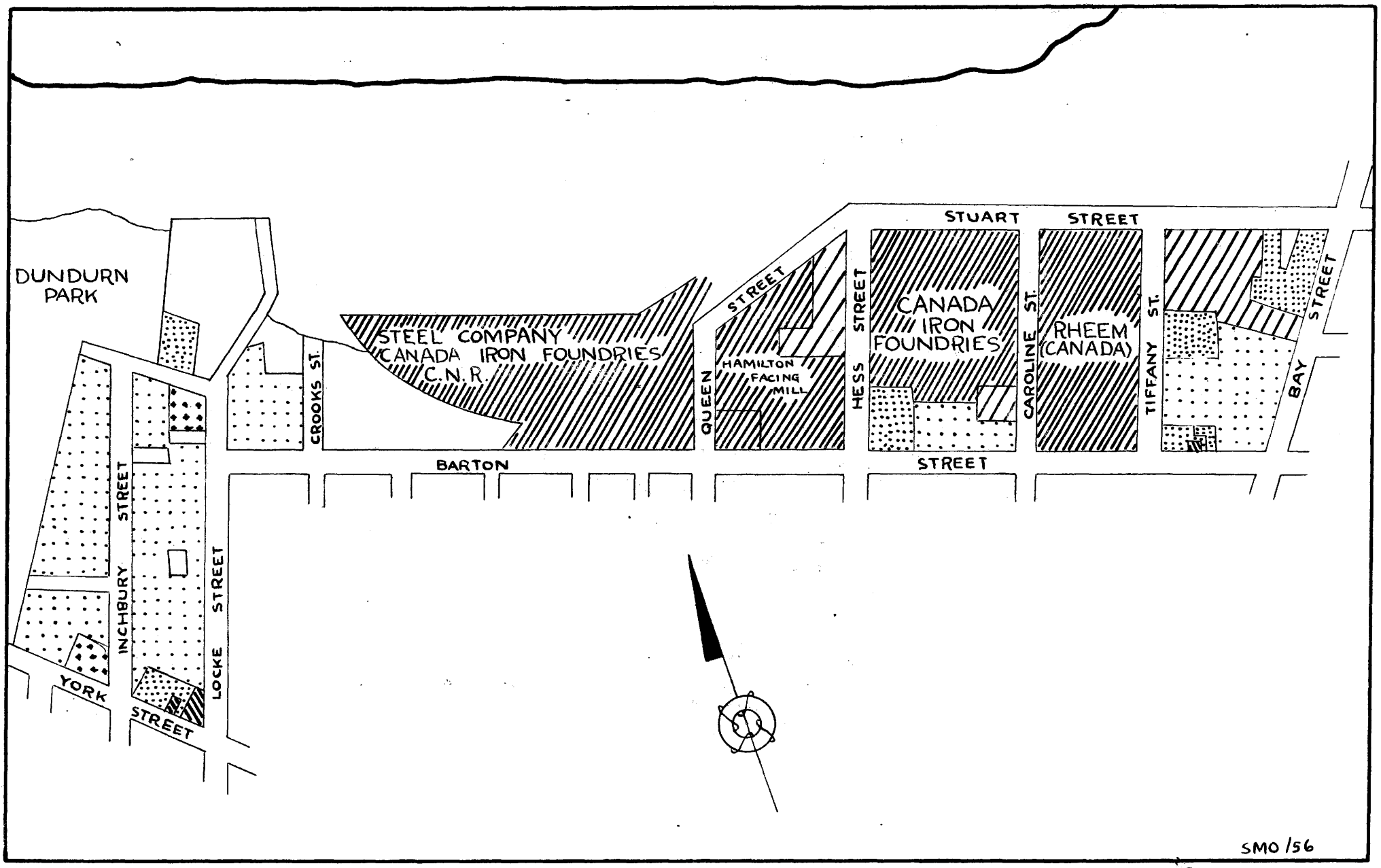
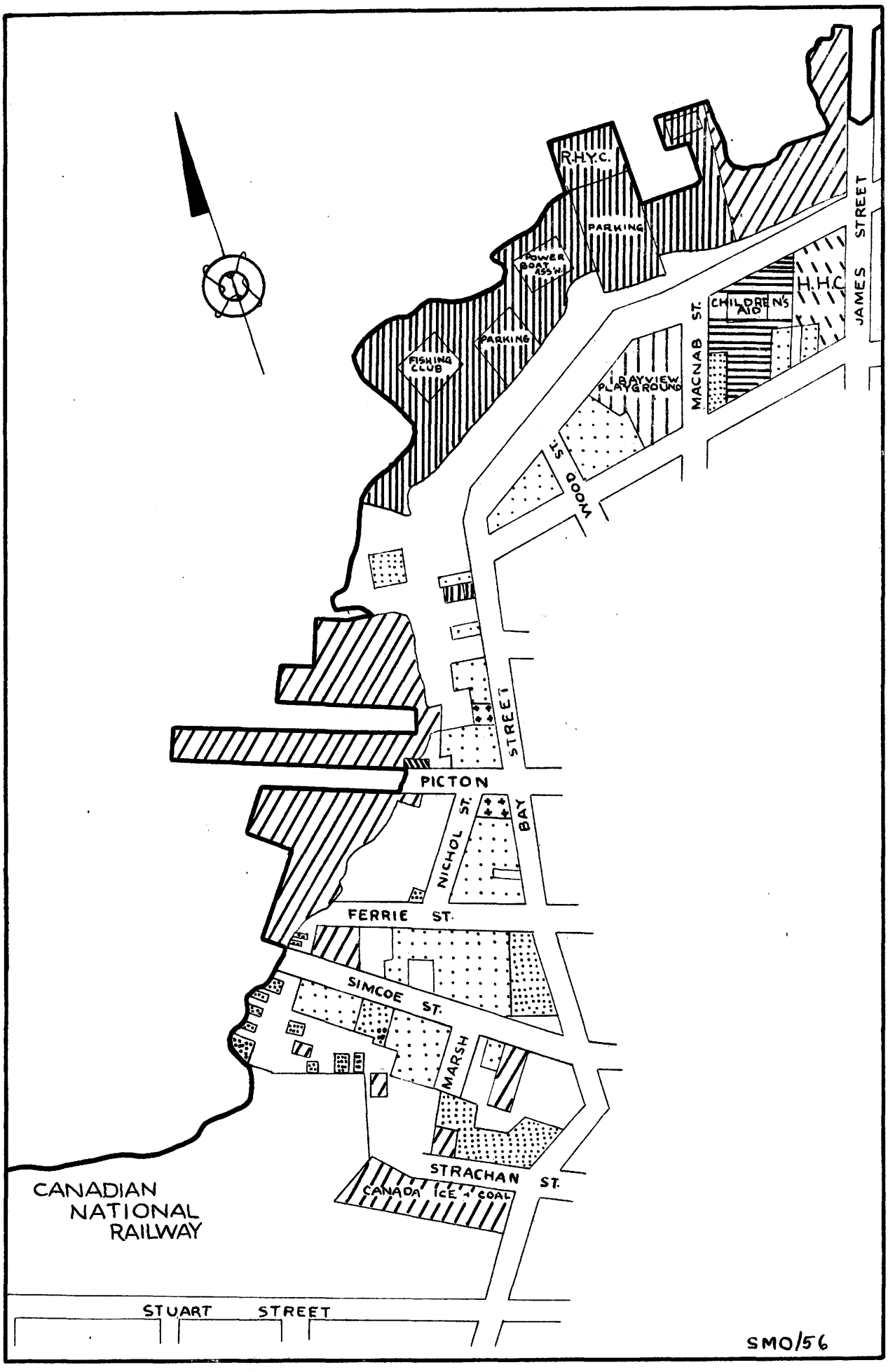

DUNDURN PARK
STEEL COMPANY CANADA IRON FOUNDRIES C.N.R.
CROOKS ST.
QUEEN STREET
HAMILTON FACING MILL
HESS STREET
STUART STREET
CANADA IRON FOUNDRIES
CAROLINE ST.
RHEEM (CANADA)
TIFFANY ST.
BAY STREET
BARTON STREET
INCHBURY STREET
LOCKE STREET
YORK STREET
SMO/56

FIGURE 12A


R.H.Y.C.
PARKING
POWER BOAT ASSN.
PARKING
FISHING CLUB
JAMES STREET
H.H.C.
CHILDREN'S AID
MACNAB ST.
BAYVIEW PLAYGROUND
WOOD ST.
STREET
PICTON
NICHOL ST.
BAY
FERRIE ST.
SIMCOE ST.
MARSH
STRACHAN ST.
CANADA ICE & COAL
CANADIAN NATIONAL RAILWAY
STUART STREET
SMO/56

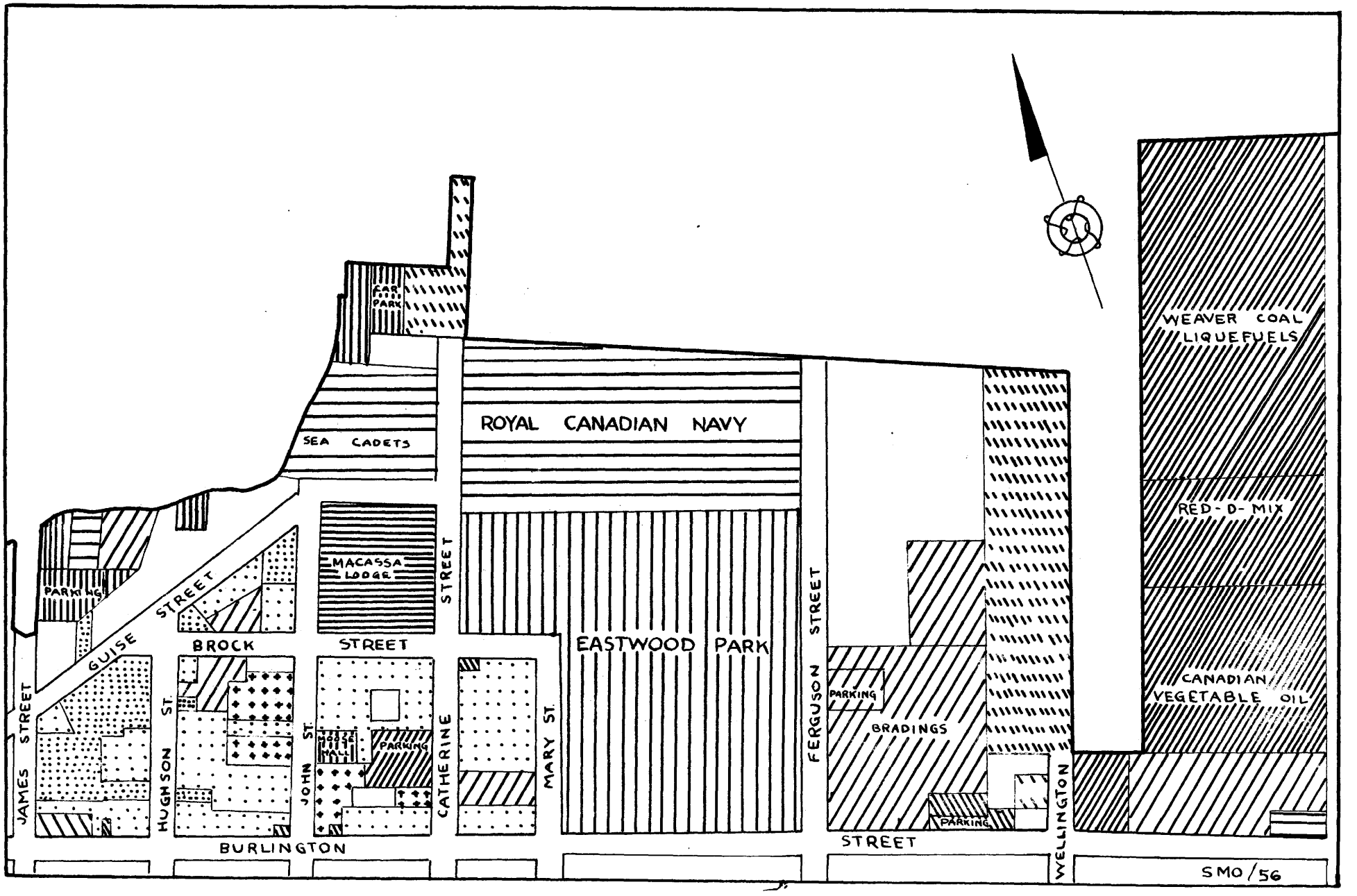

CAR PARK
SEA CADETS
ROYAL CANADIAN NAVY
WEAVER COAL LIQUEFUELS
RED-D-MIX
PARKING
GUISE STREET
BROCK STREET
MACASSA LODGE
STREET
EASTWOOD PARK
FERGUSON STREET
CANADIAN VEGETABLE OIL
PARKING
BRADINGS
JAMES STREET
HUGHSON ST.
JOHN ST.
PARKING
CATHERINE
MARY ST.
PARKING
BURLINGTON STREET
WELLINGTON
SMO/56

