PLANNING PRINCIPLES FOR THE PORT-CITY INTERFACE

by

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We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

November 1997

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ABSTRACT

The once close physical, functional, economic and cultural solidarity between ports and cities has diminished as a result of changes within both ports and their surrounding urban areas. Spatially, ports and cities have become separated as port structures have grown and evolved to meet the demands of trade and shipping technology over the past few decades. This separation is exacerbated by changing social priorities in the use of urban waterfront space and heightened interest in quality of life issues. As the pressures affecting the urban waterfront continue to grow, the port-city relationship has become strained.

This paper is concerned with how the relationship between ports and cities can be improved to support the complementary development of the port with its urban region and, at the same time, maintain the quality of life city residents have come to expect. More specifically, this study seeks out the appropriate planning principles, strategies and approaches that can effectively address the problems and land use conflicts at the port-city interface.

The study begins by exploring the literature of structural and societal changes that are affecting port city waterfronts and the conflicts that result between ports and cities in their planning for the waterfront. In a number of cases, these challenges are being met by the separate actions of ports and cities; however, given port-city linkages in many issues it is revealed that there is much to be gained through the
effective coordination of efforts based on shared planning principles. A review of
the Vancouver cityport confirms the port-city challenges suggested by the literature
and interviews with municipal and port representatives lend support to the concept
of port-city planning principles.

The major conclusions of this study are that ports and cities can benefit from
increased collaboration on the basis of agreed planning principles and a shared
approach to waterfront planning that recognizes each party's needs. The challenge
to be borne by city and port planners is one that seeks reconciliation, balance and
the re-building of a synergistic relationship.
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My thanks also are due to a number of other individuals in many libraries and the Vancouver Port Corporation who kindly assisted me in compiling the necessary literature and graphics for this work.

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...[port cities] possess one great advantage—all the products of the world can be brought by water to the city in which you live, and your people in turn can convey or send whatever their own fields produce to any country they like.

Cicero, *The Republic*
1.0 INTRODUCTION

Throughout history, cities and ports have evolved together, forging strong functional, economic and cultural links between them. Konvitz (1978: 5) suggests that port cities are distinguished by “their potential for enormous growth and for contact with distant cultures, societies, and economies.” These linkages to the outside have not only allowed for the important dissemination of ideas, customs, commodities and people across the oceans but have led to the creation of many of the world’s largest and most important cities. Moreover, the activities of the harbour have given rise to a distinct “maritime culture” evident in a way of life that is focussed on the sea and the benefits it brings (Konvitz 1978).

According to Broeze (1985: 209), the term 'port city' (which is also used interchangeably throughout the literature with the term 'cityport') "evoke[s] clear, and often more than just pictorial, images in the mind of the beholder: the bustle of nineteenth-century South Street, New York, or the more modern Brooklyn piers.” In this sense, the port is recognized as a major component of its urban setting in the way it contributes to the form and identity of the city. Yet, despite the widely known and diverse romantic notions and more quantitative definitions attempted by some, Broeze (1985) believes that the concept remains uncertain given the dynamic nature of the port-city relationship.

Konvitz (1982: 24) suggests that the association between ports and cities indeed
has changed such that the role of today’s ports is no stronger than that of airports in creating a city’s character and further argues that ports have become “peripheral, spatially and culturally, to the city whose name they carry.” With the port’s diminishing role in its urban environment, its coexistence with the adjacent community has become rather uneasy. The resulting discord has led McCalla (1983: 48) to the following definition:

The term cityport, which can be applied to all major ports within an urban setting, is used to acknowledge the importance of the port function in these cities, and the particular conflicts that arise in the waterfront as the port attempts to expand in an area where other land uses, independent of the port, also have land requirements.