FIGURE 13

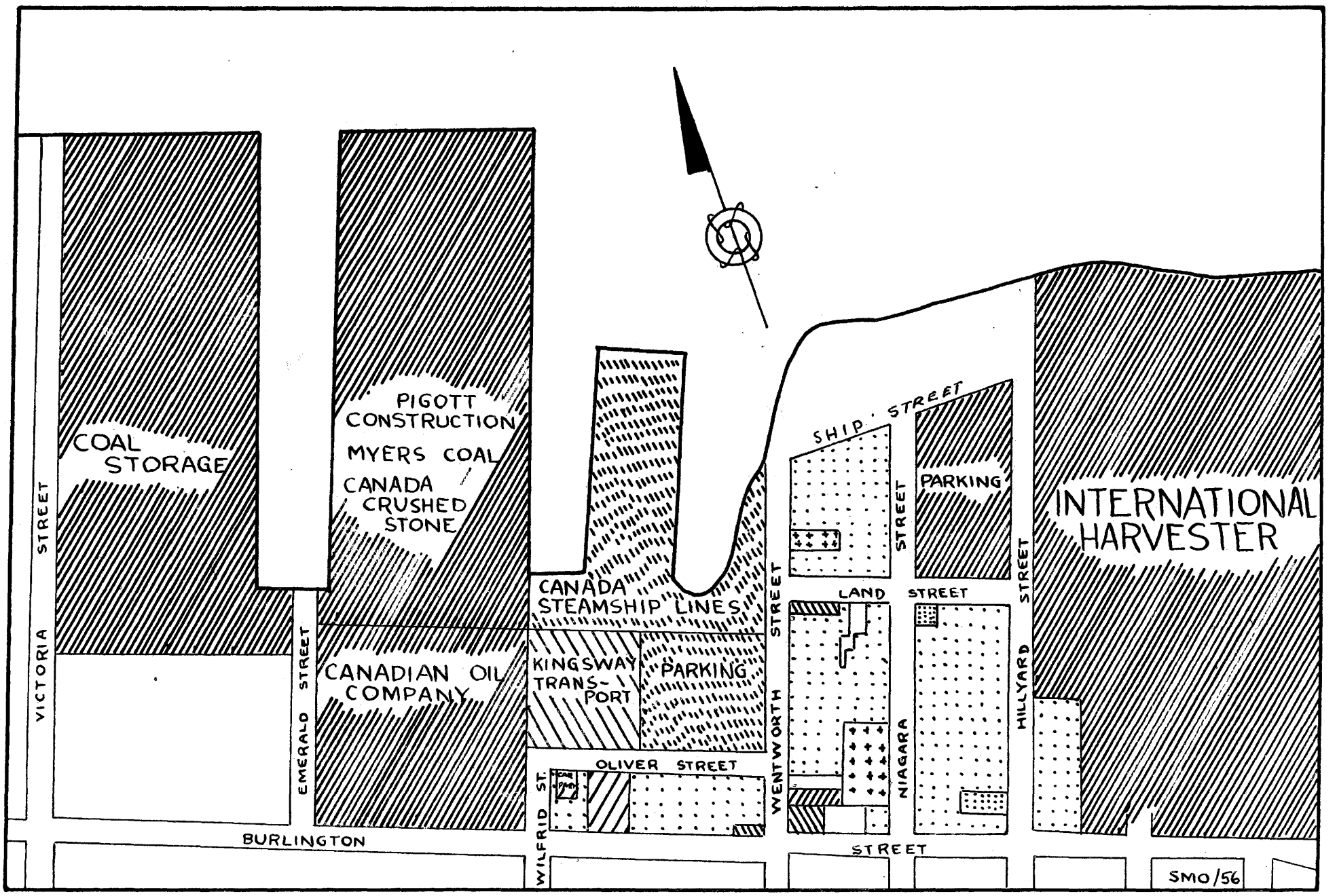

COAL STORAGE
PIGOTT CONSTRUCTION
MYERS COAL
CANADA CRUSHED STONE
CANADIAN OIL COMPANY
CANADA STEAMSHIP LINES
KINGSWAY TRANS-PORT
PARKING
SHIP STREET
PARKING
INTERNATIONAL HARVESTER
VICTORIA STREET
EMERALD STREET
WENTWORTH STREET
LAND STREET
HILLYARD STREET
NIAGARA STREET
OLIVER STREET
WILFRID ST.
BURLINGTON STREET
SMO/56

FIGURE 12.9


STEEL
COMPANY
OF CANADA
INTERNATIONAL
HARVESTER
SHERMAN INLET
WILCOX STREET
BURLINGTON STREET
BURLINGTON STREET
SMO 156

FIGURE 13 E

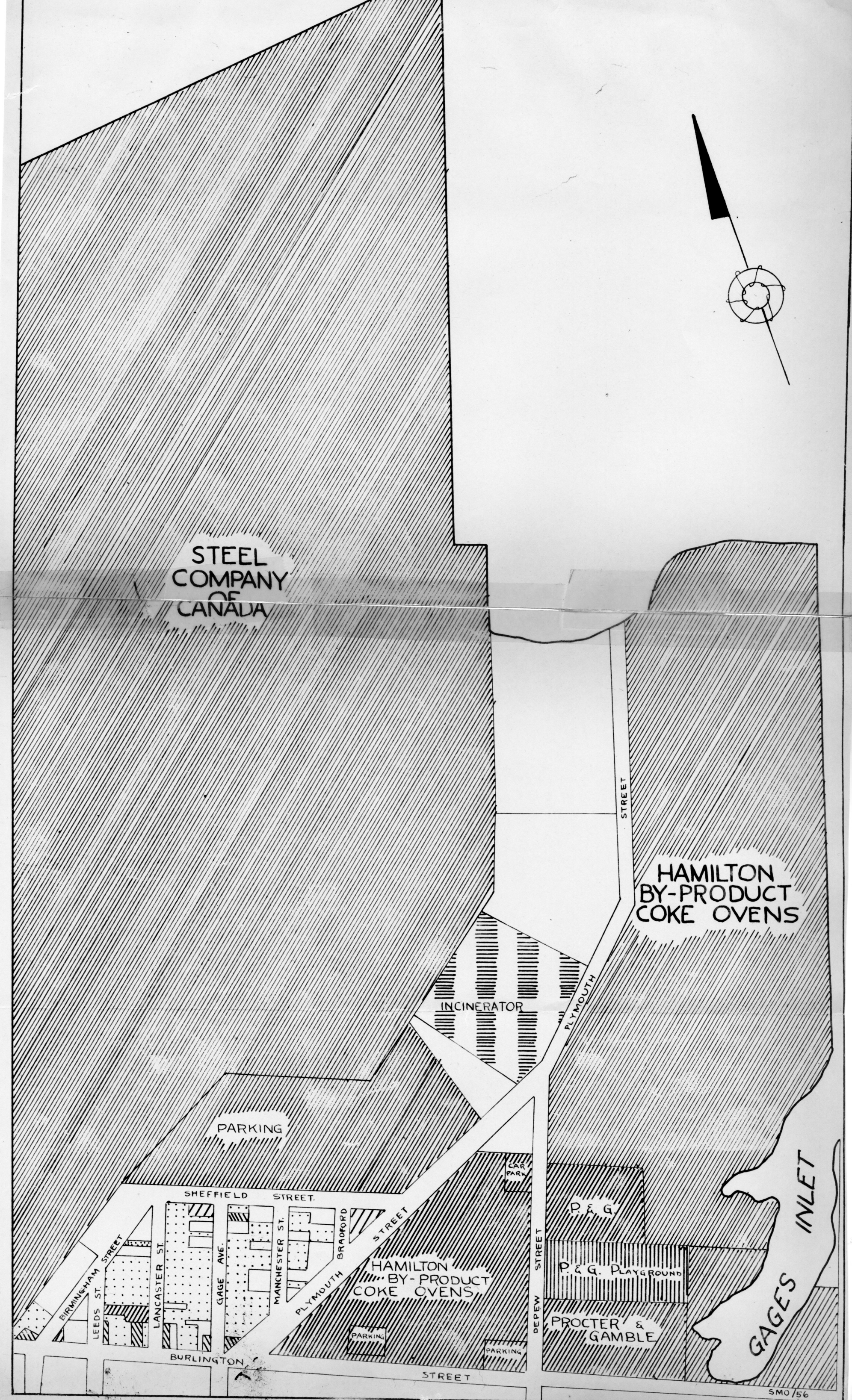

STEEL COMPANY OF CANADA
STREET
HAMILTON BY-PRODUCT COKE OVENS
INCINERATOR
PLYMOUTH
PARKING
SHEFFIELD STREET.
BIRMINGHAM STREET
LEEDS ST.
LANCASTER ST.
GAGE AVE.
MANCHESTER ST.
BRADFORD
STREET
PLYMOUTH
HAMILTON BY-PRODUCT COKE OVENS
CAR PARK
P. & G.
DEPEW STREET
P. & G. PLAYGROUND
PROCTER & GAMBLE
PARKING
PARKING
BURLINGTON
STREET
GAGES INLET
SMO/56

FIGURE 125


INLET
DOMINION FOUNDRIES AND STEEL
CANADIAN INDUSTRIES LIMITED
NATIONAL STEEL CAR CORP.
BRITISH AMERICAN OIL Co.
SHELL OIL Co.
[C.I.L.]
McCOLL FRONTENAC OIL Co.
[DOFASCO]
CANAD IRON FOUNDRIS
OTTAWA STREET
KENILWORTH STREET
BURLINGTON STREET

FIGURE 13

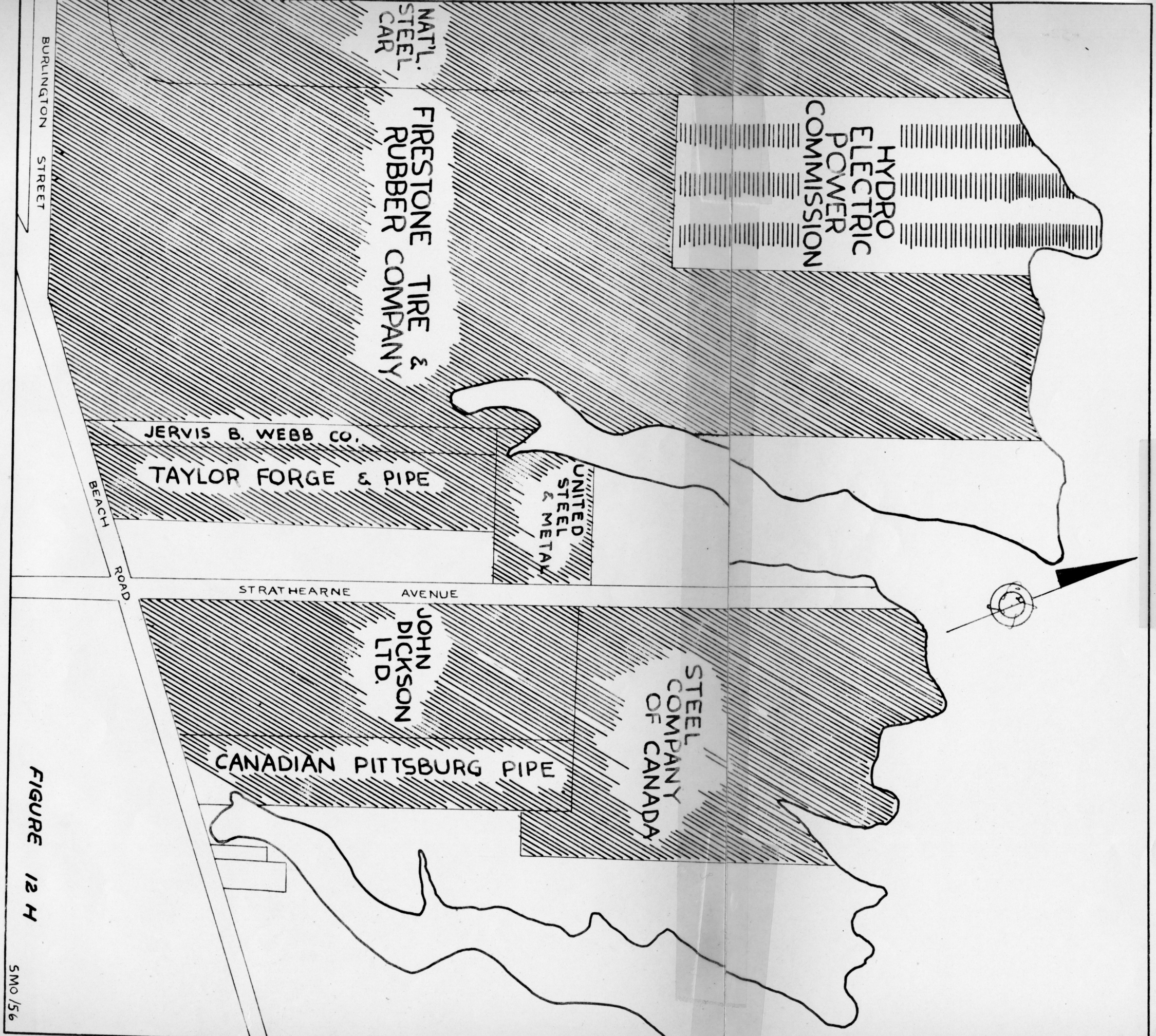


FIGURE 12 H

SMO/56

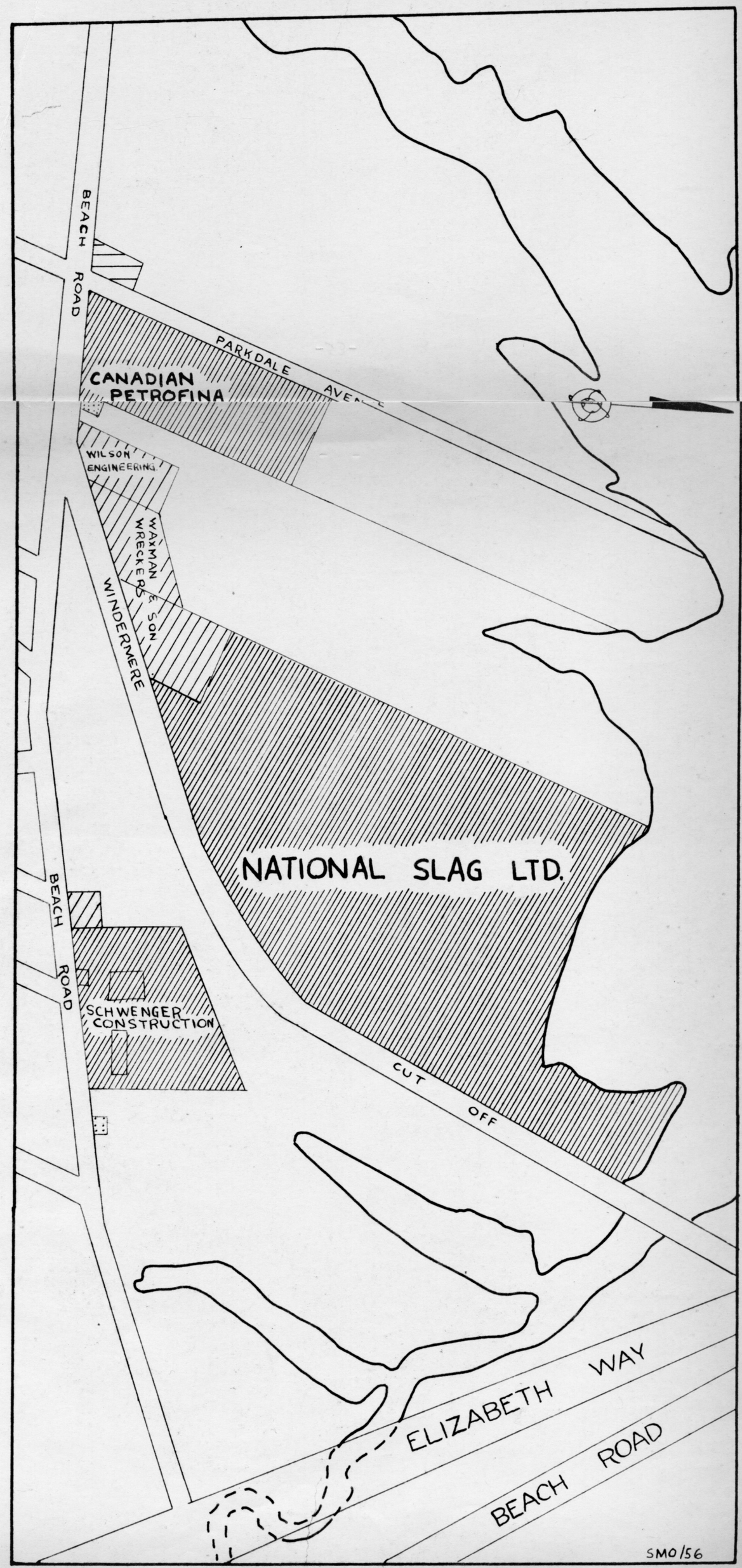

BEACH ROAD
PARKDALE AVE.
CANADIAN PETROFINA
WILSON ENGINEERING
WAXMAN WRECKERS & SON
WINDERMERE
NATIONAL SLAG LTD.
BEACH ROAD
SCHWENGER CONSTRUCTION
CUT OFF
ELIZABETH WAY
BEACH ROAD
SMO/56

FIGURE 12 I

harbour is the dominance of industry. Although industry is localized on the south shore, no other waterfront land use in the area provides such an imposing picture. Even residential areas, which occupy the most space along the waterfront, are either hidden from view by trees, or dwarfed by the tall smoke stacks of the factories. Wherever the observer may stand, on the wharf at La Salle Park, at the Burlington Canal, or on the Escarpment, the stock piles, chimneys and blast furnaces of industry dominate the scene.

Among the factors which have influenced the location of industry in Hamilton, the first which should be mentioned is the general location of the area with respect to raw materials and to the Canadian market. Hamilton Harbour offers a waterway for the movement of raw materials from Lake Superior, Lake Erie and the St. Lawrence River, and the shipment of finished products throughout southern Ontario and Quebec.

Industry may be divided generally into two types, heavy and light. Heavy industry involves the movement and processing of bulky goods. Light industry requires less bulky raw materials, but usually a labour force which is relatively more skilled. Industry along the waterfront is dominantly of the heavy type and is often both noxious and noisy. Because of the bulky raw materials that are used, water transportation is essential. Also the bay is a reservoir from which water may be drawn for use in various

industrial processes. Into it are disposed the liquid wastes of these processes.

Because of the seasonality of navigation, heavy industry requires large areas of relatively flat land for stock piling raw materials which are used in great quantities throughout the year. This type of land was available on the south shore of the bay. Although much of it was poorly drained, the amount of fill required to reclaim it was relatively small. Also, by the time industry came to Hamilton, the main rail line was established near the waterfront.

In addition to these physical advantages, Hamilton supplies a ready labour force, and capital is available for the expansion of industry. It is, therefore, not difficult to explain the presence of a large amount of heavy industry on the Hamilton waterfront.

There are, as well, a few welding firms characteristic of light industry throughout the area. Some types of light industry also have special reasons for locating on the waterfront. The Harbour Commission's Marine Dockyard at the foot of James Street repairs and drydocks navy Fairmiles as well as private craft. James H. Beale and Son, at the corner of Burlington Street and Wellington Street make boiler repairs and alterations on lake freighters and tugs.

1. Use made of Harbour by Waterfront Industries for Bringing in Raw Material:

The statistical information on which the four following sections are based, is derived from the

Hamilton Harbour Commission property at foot of James Street showing home of "Lady Hamilton." To the left is the Marine Dockyard where two navy Fairmiles are in drydock.

A view of the Steel Company of Canada taken from the Plymouth Street sewage ditch. Note the man-made character of the water frontage of the Steel Company property.

questionnaire (see appendix III) which was sent to the fifteen most important waterfront industries. Approximately 66% of the raw materials used by these industries is brought in by ship; 29% by rail; 3% by truck; and the remaining 2% mostly by pipeline. Those industries which do use the harbour for bringing in raw materials generally have a high percentage of their goods coming by water. However, they are offset by other industries along the waterfront which do not bring in any raw materials by ship. The largest industries which use the harbour for this purpose have private facilities, docks and warehouses which are adequate for company operations. These are the Steel Company of Canada, Dominion Foundries and Steel, International Harvester, Hamilton By-Product and Coke Ovens, and Canadian Industries Limited.

A general pattern in the movement of raw materials may be noted. The method of transport is determined by several factors. Where large shipments are economically sound because of the seasonality of navigation, because the raw material is not perishable and is used in great quantities in the industrial processes, then the usual method of shipment is generally by water. Thus coal and iron ore come by water despite direct rail links with the mines. These two constitute the largest tonnages moving by water. In 1955, approximately 3,000,000 tons (see appendix IV) of iron ore were shipped from Lake Superior and Labrador to the Steel Company and to Dominion Foundries. In the same

year coal imports from Pennsylvania, West Virginia, Kentucky and Ohio through Hamilton Harbour totalled 2,859,721 tons. The Steel Company and Dominion Foundries together used approximately 2,100,000 tons of this. The remainder was used in many small industries and also as domestic fuel. The Harbour Commission Terminals Number 1 and 2, between Wellington Street and Wilfrid Street provide local coal companies with space for the open storage of the coal which is brought in by water and transshipped to local points by truck. In the same area are located companies which produce mixed concrete for construction purposes. Sand is brought to these industries by water from the Niagara Bar and the north eastern section of the harbour itself.

Another factor which influences the method of transport is the point of origin of the raw material. If this should be an overseas location, water transportation will, of course, be used for part, at least, of the passage. However it does not necessarily follow that the ocean vessels will discharge at Hamilton. It is common for commodities to be unloaded in Montreal and sent into Hamilton by rail. For example, palm oil from Africa comes by rail. Also some of the tin and crude rubber from Malaya reaches Hamilton by rail. Nevertheless, some raw materials normally come all the way by water. This includes the remaining tin and rubber from Malaya as well as fluorspor from Mexico and Newfoundland and potash from Germany.

Many raw materials whose annual tonnages exceed

10,000 tons are carried to Hamilton industries by truck or rail. Often these goods are found or produced locally - stone, lime, sulphuric acid and limestone. Water transport is therefore not possible. In other instances, where water shipment is possible, land transport is used instead, in order to avoid the costs of transshipment. For example manganese used by waterfront industries comes from Welland Ontario by rail, directly from the mines. Some fuel oil comes to Hamilton by pipeline. The remaining petroleum products are transported by tanker or truck. The petroleum industry located along the waterfront when water was the major method of transporting the raw material. Since then, a pipeline has been built from Sarnia to Toronto. There are three branch lines which carry the oil under the harbour to Hamilton's industrial zone in the vicinity of Burlington Street. Here it goes into tankage until it is needed. In some cases, waterfront facilities are no longer essential. However the route of the pipeline as well as the inherent inertia of the industry, precludes any change of its location.

2. Use made of Harbour by Waterfront Industries for Shipping out Finished Products:

The ratio of raw materials coming in by water, rail and truck, 66:29:3 shows the dominance of water transportation. It indicates keen competition, especially between shipping companies and railways, a healthy sign in any industrial community. In constrast to this, there is a definite imbalance in the method of exporting finished products. In 1955, 1558 ships entered Hamilton Harbour; of these only 465 left with

cargo. This difference is due to the fact that the majority of ships entering the harbour are carriers of bulky commodities such as coal and iron ore and are not therefore, suitable means of export from Hamilton. Of the fifteen companies that were questioned, only six indicated that they export by water. It is not possible to give percise overall figures of the relative quantities of finished products shipped out by various means of transportation. However it is certain from statistics compiled by the Harbour Commission and from the known and estimated output of waterfront industries, that not over 10% of the finished products of industry move by water. Of the remainder, the greater part moves by rail, though some industries, with a small market area, make deliveries entirely by truck. The ratio between these three modes of shipment is approximately 1:7:4.

There are several reasons for the small percentage of finished industrial goods that are sent by water. Much of Hamilton's industrial products are used within the Province of Ontario. The distances involved are so short that transportation by rail or by truck is much more economical than water shipment. Thus approximately 94% of the total steel production, the bulk of which is used in Ontario, is exported by rail or truck. The remaining 5% - 6% is shipped by water to overseas points.

Where the point of destination of industrial goods from Hamilton is a port, water transportation may be used.

But if the point of consumption is not at a waterfront site, then shipment by rail is often the most economical. Thus the export of steel products to Western Canada, Quebec and the Maritimes is generally by rail. Only 20% of the farm implements exported to Western Canada is sent by ship, the remaining 80% is sent by rail. Similarly 15% of the baler and binder twine produced for the United States is shipped by water, the remainder being sent by rail. Again, water transport is used for only 9.5% of the rubber products destined for points in Western Canada. Rail transport is used for 76% and trucks for 14.5%. The National Steel Car Corporation, because of the nature of its finished product, railway freight and passenger cars, which are used throughout Canada and the United States, uses only rail transport.