The declining cultural association between ports and cities in itself may not be an orthodox planning concern; however, it can translate into marked differences between port and city approaches to the urban waterfront. Hoyle (1989: 429) suggests that “[f]rom many standpoints, perhaps particularly that of the urban planner, there often appear to be conflicting ideas and objectives on the port side and on the urban side. Sometimes there is cooperation and harmony, sometimes there is hostility and disagreement.” Konvitz (1978: 6) points to port city planning as a means to provide port cities “with a framework appropriate to their functions in the maritime economy.” The changes and conflicts at the city-port interface demand attention by port and city planners if suitable approaches are to be developed that will increase mutual understanding of the external pressures faced by ports, the interdependence between a city and its port, and changing social demands of city residents, and effectively address land use issues of mutual interest. This work is
intended to further the dialogue between port and city planners and help initiate appropriate responses to their shared challenges within their respective organizations.

1.1 Research question

This study attempts to understand and begin addressing the mutual challenges of port and city planners. The central research question is, therefore, in light of the changing cityport waterfront, what are the appropriate planning principles, strategies and approaches that effectively address the problems and land use conflicts experienced between cities and ports along their interface?

To answer the research question, this study, first, investigates the changes occurring along the port-city interface and describes the resulting conflicts and, second, investigates how planning approaches can help alleviate conflicts and begin reestablishing the links once enjoyed by ports and cities. To meet these objectives the study will address the following points:

1. How has the cityport waterfront changed through history? What has precipitated the changes? What are the results of the changes?

2. What is the role of ports and cities along the urban waterfront and what unique factors do they encounter in their planning functions? What do documented approaches offer in the way of possible principles and strategies?

3. How has the Vancouver port-city interface changed over time? What are some of the challenges being faced and what observations and examples illustrate appropriate planning principles and their effect?
4. What do the literature and the Port of Vancouver case study offer to improve planning responses at the port-city interface?

1.2 Relevance of study

The literature on port cities is rich and originates from many different perspectives. It includes accounts of cityport history (e.g., Konvitz 1978), descriptions of ports and their development (e.g., Bird 1971; Takel 1974); other works investigate the linkages between ports, cities and regional development (e.g., Hoyle & Pinder 1981a; 1992b).

Beginning in the 1970s, increasing attention was drawn to the way in which cityport waterfronts are changing. Works by Slack (1975), the Canadian Ministry of State for Urban Affairs (1978), Norcliffe (1982) and Hoyle and Hilling (1984) analyze the changes in the port industrial structure and their effects on port cities. In some cases, especially within North America, port restructuring has provided cities with opportunities to reconnect with their water edges through waterfront redevelopment or regeneration. This in turn has led to a growing interest by academics and professionals in the study of these processes which continues today (e.g. Harney 1979; United States Office of Coastal Zone Management 1980; Waterfront Center 1984; Hoyle, Pinder & Husain 1988; Breen & Rigby 1994). This initial interest in urban waterfronts has been paralleled by increasing environmentalism and the emergence of coastal zone management principles, approaches and legislation (such as that passed by the United States government in 1972).
Meanwhile, a 1982 article by Hayuth has refocussed attention on the port-urban interface through a unified understanding of the changes occurring within cityports from both the water and land sides as well as their resulting conflicts. This theme has also been addressed by Konvitz (1982) and in later works by Hayuth (1988) and others found in Hoyle, et al. (1988).

This study is intended to supplement the work on the port-city interface by providing further insight into the problems and solutions in a particular port city, Vancouver, British Columbia. By addressing planning issues specifically, the study attempts to bridge the gap between port and city planners by encouraging a better understanding of shared challenges, an understanding that is critical to building better relationships through which common problems can be addressed to the mutual benefit of ports and cities. In this way, the study offers a contribution to planning literature, especially that which is concerned with port cities, land use conflict and cross-jurisdictional issues.

1.3 Methodology

The study's methodology involves two principal means of research: literature review and personal interviews. The literature review is based on relevant literature consisting of texts, reports, journal articles and other governmental publications. The literature is used to document the port-city relationship, port industry trends, waterfront redevelopment, community interests and also to support the case study
and the paper's conclusions. The case study and conclusions are further reinforced by the results of in-depth interviews with senior planners from five municipalities located adjacent to the Port of Vancouver and a planner and the President and CEO of the Vancouver Port Corporation.

The Vancouver port city was chosen for three primary reasons: both the port, which is Canada's largest, and its surrounding urban area, the nation's third largest, are expanding rapidly, thus creating a high potential for conflict between the two; the port's stages of development are representative of generally documented trends; and the port is bounded by a number of municipalities, thereby allowing for the development of a composite perspective within a single cityport.

1.4 Scope and limitations

This study focusses on port cities that are experiencing the challenges associated with growth pressures and their effects on the port-city interface. While both ports and cities in these areas may still experience declines in some sectors on a periodic or even a secular basis, their overall economic health is positive. The reason for excluding port cities embroiled with a decaying waterfront is that the pressures from competing interests, especially between port and urban uses, may be less intense and therefore foster a more collaborative climate. In addition, the planning principles that apply to disadvantaged port cities may not be appropriate to those in a more favourable economic position.
The study does not provide a detailed analysis, spatial or otherwise, of the physical changes that have occurred in the case port city of Vancouver but rather reveals the changes through literature, interviews and illustrative examples. For the purposes of this study, the Vancouver cityport waterfront is found along the frontier between the Port of Vancouver, under the jurisdiction of the Vancouver Port Corporation, and its key adjacent municipalities of the City of Vancouver, the City and District of North Vancouver, the City of Burnaby and the Municipality of Delta. The port shares boundaries with additional municipalities in the region; however, the pressures and conflicts in these other areas are not as significant or deal with issues, such as private residential docks, that may not be representative of typical problems faced by port cities with a well developed urban harbour.

While the study focuses on planning issues, it necessarily relies on the writings of various disciplines such as geography, port development, management and engineering, coastal zone management and others, to establish the background. The relative absence of planning literature indicates both a lack of interest in the subject by planners as well as an under-developed perspective and theory. Despite this limitation, the richness of the other works and the thoughts of practising professionals should well serve to initiate the dialogue.

The planning issues addressed focus on land use and, to a lesser extent, on transportation and related matters. Although a complete planning framework should also include environmental issues such as wildlife habitat and water quality, these
are not included as they involve the efforts of many different agencies. Watershed or estuary based institutional arrangements which address land use and environmental issues do exist in some port areas. However, this paper is intended to examine only the relationship between ports and cities.

Through its findings, the study recommends a variety of planning principles to help improve the functioning relationship between ports and cities. Although some examples of planning strategies are offered, they are not meant to be an exhaustive list of planning mechanisms but rather to illustrate how the planning principles brought out through the literature and interviews might be implemented. The principles are intended to have broad application, though planners from other jurisdictions are encouraged to evaluate the principles and determine what is appropriate given their particular developmental and institutional circumstances. This caveat applies particularly to the specific mechanisms available to planners in different jurisdictions and what is achievable under their governing legislation.

1.5 Organization of thesis

To set the stage, the evolution of cityports is explored in Chapter Two. Literature providing accounts of cityports in Europe and North America is investigated to uncover the historical development and ties between ports and cities. Shipping and port industry trends are tracked to demonstrate how the port complex has changed over time and how this has impacted port-city relations. Landside changes in cities,
such as waterfront redevelopment, recreation and the parallel changing interests of cityport residents are explored to balance the perspective on cityport challenges.

Chapter Three also looks to the literature to explore the role of ports and the planning challenges ports and cities face along the waterfront. The chapter concludes with a set of planning principles derived from the literature that are applied to the sample port city in the following chapter.

The next stage of the study assesses the Vancouver cityport experience. Chapter Four illustrates how the changes at the Vancouver port-city interface parallel the documented changes. Drawing information from publications and interviews, port city challenges and approaches are reviewed. The results are applied to the planning principles from the previous chapter to establish their validity in the sample port city.