In constrast to this pattern, 54% of the soap products destined for Canadian centres, excluding points in Ontario, is sent by ship. The remainder goes by rail and truck. Also, 88% of the binder twine produced for western Canada is sent by ship. Evidently there are, in these two examples, factors which outweigh the advantages of direct land shipment where the point of destination of the finished products may not be a waterfront site. The soap is marketed throughout Canada and since it is not perishable, can be sent in large shipments to a few ports from which local distribution takes place. In the case of binder twine this is possibly the fact that its consumption is highly seasonal, coinciding with the period of navigation. Nevertheless the overall trade pattern of

goods moving throughout Canada indicates the popularity of land shipment, particularly rail. The great advantage of land transport is the lack of seasonality. Exporters find it easier to maintain one type of shipment throughout the year. Also the distances involved are, in most cases, too short to permit the low line -haul costs of water shipment to outweigh the high terminal charges of this type of shipment.

Of importance also is the quantity of goods shipped. When the shipment is small, rail transport is preferred, regardless of destination. Even in some overseas trade, this is true. Only 2% of the total farm implements produced in Hamilton is sent to overseas points. These are sent exclusively by rail to a transshipment point, such as Montreal, from which they are carried overseas. For the same reason, 4.5% of the rubber products from Hamilton are destined for overseas, but this entire amount is sent by rail to a transshipment point.

A very significant factor underlying the movement of goods, particularly to overseas points, is the inertia of trade patterns. Certain routes become specifically crystallized by the establishment of freight rates, financial houses, customs brokers and other commercial enterprises. Ports like Montreal and Quebec are well established in this regard while Hamilton, and indeed all Canadian Great Lakes Ports, are not. Montreal and Quebec have the added advantage of being nearer the main ports of Europe and also being able to accommodate the larger ocean vessels which are not

as yet able to enter the upper St. Lawrence and the Great Lakes. An example of the inertia is apparent in the trade pattern of soymeal. Only 7% of the total export to overseas points is sent directly from Hamilton by ship. The remaining 93% is sent by rail to a transshipment point. Since the overseas market takes 75% of the total production of soymeal, we obviously cannot conclude that the bulk or weight of the cargo is insufficient to warrant direct water shipment from Hamilton. The underlying factor is the keen competition between ports and the inertia of trade patterns.

We have seen that rail shipment dominates the export of finished products of industry. This is partly due to the imbalance between import and export tonnages. In 1955, imports totalled 7,166,649 tons and exports were only 352,900 tons. Some reasons for this imbalance have been discussed. Another very significant factor is the consumption and compression of the bulky raw materials such as coal and iron ore, as a result of the industrial processes. Yet, while industrial raw materials constitute 97% of the total imports, the finished products of industry make up 82% of the harbour's exports.

Therefore industry, although it uses water transportation for only a small proportion of its own exports, provides a large proportion of the total exports through Hamilton Harbour. On the whole, the important influence of industry on harbour traffic is maintained.

3. Use made of Harbour by Waterfront Industries as a Source of Water for Industrial Purposes:

A source of water for cooling and other industrial purposes is an important locative factor for some industries. Of the fifteen industries questioned, eight indicated that they have private pipelines to the harbour for this purpose. Together they draw approximately 126.8 million gallons of water per day. Most of these industries also use the harbour for shipping but the National Steel Car does not because of the nature of its finished product. Yet this industry requires a location near the waterfront because of the large amount of water, approximately 21,000,000 gallons per month, which it draws from the bay.

Twelve of the fifteen industries use water from the city mains for industrial processes. These draw approximately 9.3 million gallons from the city mains per day. In most cases, the industries require the purified water because it forms a part of the finished product for example, the Canadian Vegetable Oil Company. The Studebaker-Packard Company which is located south of Burlington Street, gets all its water from the city mains because it has no private pipeline to the harbour. There are also industries like Canadian Industries Limited which require purified water from the city mains for industrial processes but do not retain this water in the finished product. Thus waterfront industries have the advantage of two sources of available water, depending on

the use for which it is needed.

Most of these industries would be unable to operate as economically far away from the harbour which is the natural reservoir of industrial water. However waterfrontage is not necessary for this reason alone. Because of the flatness of the lake plain, the extra cost of pumping bay water to an industry located on the plain, a few hundred feet from the water's edge, would not be great.

4. Use made of Harbour by Waterfront Industries for Disposal of Waste:

Whatever the means of disposal, through the city sewage system or private pipeline, all liquid wastes find their way to the harbour. Only nine of the fifteen industries questioned indicated that they have liquid wastes in any quantity.

The amount of liquid waste disposed of into the harbour is approximately 135 million gallons per day, as compared to 126.5 million gallons drawn out daily. The difference is made up of water from the city mains which is used by industries such as Studebaker-Packard and Canadian Industries Limited for processing but not retained in the finished product.

Most of the industries indicated that impurities do not exist in appreciable quantities in the waste water. A few showed that miscellaneous industrial wastes are present, but they were not able to supply accurate information.

Nevertheless, an attempt is made to keep contamination at a minimum.

B: TRANSPORTATIONAL LAND

The Hamilton Harbour area is an important crossroads of transportation. The major factors controlling the direction and orientation of main routes in the area is physiography. The Dundas Valley at the west has caused main east-west routeways to converge at the head of the lake. Also, because of the obstruction formed by Lake Ontario, the area provides a route for traffic between the north and south shores.

The Lake Iroquois plain on the south shore is an area of low relief and, especially near the waterfront, a zone of great industrial and economic importance to the city. Here, there is a concentration of east-west routes, principally railways, the Canadian National and Canadian Pacific, Highway No. 8 and several important city streets such as Burlington Street and King Street.

The North Shore Boulevard is located on the lake plain on the north shore of the harbour. This is mainly a local distribution road serving the people who live in the area.

The Iroquois Bar and the Ontario Bar are natural routes for land transportation. The southern arm of the Iroquois Bar is used by the Canadian National Railway and by two highways, No. 6 and No. 2, as a means of access between the north and south shores. These routes branch, one leading to Kitchener, Galt, Guelph and points west, the other to

The Canadian National Railway tracks along the south-western shore of the Bay.

The Harbour Administration Building at the corner of James and Burlington Streets.

Burlington, Oakville and Toronto.

Highway No. 2, which is the main east-west road artery on the north shore, follows the northern arm of the Iroquois Bar for part of its course. East of Aldershot, it leads on to the lake plain. The Canadian National Railway line on the north shore, avoids the Bar; it is to the north of the highway on the lake plain. All of these routes are important means of access to the City.

The Ontario Bar or Beach Strip, bridges the five-mile gap between the north and south shores of Lake Ontario. The Queen Elizabeth Way and a Canadian National Railway line are located on it. Traffic from the Niagara Peninsula to south-central Ontario uses this route to by-pass the city traffic of Hamilton. With the completion of the Skyway Bridge this function of the route will become more important.

In this thesis "The Land Transportation Geography of Hamilton," S. I. Westland has drawn some conclusions which are significant in describing the relative importance of various types of land transport throughout the Hamilton Harbour area. "Railway is still the key agency in the transport economy of the city as it supplies the raw materials and carries away the products of the manufacturing plants that dominate Hamilton's economy. Highway transport, the other principal land agency, is concerned primarily in the commercial and social functions of the city. It is that form with which the average citizen comes into daily contact, while the railways are not as obvious to him, despite their indispensability.

Motor transport is primarily concerned in the retail and cultural economy of the city.

Because of these varying functions, the effective range of the land transport agencies from the city differs widely. Railways are the more national or continental in their transportational scope from Hamilton, while road transport is localized. Truck transportation is generally provincial in its range while bus and auto transport is more restricted to the actual controlled hinterland of the City of Hamilton." [1]

C: RESIDENTIAL LAND:

Residential land throughout the Hamilton Harbour area has been classified into four types on the basis of quality. In contrast to the classification of the City Planning Department which is based on the number of family units per structure, this is a somewhat subjective classification. Yet it gives a good guide to the economic conditions in the various neighbourhoods. In addition, it gives an indication of how residential land can compete with other land uses.

Four types of residential land have been distinguished. Type I represents houses with a value of $20,000 or more. They are spacious, clean, well-kept houses of relatively individual design. Often there is a double garage which may be a separate structure or attached to the house. The lots on which such houses are situated are large and often elaborately

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[1] Westland, S. I., Land Transportation Geography of Hamilton (1950) Page 186

landscaped.

Houses of value from $10,000 to $20,000 are classed as Type II. These are also neat, clean and well-kept but are situated on smaller lots than Type I homes. The houses are usually set side by side with the width of a driveway or garage between each. Often several adjacent homes of this type have the same design, but moderate landscaping provides a degree of individuality as well as attractiveness.

Type III houses range in value from $3000 to $10,000. These are mostly old structures which have, in most cases, been somewhat neglected. Usually the houses need repairs, such as a new roof or a coat of paint. The lots are smaller than in Type II and the houses are crowded together. Very often the family which occupies a house of this type will own a car, but there is no side drive or garage. Usually, a series of these houses will have the same design. Even landscaping, which generally involves only a grass lawn, maintains this uniformity.

All houses with a value less than $3000 are classed as Type IV. Some of these are row houses and others are detached structures. All show signs of neglect - broken windows, chipped paint, faulty roofing or no lawn. There is little back-yard space, and often there is only approximately five feet of land between the house and the sidewalk.

In the Hamilton Harbour area, there are three distinctly different residential sections, the north shore, the south

shore and the Beach Strip. Different locative factors are operative in each. On the south shore, there is relatively little residential development; industry occupies the bulk of waterfront land. Most of the houses are of Type III. These are located between Locke Street and Dundurn Park, along sections of Bay Street, between Hughson Street and Mary Street, between Wilfrid Street and Hillyard Street and between Sheffield Street and Burlington Street, (see figures 12-A,B,C,D,F). There are three major areas of Type IV houses; between Tiffany Street and Bay Street, Ferrie Street and Strachan Street and between James Street and Hughson Street, (see figures 12-A,B,C). Type II residential land is represented by a few fine old homes, reminiscent of very early days when the harbour was not the industrial centre it has since come to be. Also of Type II are a few relatively new bungalow-type homes.

The residents of this shore do not make any use of the harbour. Most are employed at the nearby factories. Many are dissatisfied with their homes and would, if it were financially practical, move to a better district. They do not represent a stable population. In the last few years, there has been a general migration from the area, especially in the land adjacent to the large industries. The industries are permitted to expand because the land is zoned industrial. Hence, between Burlington Street, Plymouth Street and the Steel Company, (see figure 12F), there are a few blocks of houses in an area zoned industrial. But, north of Sheffield Avenue, in the same section, houses have been bought out by

Type IV houses on Strachan Street. Shack next to vacant house used for light industry. Shacks along waterfront represent more type IV residential land.

3rd and 4th class houses on James Street North. "S.S. Lady Hamilton" in berth; Left in centre in photo is Harbour Commission's Marine Police Patrol.

the Steel Company. There is also a section zoned industrial between Wilfrid Street and the Industrial Harvester, (see figure 12D). It is here, off Ship Street, that the Harbour Commission is reclaiming land for a new public dock. This will not create any immediate impact on housing, however, there has already been some migration from the area and one whole block is now being used as a parking lot for International Harvester employees.

The north shore and Beach Strip are given over almost entirely to residential development, with which are connected various commercial and public land uses. Along the north shore houses may generally be classified as Type I. There are a few examples of older and less well-kept homes, but on the whole the houses are typically spacious, clean and well-kept.

Some of the oldest homes are located at the western end of the shore at Willow Cove. This was the first section to be affected by the suburban expansion from Hamilton. Physical detachment from Hamilton meant there was little chance of industry locating there. Willow Cove is the only survey on the north shore that gets its water supply from Hamilton. Surveys to the east, throughout Aldershot, Glen Acres and Long Acres get their water supply from Burlington which is much closer.

Homes were drawn to the area also because of many local locative factors. The scenic qualities of the north shore are important, especially along the North Shore

First class home on North Shore Boulevard.

Residential Land on Guise Street between Hughson and John Streets. Note vacated building on corner - 4th class. To left are type III homes. Note flatness of the land.

Boulevard where a high shore and wooded ravines provide very attractive sites. In addition, the sand and gravel soils throughout the area provide good drainage and a desirable type of land on which to build. Good transportation makes the area easily accessible. There is too the prestige of proximity to existing high class homes. The high price of the land, because it is agriculturally valuable, excludes people from the lower income brackets.

Residents of the north shore make limited use of the bay for boating. There is no swimming because the water is polluted. Some of the most expensive homes have swimming pools, the water for which comes from Burlington.

The Beach Strip represents an area of transition. Most of the houses were summer cottages, but since the decline of recreation in the area, they have been converted to permanent occupancy. Houses are generally of Type III or IV. Some may be ranked as Type II, but these are few in number. Residents of the area make limited use of the harbour for boating.

Several factors limit the residential development of this area. Because of the low-lying nature of the land and the resulting high water level homes and property on the lake side frequently suffer much water damage. The use of the Beach Strip as a main highway conflicts with residential land utilization especially now since the bay shore is being cut off by construction for the new Skyway Bridge. The Beach Strip is a complex area where several

types of land use conflict. The class of home would denote a fairly unstable population, but whether or not there will be a migration from the area will depend on the direction from which competition for use of the land will come.