The final section, Chapter Five, presents an assessment of the planning principles established in the previous chapter based on the lessons from the Vancouver cityport experience. A revised set of planning principles is offered along with additional conclusions and recommendations which may be considered in developing planning approaches for the port-city interface in Vancouver and elsewhere. Areas for future study are also suggested in this concluding chapter.
2.0 PORT CITY EVOLUTION

2.1 The early port city

Ports have always had an important role in their host cities; "in the broader sense, coastal cities generally owe their origin and redevelopment to the port function" (Hoyle 1989: 429). It may be true that the association of first settlement with the port is predominant; however, the relationship between ports and cities, especially in their formative phase, is not one-sided. It is based on a strong interaction of functions benefitting both.

Throughout a port city's early stages of growth, the functions and prosperity of both the port and the adjacent city are closely tied. “Historically, the area immediately surrounding the port was the sole or primary hinterland... with the result that a mutual interdependency was felt” (Boschken 1988: 24). Over time, the hinterland of the port grows as domestic resources are exploited, transportation routes are improved and markets opened up abroad. Mass production introduces surplus for trade, first regionally, then beyond. The port city becomes increasingly important as a regional centre as it attracts industry, expands trade links to external markets and fosters the exchange of ideas, technology and new cultural perspectives. Through this early period, the city and its port continue to grow together and support one another, one providing vital services, products and labour, the other facilitating trade and economic growth, both reinforcing a shared culture.

In [port cities] arose a specific maritime culture and the life of their inhabitants evolved around the wealth brought to them by the sea...
In many cases the identification of these cities with the sea became so close that motifs of port and sea would be incorporated into their coats of arms and any pictorial representations of them (engravings, drawings, paintings) would emphasise their maritime character (Pesquera 1994: 322-3).

As the original settlement is focussed functionally and physically around maritime activity, ports have a strong influence on the layout of their surrounding urban areas (Slack 1975; Hoyle & Pinder 1992a). The development of the first piers usually marks the location of the city core and affects adjacent land use and the resulting street pattern. Pesquera (1996) describes the early physical relationship between the port and urban areas as intimate, without any differentiation between the two areas. This relationship is highlighted by the coexistence of maritime activity with commercial and residential areas accommodating businesses and city residents linked to port activities.

Increasing trade through the port encourages the introduction of suppliers of auxiliary goods and services that support the port function. Over time, the development of these businesses adjacent to the port leads to the creation of a distinctive “dockland” (Slack 1975) or “sailortown” (Hilling 1988) with activity directly related to ships in port, cargo transfer operations and arrangements for ship and cargo movements (Norcliffe 1982; Slack 1989). Ship-related businesses include ship chandlers, ship building, vessel repair and providers of marine equipment; typical cargo services are stevedores and companies manufacturing and supplying cargo handling equipment; vessels and their cargo are served by shipping
companies and agents, marine insurance agents, freight forwarders and customs brokers. Legal and illegal services for visiting ship crews, such as boarding houses, taverns and brothels, led to the notorious character associated with early port districts including those of London, San Francisco and New York (Hilling 1988). Railway companies also became major users of waterfronts in the late 1900s by extending their rail lines onto piers, across major trestles and by creating large rail yards in port areas for the transfer of goods from rail to ship (Moss 1976).

The early port city demonstrates clear interdependence between the urban area and the port function such that their identities are unified. Physically, economically, socially and culturally, the port and city are intertwined, each benefitting from the presence and growth of the other. Over time, however, external controlling factors dominated by changes in the shipping industry and dynamic internal pressures stemming from changing social priorities led to the disintegration of the once close ties.

2.2 Changes in shipping and ports

2.2.1 Increasing vessel size and changes in cargo handling

With the introduction of vessels powered first by steam then by oil-based fuel, shipping routes greatly expanded in number and distance from many ports. This allowed for the trading of a vast array of cargoes and increased demand for shipping. Initially, shipping companies responded with a greater number of vessels
calling at a variety of ports. By the mid-1900s, this approach proved costly given the capital cost of building vessels and their operating costs while in transit and at port. Growing competition among shipping lines and the extraction of resources in previously remote areas throughout the world also created pressures on shipping lines to improve their efficiency (Takel 1974).

Increasing ship size results from economies of scale (Bird 1971) and technological innovation. Despite the higher capital cost of larger ships, they are cheaper to build on a per tonne basis. Carriage costs per tonne of cargo can be dramatically lower as little increase in labour is required, and fuel costs remain either constant or fall with the increasing efficiency of newer ship’s engines. The following two examples illustrate the economic benefit of larger vessels:

- a 100,000 dead weight tonne (DWT) tanker requires only a slightly larger crew than a 30,000 DWT tanker, uses less than twice as much fuel and requires the same costs of administration (MSUA 1975: 7);

- a 200,000 DWT tanker costs five times the capital to build as a 25,000 DWT vessel yet carries eight times the cargo with only a twenty-five percent increase in crew members (Takel 1974: 7).
Table 2.1 Evolution of tanker size

<table>
<thead>
<tr>
<th>Year</th>
<th>Deadweight tonnage</th>
<th>Length (m)</th>
<th>Beam (m)</th>
<th>Draught (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>16,500</td>
<td>160</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>1950</td>
<td>28,000</td>
<td>190</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>1960</td>
<td>70,000</td>
<td>250</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td>1965</td>
<td>120,000</td>
<td>270</td>
<td>42</td>
<td>16</td>
</tr>
<tr>
<td>1970s</td>
<td>200,000</td>
<td>325</td>
<td>50</td>
<td>19</td>
</tr>
<tr>
<td>1980s</td>
<td>320,000</td>
<td>340</td>
<td>55</td>
<td>24</td>
</tr>
<tr>
<td>1990s</td>
<td>476,000</td>
<td>350</td>
<td>60</td>
<td>28</td>
</tr>
</tbody>
</table>


Table 2.1 shows the dramatic increase in size of liquid bulk vessels over the last five decades. It should be noted that the largest of the tanker vessels, classed as Very Large Crude Carriers and Ultra Large Crude Carriers, are capable of calling only at a few of the world’s ports owing to their extreme size and draught requirements. Although dry bulk carriers have also increased in size to as much as 356,000 DWT, about half of all vessels are below 50,000 DWT (Hayuth & Hilling 1992: 43). Growth in general cargo vessel size has been restricted by the labour-intensive handling of general cargo, which reduces the potential productivity gains of larger ships evident in bulk shipping. Larger ship size has become practical with the introduction of specialized ships transporting single or limited cargo types such as lumber or automobiles.

Without improved handling methods the efficiencies gained by larger and faster
ships would be lost through costly delays in port. Thus along with the increasing ship size, vast improvements to bulk cargo handling have developed resulting in, for example, a thirty-fold increase in grain handling rates (Hayuth & Hilling 1992). Brookfield (1984) identifies a number of factors which have led to similar progress in the handling of general cargo: growing world trade in the 1950s, strained port facilities, rise in labour costs and increasing shipping costs. While bulk vessel size has been an important factor in encouraging more efficient cargo handling, the labour requirements and resulting time in port were critical elements in initiating the drive towards mechanization and consolidating cargo into standard volumes.

Traditional general cargo handling was accomplished by gangs of dock labourers who manually transferred goods in four stages: moving the cargo from the land carrier, to storage, to dockside and into the ship’s hold (Schwimmer & Amundsen 1973). Owing to the multiple handling of cargo, handling rates of ten to twelve tons per gang-hour (Hilling & Hoyle 1984) and one to two hundred tons per shift (UNCTAD quoted in Hayuth 1982) were common. As a result of the low productivity general cargo ships spent up to eighty percent of their time idle in ports (Hayuth & Hilling, 1988).