D: RECREATIONAL LAND:

There are two major types of recreational land; public open space which is for the enjoyment of the entire community, and quasi-public land, the use of which is restricted to members of clubs and their friends. There are several examples of each type of recreational land throughout the Hamilton Harbour area.

1. Public Land:

There are five major areas of public open space. On the south shore, Eastwood Park (see figure 12 C) on Burlington Street between Mary Street and Ferguson Avenue, is one of the best equipped parks in the city. Besides an area of grass and trees, there is a baseball diamond, a playground supervised by the Hamilton Recreation Council, a swimming pool and a skating rink. The park has no water frontage because H. M. C. S. "Star" is located on the harbour side of it. Its main function is to the people who live in the area. Although there is little residential land north of Burlington Street, to the south the number of houses is great. The park does not require its present position for it does not use the harbour. The land is, in actual fact, zone for light and limited industry. However there is no vacant land south of Burlington Street in the same vicinity which could be used for this

Boys having a scrimmage at Eastwood Park playing field. In background is H.M.C.S. "Star."

The Harvester Playground - small, but well-kept and equipped - at Burlington Street and Birch Avenue.

purpose. A park such as this is needed in the area for it serves the leisure and recreational requirements of a dense population.

The Harvester playground, at the corner of Burlington Street and Birch Avenue, is smaller in area than Eastwood Park. The land is owned by the International Harvester Company but the city Recreation Council provides supervised recreation for the young people of the district.

Along the Iroquois Bar, between York Street and the Canadian National and Canadian Pacific railway lines is Dundurn Park. Itis a very attractive and well-kept area of public open space including a museum, aviary and various historical monuments. Farther north are various sections of the Royal Botanical Gardens. Travellers come from near and far to see the famed Rock Garden and Spring Garden. The Bar was once an important source of sand and gravel, and the parks now occupy the holes left by the early quarries. These parks are all family favourites. They are easily accessible by road, and provide an attractive entrance into the city.

On the north shore, La Salle Park is the only area of public recreational land. This used to be a very popular picnic ground. The Harbour Commission's "S. S. Hamiltonian" and many ships before her, used to carry thousands of passengers from the berth at the foot of James Street, to La Salle, Burlington Beach and Port Dalhousie for picnics.

Because of this La Salle is really the only area of publicly owned recreational land in the Hamilton Harbour area which is in any way dependent on the harbour. However, this ferry boat service has declined in popularity with the increasing ease and importance of automobile traffic. Distant park and picnic area are now more accessible. La Salle has therefore fallen into relative disuse. However various playground equipment and picnic facilities still remain. The park is located on an attractive site. The land is level and trees are plentiful. A fairly steep bluff leads from the parkland down to the wharf and the waterfront. Steps should be taken to revive recreation in this area. The Harbour Commission now leases the wharf at La Salle to various companies which require the space for stockpiling sand and gravel for construction purposes.

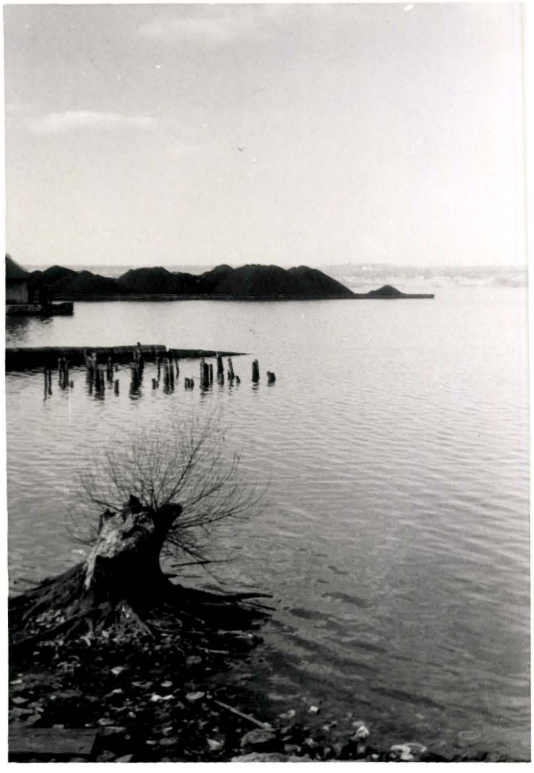
The Beach Strip was at one time an important area of recreation. Private cottages lined the shores of the bay and the lake. When the Burlington Canal was constructed, sand taken from the cut was deposited in the area immediately to the south of the canal. Since this became the widest section of the bar, the main public beach, with an amusement park and novelty rides, located here. The park still attracts many people on hot summer days. However, on the whole, the recreational importance of the Beach Strip is declining. As has been noted earlier, it is an area of transition where cottages have been converted to permanent occupancy.

Several factors have brought about this change residents of the Beach Strip, near the canal, noted that, at times, depending on the current, bacteriological wastes drift from the harbour into Lake Ontario. The part of the Beach Strip most affected by polluted water is, therefore, the area near the canal including the main public beach. This factor, as well as the at times uncomfortably cold waters of the lake, has caused many people to turn to the more sanitary public pools, located throughout the city, and supervised by the Recreation Council. The importance of the Beach Strip as a transportation artery has been noted. The result is a dense auto traffic which conflicts with recreational activities in the area. Another factor which has had an adverse effect on recreation on the Beach Strip is the ease of auto transportation. More desirable places of recreation, though not as near, have become more accessible.

2. Quasi-Public Land:

Unlike public open space, qasi-public land for recreation is, in almost every instance, related to the harbour. Located along the south shore between Catharine Street and Burlington Street (see figure 12 B and 12 C) are the Royal Hamilton Yacht Club, Leander Boat Club, Hamilton Power Boat Association and the Good Times Fishing Club. The first three clubs have yachting and sail boating regattas, skulling facilities and motor boat racing. In the winter, ice boating is popular. These all take advantage

La Salle Park, on the north shore. Note unkempt condition of the sign; also the steep bluff. Wharf is used for open storage of gravel.



Hamilton Harbour Commission Terminal No. 2 being used for open storage of

of the relatively protected waters of the harbour. Some varieties of fish are found in the bay - carp, pike catfish, perch, sunfish, rock bass and silver bass. However, due to the degree of water pollution, their flesh has a distinct oily taste and they are inedible. The Fishing Club is therefore, a meeting place for anglers who use the bay for practice casting. The section of the waterfront which these activities now occupy, was established as a recreational site in the last century when the Yacht Club and Leander were founded. Proximity to the centre of the city was a major locative factor.

On the north shore, between Highway No. 2 and North Shore Boulevard is the Hamilton Golf and Country Club. It is located in relation to a wealthy residential district on the north shore. It is a very attractive site and the dissected character of the land makes it suitable for a golf course.

E: PUBLIC AND QUASI-PUBLIC LAND:

This is land that may be used or shared by the community as a whole. It is maintained at the public expense and is under the control of the civic, provincial or federal governments. Transportational land is of this type, but because of its singular importance in the Hamilton area, it has been discussed separately. This section therefore deals only with institutions and utilities. In general, the activities constitute various services for the residents of any area. Throughout the Hamilton Harbour area, there are many examples

Good Times Fishing Club. Drop from Burlington Street where photo was taken, to water level is 25 feet. Note steep Iroquois Bar on opposite shore.

The Royal Hamilton Yacht Club.

of this type of land: each will be dealt with separately in an attempt to show the relationship between these services and the waterfront.

1. Government and Administrative Land:

All examples of this type of land are found on the south shore of the harbour; all are very closely related to the waterfront and its facilities.

At the foot of James Street, a small section of land is being utilized by the Marine Police Patrol. Although the harbour is relatively protected from bad weather, there is always danger of rough weather, squalls, thin ice in winter, boats adrift and drowning. The Harbour Commission maintains the Police Patrol throughout the year to deal with these contingencies.

Trucks carrying a bulky cargo may weigh their loads at the Public Weigh Scale at the corner of Victoria Street and Burlington Street.

During the last world war, the Department of National Defence established H.M.C.S. "Star" on the waterfront between Catherine Street and Ferguson Avenue. Because of its central location with respect to the other naval reserve stations in Ontario, and because of the good berthing facilities in Hamilton Harbour, "Star" has become the most important base in the Great Lakes' Training Schedule. [1]

2. Welfare Institutions:

This type of land is found in all large cities.

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[1] Private Interview, H.M.C.S."Star", Hamilton, Ontario.

Although it is lacking on the north shore, and the Beach Strip, there is one example on the south shore. This is the Children's Aid Reception Home, located at the corner of MacNab Street and Bay Street. Associated with this is the Bayview Playground which occupies a small lot in the same area. It has only a few facilities. The land is not flat, hence there is a minimum of suitable playing area.

The waterfront is not a desirable site for this type of welfare institution. Yet it remains here because the land is not suitable for all types of utilization. The area is zoned residential, but it is not likely that new homes will be constructed here. It is a suitable site for an office building, but most offices, unless they are related to the waterfront and its facilities, would prefer a location in the main commercial seciton of the city. However, if the land surface were levelled off, some type of light industry might locate here.

3. Schools and Churches:

These have no relation to the waterfront. They are located in reference to residential land. Therefore, on the south shore, north of Burlington Street, thepopulation is not dense and no land is given to this type of use. On the north shore there are three public schools and three churches serving the residential area. Along the Beach Strip there are three churches but only one school.

4. Cemeteries:

There are three cemeteries in the Hamilton Harbour area. The Hamilton Cemetery is located on the south arm of the Iroquois Bar. The Woodland Cemetery and Holy Sepulchre Cemetery are located on the north arm of the bar. The well-drained sand and gravel of the bar affords a very suitable site for this type of land utilization.

The location of cemeteries in the urban plan often raises a very difficult problem. In most cases, they are found quite close to the original city site, and as the city grows, it often becomes evident that the cemeteries occupy land which could be advantageously used by the living. The sentimental and religious values are against the removal of cemeteries, but in the end, there is often little choice.

It is not likely however, that the two cemeteries which are located within the limits of the City of Hamilton, the Hamilton Cemetery and the Woodland Cemetery, will be displaced by the urban growth. Much of the space on the south arm of the bar is devoted to roads, railways and park land. It is a major routeway into the city and the land is now in public ownership. The Woodland Cemetery is in somewhat the same position in that a main highway passes along its periphery. Yet it and the Holy Sepulchre Cemetery afford a more suitable physical site for urban growth than the Hamilton Cemetery does. However, there is still sufficient land throughout the Hamilton area to accommodate any suburban development and it is reasonable to assume that the cemeteries will remain untouched.

F: COMMERCIAL LAND:

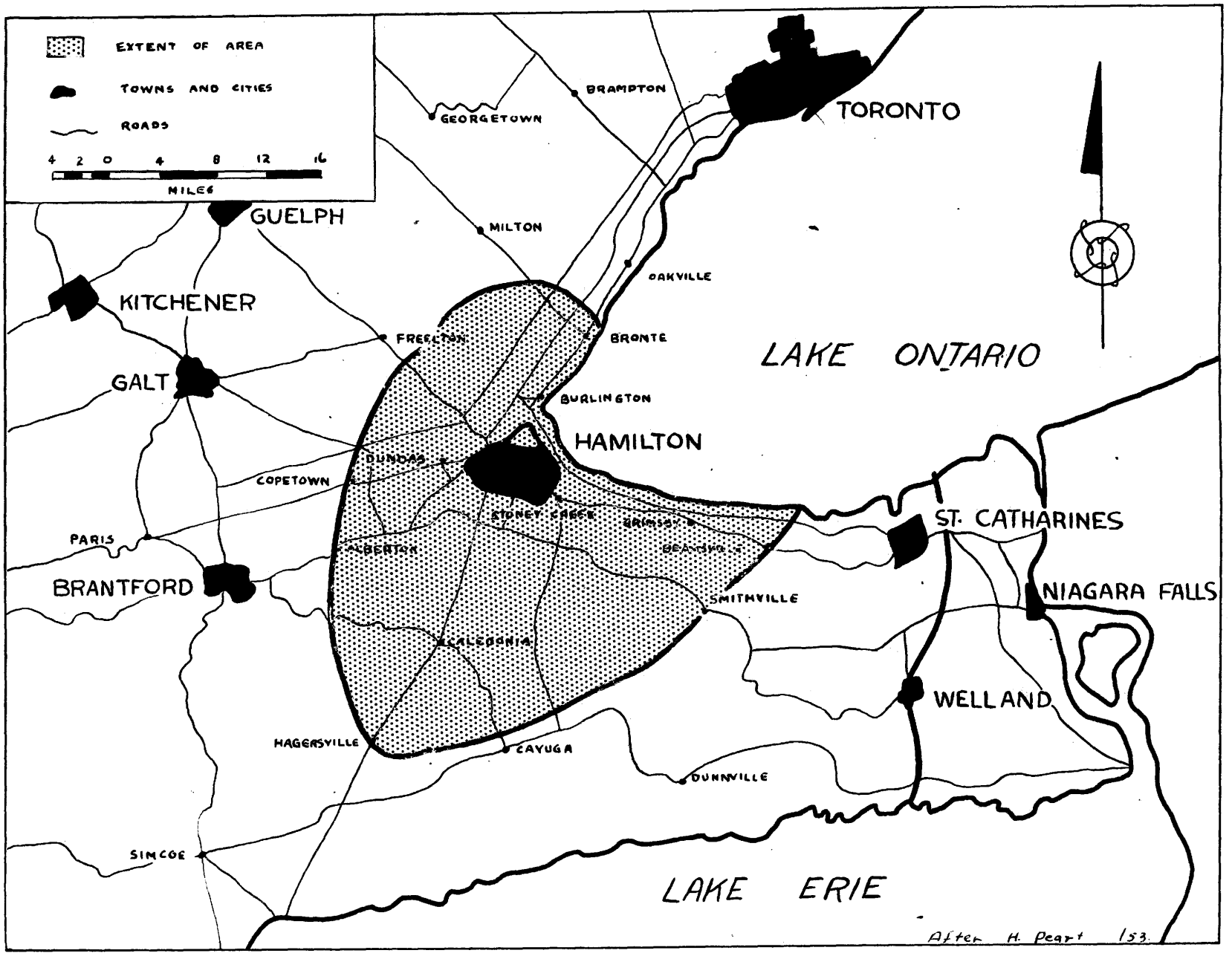
There are many types of commercial activities along the shores of Hamilton Harbour. Those which are directly associated with the Port of Hamilton include the docks and warehouses of the Harbour Commission and of the Canada Steamship Lines. Others, which are in varying degrees independent of the port and its development, include retail centres which have developed because of neighbourhood residential areas.

1. Harbour Commission and Canada Steamship Lines:

The commercial activities vary greatly in character and in the areas they serve. Figure 13 shows the "umland" of Hamilton. This is the zone through which Hamilton exercises a pronounced degree of influence. The most important establishments in the development of the harbour as a commercial port are the Harbour Commission and Canada Steamship Lines.

The latter carries most of the water-borne package freight between Hamilton and other Canadian ports. In some instances, its ships also carry industrial raw materials for Hamilton factories. The Canada Steamship Lines warehouses provide 80,000 square feet of storage space.

The Hamilton Harbour Commission Docks accommodate ships from Europe as well as those from ports in the United States and Newfoundland. When the cargo has arrived in Hamilton, land transportation is arranged by rail or truck to various points in Southern Ontario. Usually these shipments



THE UMLAND OF HAMILTON FIGURE 13

are to points within the umland, however, there are a few instances where goods are destined for points outside the limits of this area. Though statistics are not available, a sizeable proportion of the cargo leaving the Harbour Commission Docks in 1956 consisted of army trucks and supplies to N.A.T.O. forces overseas. These are stored at Hagersville which is within Hamilton's trade area.

The Wellington Street dock and warehouses are larger than those at Catharine Street and have the added advantage of a railway connection. The Wellington Street warehouses provide 88,000 square feet of storage space. [1] The Catharine Street warehouse offers 32,000 square feet of storage; there is no railway spur here. However, the area served by Hamilton is so small, that rail transport is not usually necessary, except for the few bulky shipments which may be received.

In 1951, 23 ships from overseas ports carried 2,755 tons of cargo for Hamilton. By 1955, this had increased to 207 ships and 26,716 tons of cargo. Throughout this period however, the average overseas freighter carried only a little over 100 tons of cargo for the port of Hamilton. Total tonnages to and from Newfoundland have also shown a general increase in the last four years, but here the number of ships has decreased from 51 in 1953 to 38 in 1955. This trend is likely due to the confederation of Newfoundland in 1949.

It is an advantage for a mature commercial port to maintain a balance between export and import tonnages, especially

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[1] Hamilton Harbour Commission, Port of Hamilton

of general and package freight and consumer goods. Hamilton Harbour tonnages indicate a definite imbalance. In 1955 imports totalled 7,166, 649 tons while exports were only 352,900 tons. As was pointed out earlier, this is in part due to the relatively few ships which leave the harbour with cargo as compared to the number of carriers that bring in bulky raw materials. The latter may not be used for the dual purpose of exporting and importing as regular freighters are. Nevertheless, dispite a degree of imbalance which is inevitable because of the two types of ships used, there is still much room for the expansion of commerce in the port of Hamilton.

2. Retail Centres:

Throughout the surveyed area there are several stores which are relatively independent of the Port of Hamilton. Their main function is to serve the neighbouring residential area, hence most of them are located on the north shore and on the Beach Strip where residential development is most intense.

On the south shore, there are only a few stores. Restaurants serve a non-residential clientele, made up chiefly of stevedores and truck drivers. Drug and grocery stores serve the local population. Most of these retail centres are located on Burlington Street. Living quarters for the proprietor are included either on the second storey or in the rear of the building. There are no specialty shops or large groceterias because of the relatively small area of land given to housing. Residents of the area have access to the larger commercial centres throughout the city. As has been noted earlier, Burlington Street is a major east-west traffic artery, parti-

cularly for the trucking trade. Hence several service stations and trucking depots are located along or near Burlington Street.

On the north shore all retail stores are located along Highway No. 2. Large groceterias serve the residents in the many new surveys in Aldershot and Willowcove. The Long Acres shopping centre provides a number of different stores and adds to the variety of the commercial activity in the area. These stores are well-kept and attractive. Numerous service stations, motels and restaurants cater to the traffic along this major highway.

The stores along the Beach Strip are not as spacious or as attractive. They had developed in a densely built up residential area. In many cases, the proprietor lives in the same building as the store. Most of these establishments: snack bars, restaurants, grocery and drug stores, as well as gas stations, are keenly affected by tourist and recreational trade during the summer months. Permanent beach residents do most of their shopping in the city proper.

G: MISCELLANEOUS LAND:

In the Hamilton Harbour area there are three minor types of land utilization which do not fit into any of the categories discussed so far. None of these is characteristic of the entire harbour area - they are all located on the north shore, nor does each one occupy an area large enough to warrant a separate section in the thesis. Hence, they have

all been combined under one type, miscellaneous land utilization.

There is some land on the north shore which is still being used for agriculture. The sandy soils of the area are especially suited to truck and market gardening. Near Long Acres there is still some land in orchard. However, agriculture throughout the area has declined. A few individual farm houses and several greenhouses are reminiscent of the early agricultural importance of the area. All along the north shore, the acreage alloted to open cultivation has steadily decreased. Agricultural land has given way to a widespread residential development, the features of which have been discussed in an earlier section.

In some sections along the north shore, sand, used for construction purposes, is being strip quarried from left over parcels of farm land. East of the Holy Sepulchre Cemetery, a new residential survey is being developed in an area which was used for this type of quarrying.

CHAPTER V

POTENTIALITIES OF THE HARBOUR

Certain areas of the Hamilton Harbour waterfront are occupied by activities which require location on a navigable waterway. On the other hand, there are many sections of the waterfront which do not use this feature of their location. The purpose of this chapter is to delimit the areas of waterfront in which these two major types of land use occur, and to discuss the potentialities of each.

A: Delimitation of Areas Occupied by Activities Requiring Waterfront Location:

Those sections of the waterfront which may be put in this category are shown in figure 14. By far the greatest percentage of this land is industrial, though west of James Street the use is recreational. There is a small section of administrative land just east of James Street. Commercial land is found at the foot of Catherine Street and Wellington Street, and between Wilfrid Street and Wentworth Street. The eastern side of the Beach Strip, not of course in the harbour, has recreational activities which use the waterfront.

The commercial and recreational uses have been described in an earlier chapter. The industrial sections which have been marked off include only those factories that have their own facilities for import and/or export by water. Hence those industries that use only the commercial docks of the Harbour Commission or the Canada Steamship Lines, are not included. Nor are those included that use the harbour only as a source of industrial water.

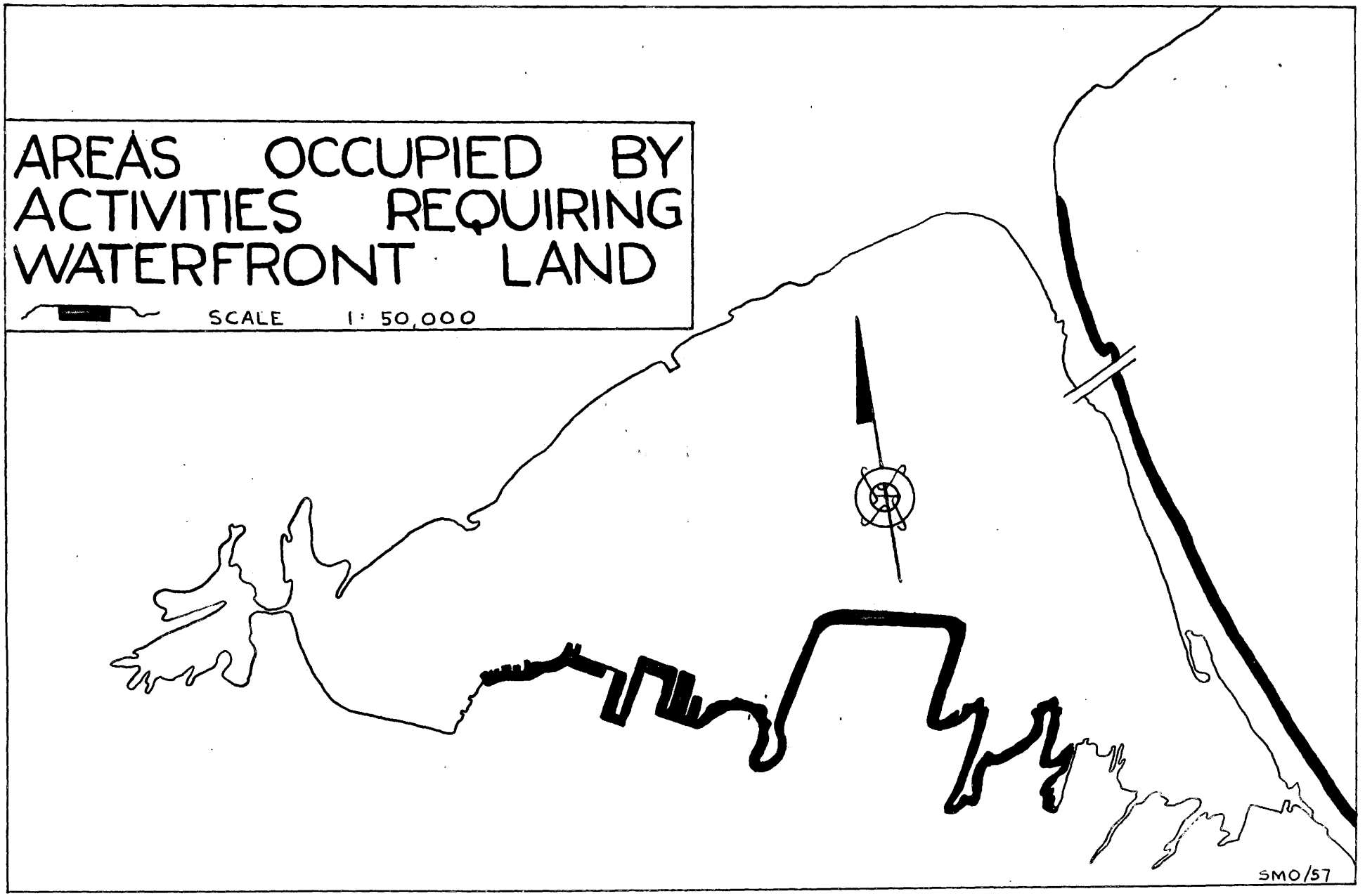
AREAS OCCUPIED BY ACTIVITIES REQUIRING WATERFRONT LAND
SCALE 1: 50,000
SMO/57

FIGURE 14

If space is to be supplied for the expansion of these activities, it may be done in two ways; by more intensive land utilization, or by land reclamation. For many activities along the waterfront, the first means of expansion may be employed. This is especially true for the various boating clubs on the south shore. These do not require much area on land since the basis of their operations lies in the water medium. Any sizeable expansion in the activities could be accommodated by an extension of docking facilities by land reclamation. The Leander Boat Club and the Power Boat Association appeal to people of a more specialized taste and are therefore not as likely to expand as the Royal Hamilton Yacht Club. The real limiting factor in any expansion of the Yacht Club is the Harbour Commission's Marine Railway where most of the larger private craft are kept through the winter season. In order to accommodate any sizeable increase in the activities of the Yacht Club, the facilities of the Marine Railway will have to be expanded.

On the eastern shore of the Beach Strip where the shore itself is the main area of recreation, it is not as easy to expand recreational activities. The decline of recreation in this area has been discussed earlier. There is no doubt that the transportational use of the Beach Strip will increase with the completion of the Skyway Bridge. The area suffers too from water pollution, a problem for which there is no real solution in sight. It is therefore not unreasonable to assume that the decline of active types of recreation will

continue, for the Beach Strip is even now, not a desirable site for activities such as bathing. However the main beach area south of the canal, could be developed into a zone of organized passive recreation. A public parkland here would serve citizens of the immediate area as well as a great number of travelling non-residents. The midway could be maintained; picnic tables and barbecue pits could be made available for public use. Attempts might be made at landscaping, so that this entrance to the city will be as attractive as possible.

The expansion of industry along the Hamilton water-front is of great importance. It is less easy to state what the possibilities for expansion are in industrial areas as an increase in industrial output is related not merely to the area occupied, but to the height and shape, technique, and overall efficiency of the plant. In most cases, there is land available for limited expansion. When this has been put to use, further expansion through land reclamation is feasible. Even now, the Steel Company of Canada and Dominion Foundries and Steel are reclaiming land at their present locations. Yet hundreds of acres more can be created between Ottawa Street and the Beach Strip and also in the south-western corner of the harbour.

In the south-east, the water is shallow and reclamation would be relatively simple. Much of the area has already been filled in naturally to the extent that it is a marsh. Industrial development here would be an

extension of the existing industrial area. In the south-west, the level lake plain is not as broad and most of the land required for industrial expansion would have to be reclaimed. However the water off shore in this area is deeper than in the south-east, so that reclamation would not be as easy. In addition, any such development in the south-west would mean the creation of a new industrial area which could conflict with existing land uses.

Both sites are suitable from the point of view of transportation, though the south-east, due to its proximity to the Skyway, will have some relative advantage with respect to trucking traffic. The south-west has the advantage of a nearby dense railway network. On the whole however, the south-east would be more suitable and more economical and is the favoured site. If Burlington Street is linked with Highway No. 2 on the north shore, (see figure 15), reclamation in the south-western end would be more feasible.

A further possibility for the expansion of industry is on to adjacent land, most of which is now residential. There are obvious disadvantages to living close to noxious and noisy industries; there are more desirable and attractive areas for residential development. The trend toward the shift of land use on the south shore, from residential to industrial uses has been noted in an earlier section. Residents of the area say that in five years, industry will have bought out the houses in the area between Sheffield Street and Burlington Street.

This is a good trend, for industry, in purchasing the land, allows the potentially unstable population to become mobile. Industry pays the highest price for these houses, for it represents the optimum use to which the land can be put.

Another activity which requires waterfront location is commerce. Since goods are constantly moving, an increase in water-borne commerce can be accommodated with greater efficiency of dispatching and handling freight. Any major expansion of commerce however, beyond that which present facilities can handle, will require the extension of present docks and warehouses, as is being done at Wellington Street, or the creation of new ones.

B: Delimitation of Areas Occupied by Activities not Requiring Waterfront Location:

In figure 14, those sections of the shoreline that have not been shaded, represent either vacant land, or land occupied by activities not requiring waterfront location. The land use maps show that in the Hamilton Harbour area, vacant land is not abundant. There are no idle sections along the north and west shores and the Beach Strip. On the south, there is vacant waterfront land near the incinerator and farther east at the foot of Strathearne Avenue and Parkdale Avenue. The Hamilton Harbour Commission is planning a public dock at Strathearne for some time in the future. The rest of the area should be available for industry.

The land occupied by activities not requiring waterfront location on the south shore, is mostly industrial.

Factories have located on the waterfront for many reasons. There are the advantages of the proximity to industrial water and to nearby road and railway networks; the availability of large areas of low-lying flat land; the desirability of large industries to be localized in one part of the city. Not only is this valid in an attempt to separate conflicting land uses, but also because the finished products of one industry may be used as the raw materials of another. This is particularly true in Hamilton where there are primary and sedondary steel industries.

In the south-west the waterfront is not being used for two reasons. First, steep slopes are common over much of the shore, but more important is that the Canadian National Railway line , utilizing the Iroquois Bar as an entry into the city from the north, closely follows the shoreline. There is at present insufficient space for the establishment of any other uses along the waterfront here.

For the harbour as a whole, it is residential rather than industrial land which comprises the bulk of waterfrontage in which direct use is not made of the harbour. Here, of course, there is no thought of land reclamation, and the critical question at the present time is not the expansion of residential land in these areas, but its survival in competition with other land uses.

Recreation at La Salle Park is still, in part, related to the waterfront, in that ferry boat service is provided from the city to the park, but this has declined

in recent years. The park is well situated in relation to the heavy automobile traffic on the No. 2 Highway. The recreational facilities which are there now should be repaired and added to; this could become an important area of passive recreation on the north shore. La Salle may even become the major urban park for the new City of Burlington.

The question now arises as to how much of the land along the waterfront which is not utilizing this feature of its location, might be used instead for activities requiring harbour frontage. Reference is made specifically to heavy industry and water-borne commerce since there is no evident likelihood of recreational activities requiring more waterfrontage than they now possess.

On the south and south-western shores, it would not be practical to displace the well-established industries which occupy this land. However, land could be reclaimed beyond these industries to accommodate new or expanding industries that require waterfrontage. The recent announcement of the North American Cyanamid plant which is to locate on Hamilton Harbour is a fine example of this method of development. The new plant will use by-products of the Dominion Foundries and Steel Company and will be situated on land reclaimed beyond the present limits of Dofasco land. Industries like the National Steel Car and Firestone, since they do not have private facilities for water-borne shipments, would not be adversely affected if industries were to locate on the harbour side of their property. Slips could be left, if desirable,

so that the present industries could maintain a contact with the harbour.

It should be noted here that the Hydro-Electric Power Commission owns 40 to 45 acres of land on the waterfront east of Kenilworth Street. This is not being used at the present time, but a few years ago, it was the location of a steam generating plant. The equipment has since been moved, but by 1962, a newer and larger plant is to be constructed. Hence although the Hydro does not use its waterfrontage now, the land will be required in six years' time, for coal will be imported by water for the steam plant. [1]

The north shore is not particularly suitable for waterfront requiring activities because the shore is much too steep. Theoretically, it would not be impossible to create a flat low-lying shore as a by-product of the extraction of sand and gravel from the flanks of the Iroquois Bar. However, this would greatly reduce the value of the north shore for the residential purposes which are now solidly established here. Any attempt to displace the expensive homes of the north shore would prove too costly and certainly impractical. In any case, such a site would have no access to existing railway lines.

It would be difficult to displace the cemeteries on the north shore and on the southern arm of the Iroquois Bar because of the sentimental values attached thereto. It would also be difficult to displace the various units of parkland located on the bar. Much of the bar is too narrow for any

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[1] Private Interview, Hydro-Electric Power Commission, Hamilton Ontario

other activity. The optimum use of this section is in providing an attractive entrance to the city and an area of passive recreation.

The Beach Strip is a multi-functional zone of residential, transportational and recreational land uses. It is facing a new phase with the construction of the Skyway; it is an area which is ripe for change. Physically, this is a suitable site for industry. The land is low-lying; pumping industrial water would be relatively cheap; the area is well-served by road and rail; it could be readily served by ship if the need arose; the water off-shore is shallow and reclamation can proceed readily - there has already been some reclamation for the foundations of the Skyway Bridge; it will be a good site from the point of view of advertising.

In addition, the value for residential purposes on the Beach Strip is low and will probably get lower, especially on the bay side which is closer to the new bridge. The lake side will improve somewhat because of less traffic which will use the local road and also because of the unobstructed view. It is not likely that industry will locate on the lake side of the Beach Strip immediately, however the location of industry or commercial docks and warehouses on the bay side is feasible. This is also a good site for stockpiling sand and gravel which may be used for local construction purposes.

CHAPTER VI

HAMILTON'S RELATIONSHIP TO THE CANADIAN ECONOMY

Industry is the main economic activity in Hamilton. The market for the finished products of the city's industries is nation-wide. Hence any expansion in Hamilton's production is dependent on the expansion of the Canadian economy as a whole.

Some businessmen believe that Hamilton has reached its peak as an industrial centre and will not grow to any great extent first, because of the trend toward decentralization of modern specialized industry and second, because of the desirability of having major steel production in other large metropolitan areas on the west coast and in Quebec. These are both important factors and cannot be overlooked.

However, despite these trends, Hamilton has gained a mementum in Canadian industrial production which should be taken into consideration. In addition, the city still offers good conditions for new industries which might locate in the area. It therefore seems reasonable to assume that industrial production in Hamilton will expand, though the percentage contribution to the total of Canadian production may go down.

The commercial activity in Hamilton is much less important than the industrial because the commercial trade area which the city serves is so small.

There has always been a degree of commercial competition between Great Lakes ports, but this has become

much greater with the anticipation of the completion of the St. Lawrence Seaway. Plans are afoot for increased and improved waterfront facilities in Hamilton Harbour. The major changes planned by the Harbour Commission include an extension of the Wellington Street dock; a new approach channel and turning basin; a slip which will provide access to Strathearne Avenue and add new docking facilities; the construction of new docks north of Ship Street and Strathearne Street.

Hamilton's keenest competition comes from Toronto and any expansion of Hamilton's commerce is to be gained at the expense of Toronto. There are several significant factors involved in this shipping rivalry. Toronto is the largest urban area on the Canadian side of the Great Lakes. Also it is the wholesale centre for the majority of towns and cities throughout Ontario. Hence, it not only requires a great amount of consumer goods to provide for its own large population, but also for its large wholesale trade area.

Most of the ocean-going ships carry package freight and only a very small proportion of Hamilton's large tonnages is made up of this type of cargo. With the completion of the St. Lawrence Seaway, larger ocean-going ships will be accommodated on the Great Lakes. Operating costs will be higher and undoubtedly, attempts will be made to keep expenses as low as possible. It is conceivable therefore, that unless a great deal of cargo is consigned to Hamilton, these larger ships will find it more economical to discharge goods that are destined for Hamilton in Toronto.

A significant point also is the degree of commercial mementum which Toronto has gained throughout its development from a trading post to a metropolitan centre. These factors would seem to indicate that, though Hamilton will take a share of the overall expansion, unless there is a sizeable increase in the population of Hamilton's trade area, Toronto will draw a much greater proportion of the anticipated increase in water-borne commerce.

CHAPTER VII

CONCLUSIONS

Despite a period of development of more than 125 years, Hamilton Harbour is essentially a natural feature rather than a man-made one. Though there have been some modifications, natural conditions still dominate. It follows then that either development has been slight or natural conditions are so favourable that little change of the natural feature is required. Both of these explanations are valid in the development of Hamilton Harbour. In order to use and fully develop all parts of a harbour in which there are many natural physical diversities, there must be a great variety of activities. In Hamilton Harbour, commerce is limited because of the city's small trade area; some types of recreation are precluded because of water pollution. The only major activity is heavy industry. Yet, though the variety of development has been slight, the total industrial development has been extensive. In addition, industry uses the south shore of the harbour, that section for which it is best suited. Hence relatively little modification has been necessary.

The land utilization patterns on the north shore, the Iroquois Bar and the south shore represent the optimum uses to which the land can be put. Although sections of the south shore are at present vacant, the pattern of land use throughout the rest of the area would seem to

indicate an expansion of industrial development on to the vacant land. On the Beach Strip however, the land is not being used to the optimum extent; here, the present multi-functional use does not represent a fine adjustment to the potentialities of the area.

The major obstacles to further expansion in the Hamilton Harbour area are cultural, though there are minor physical obstacles as well. Industry, for example, in order to use the land, must alter it physically. This may involve reclamation or dredging, but it is not a critical factor since the stimulus for physical expansion can be provided by a growth of the economy as a whole. On the Beach Strip however, the situation is much more complex, and the major obstacles to expansion are cultural, especially those resulting from the mixture of competing land uses.

It is reasonable to assume that any future expansion will not change Hamilton's function as an industrial centre. The harbour too will very largely continue in its existing functional pattern except along the bay side of the Beach Strip where industry can locate to advantage and establish the optimum use of the land.

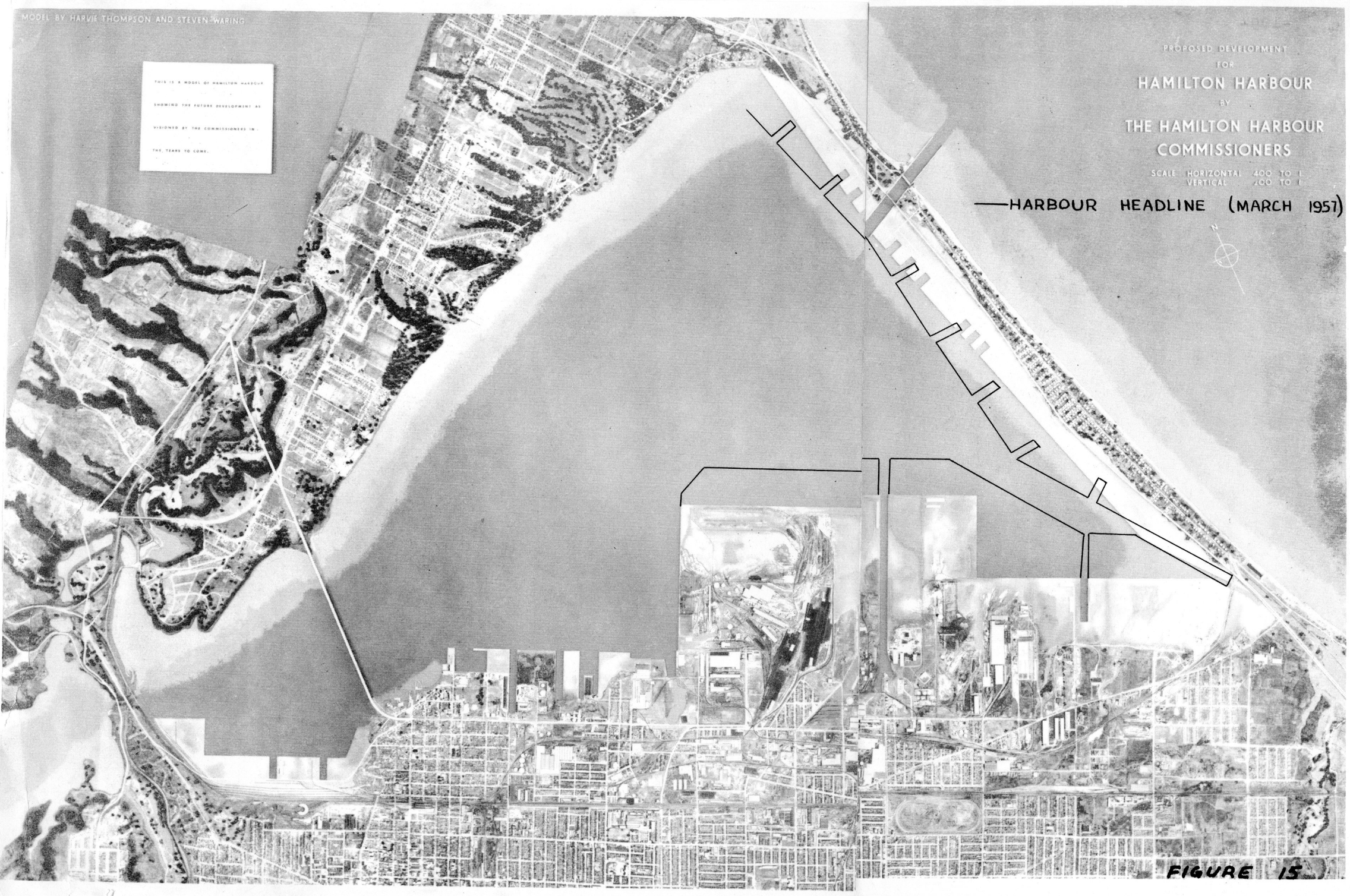
MODEL BY HARVIE THOMPSON AND STEVEN WARING
THIS IS A MODEL OF HAMILTON HARBOUR
SHOWING THE FUTURE DEVELOPMENT AS
VISIONED BY THE COMMISSIONERS IN
THE YEARS TO COME.
PROPOSED DEVELOPMENT
FOR
HAMILTON HARBOUR
BY
THE HAMILTON HARBOUR
COMMISSIONERS
SCALE HORIZONTAL 400 TO 1
VERTICAL 200 TO 1
HARBOUR HEADLINE (MARCH 1957)
N

FIGURE 15

A P P E N D I C E S

APPENDIX I

Lineal Feet of Hamilton Harbour Commission Docks as of April 1, 1955.

Marine Dockyard		712 x
James Street	1030	(462 x)
Marine Garage		782 x
Catherine Street	870	
Revetment Wall	980	
Wellington Street (including north face of Wellington Slip)	1920	
Terminal No. 1	4115	
Terminal No. 2	3220	
La Salle Dock	862	
Leander Boat Club		129 x
	14620 feet	
x - small craft mooring only -	2085'	
- docks dredged to 23' 2WL	12535'	
	14620'	

Lineal Feet of Privately Owned Docks

Royal Hamilton Yacht Club	552 x
Canada Steamship Lines	1590
International Harvester Company	2130
Steel Company of Canada	9840
Dominion Foundries & Steel	3090
Canadian Industries Limited	2880
Hamilton By-Products & Coke Ovens	1380
	21462 feet

APPENDIX II

Dock Acreages (as of April , 1955)

Hamilton Harbour Commission Docks:

James Street	3
Wellington Street	6
Terminal No. 1	52
Terminal No. 2	13
La Salle	1½
Burlington Canal (Department of Public Works)	2
	77½ acres

Private Docks:

Steel Company of Canada	32.49
Dominion Foundries & Steel	14.69
Hamilton By-Products & Coke Ovens	30
Canadian Industries Limited	(no dock storage)
International Harvester Company	2.00
National Slag	47
	126.18 acres.

APPENDIX III

HAMILTON HABOUR INDUSTRIAL SURVEY

Name of Industry.....

I RAW MATERIALS USED IN INDUSTRIAL PROCESSES

Commodity	Method of Transport (water, truck, rail)	Tonnage Normally Used Annually	Normal Point of Origin

Is the present position relatively stable, or do you anticipate that these figures will change in the future?

II USE OF HARBOUR AS SOURCE OF WATER AND/OR FOR WASTE DISPOSAL

1. Volume of water used daily:
   (a) from city mains -

   (b) from private pipeline to harbour -

2. Volume of liquid wastes disposed of daily into harbour:

3. Which impurities, if any, exist in appreciable quantities in these wastes?

III SHIPMENT OF FINISHED PRODUCTS

(Kindly indicate final destination by area as follows, using letter or letters after percentage figure):

(A) Western Canada (British Columbia to Manitoba)
(B) Ontario
(C) Quebec
(D) Maritimes
(E) U.S.A.
(F) Overseas

Commodity	Percent Shipped By: Water	Rail	Truck	Other
eg. Autos	3D 2F	10A 40B 20C	25B	---

Is the present position relatively stable or do you anticipate that these figures will change in the future?

IV WATERFRONT FACILITIES

	Docks	Warehouses	Open Storage
Possess private facilities more than adequate for present company operations			
Possess private facilities adequate for company operations			
Possess private facilities not adequate for company operations			
Do not possess private facilities: (Please list facilities used)			

V EXPANSION

Are there plans for the expansion of your industry which will require additional land on the waterfront?

If so, (a) is this land already in the possession of the company?

(b) is it to be obtained by purchase?

(c) is it to be obtained by reclamation ?

COMPARATIVE TONNAGE STATEMENT - 1954 & 1955

COMMODITY	1955	1954	Increase	Decrease
Inward				
Automobiles	(253)	(854)		(601)
Coal	2,859,721	2,229,741	629,980	
Fluorspar	5,957		5,957	
Gasoline	4,168	14,862		10,694
General Package	29,371	24,251	5,120	
Limestone		28,096		28,096
Miscellaneous Freight	1,097		1,097	
Oil-Fuel	303,614	229,562	74,052	
Ore - Iron	3,234,279	2,244,260	990,019	
Phosphate Rock	75,960	99,308		23,348
Potash	6,500	7,450		950
Salt	20,025	23,800		3,775
Sand	328,796	350,032		21,236
Scrap	215,697		215,697	
Soybeans	18,707	17,784	923	
Sugar	31,144	23,731	7,413	
Sulphur	31,360	34,292		2,932
Wine		83		83
- TOTAL INWARDS -	7,166,649	5,328,106	1,930,258	91,715
Outwards				
Automobiles and Trucks	(4,983)	(6,369)		(1,386)
Benzol	9,276	7,067	2,209	
Beer-Liquor-Wine	531	862		331
General Package	228,903	174,689	54,214	
Machinery-Agricultural	2,252	1,498	754	
Oil	1,161	3,909		2,748
Sand	61,807	73,536		11,729
Scrap		23,219		23,219
Steel Ingots & Pig Iron	18,553		18,553	
Tar	23,034	16,959	6,075	
Twine	2,400	3,966		1,566
- TOTAL OUTWARDS -	352,900	312,074	81,805	40,979

RECAPITULATION

	1955	1954	1953
INWARDS	7,166,649	5,328,106	6,809,379
OUTWARDS	352,900	312,199	289,647
- TOTALS -	7,519,549	5,640,305	7,099,026
- NO. OF VESSEL ARRIVALS	1,566	1,296	1,355

- 1955 INCREASE over 1954 - 1,879,244 Tons
  1955 INCREASE over 1953 - 420,523 Tons

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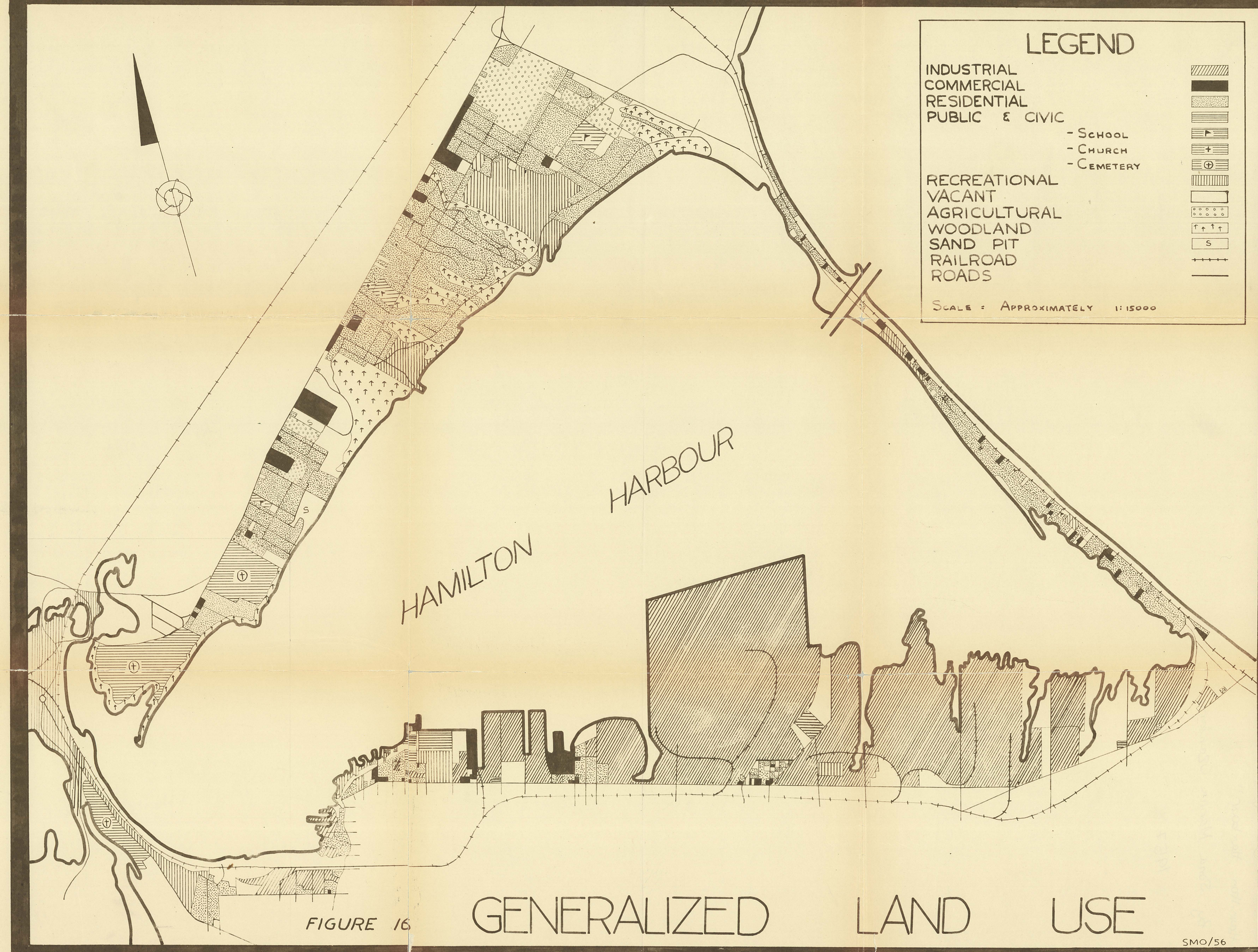

FIGURE 16

GENERALIZED LAND USE

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