To combat the increasing costs, port labour began to be assisted by, and to some extent replaced by, mechanized forms of cargo handling. Manual lifting and hand carts became replaced by ship and shore mounted cranes, conveyors, dock trucks and fork lifts, each improving the efficiency of cargo transfer. Mechanization further
led to improved methods of bundling cargo in regularized units which speeded cargo transfer and assisted in storing in the ship's hold. In its simplest forms, unitization involves consolidating loose cargo in larger bundles or stacking goods on standard pallets (Hilling 1987). Other advances include LASH\(^1\) (Lighter Aboard Ship) and RO-RO\(^2\) (Roll On-Roll Off) systems, but the greatest progress has been achieved through containerization (Chilcote 1988).

Containerization, which refers simply to the shipment of cargo in standardized metal boxes, offers numerous benefits: mechanized handling; transferability between sea and land modes of transport; and strong, secure storage for an extremely wide range of cargoes. The exact origins of the container concept are disputed by various authors. Chilcote (1984) suggests the use of boxed cargo can be traced to Roman times and more recently to the United States Navy during World War II. However, he suggests that the modern concept did not commence until the development of the standard truck container, which offered the benefits of intermodality, and its 1956 adoption by the original owner of the Sea-Land Corporation in the United States. Others, such as Bird (1971), point to the demands of the United States military for efficient cargo shipments during the

\(^1\)LASH systems involve two stage shipping wherein loaded barges, used for short distance shipping, are transferred to and from specially designed mother ships for long-distance shipment. They are often used to transfer cargo between deep-sea river mouth ports and upriver ports restricted by draught.

\(^2\)RORO systems allow for the convenient transfer of cargo between ship and dock either on a wheeled chassis or in some other wheeled form via a ramp.
Korean War, while others (Lyon & Duggan 1993) attribute containerization to the White Pass and Yukon Route of North Vancouver, British Columbia and its purpose-built ship, the *Clifford J. Rogers*, in 1955. Whatever the origin, most agree with Brookfield (1984) that the beginning of the modern container revolution began in the 1950s with a steep rise in labour costs, the increasing development of highways and railways and the concept of a 'land bridge'³ between Asia and Europe.

The adoption of containers has led to impressive gains in productivity throughout the port and shipping industry. Whereas a conventional general cargo terminal can handle 150,000 tonnes of cargo in one year, containerization has increased that productivity to 1,200,000 tonnes per year (IAPH 1993). Unlike general cargo, containerization productivity continues to benefit from increasing ship size. Table 2.2 illustrates the trend in containership size and capacity measured in TEUs (Twenty-Foot Equivalent Units), the smallest standard container length.⁴

³A 'land bridge' refers to the substitution of land transport, typically rail, for a portion of a sea route between source and destination. The concept is illustrated by the Asia to Europe route in which containerized cargo from Asia is shipped by sea to the west coast of North America, transferred to trains for shipment to the North American east coast and transferred again to ship for transport to Europe.

⁴Modern container dimensions vary, though standard lengths are twenty, forty and forty-five feet; heights are either eight feet, six inches or nine feet, six inches; widths are constant at eight feet.
Table 2.2 Container Ship Evolution

<table>
<thead>
<tr>
<th>Generation</th>
<th>Length (m)</th>
<th>Capacity (TEUs)</th>
<th>Characteristics (type and dates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>137</td>
<td>up to 1,000</td>
<td>converted dry cargo vessel (pre-1960) converted oil tanker (1960-1970)</td>
</tr>
<tr>
<td></td>
<td>192</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td>213</td>
<td>2,000</td>
<td>cellular container ship (1970-1980)</td>
</tr>
<tr>
<td>3rd</td>
<td>262-290</td>
<td>4,000</td>
<td>Panamax* cellular container ship (1985)</td>
</tr>
<tr>
<td>4th</td>
<td>274-305</td>
<td>4,000-5,000</td>
<td>Post-Panamax (1988-2000)</td>
</tr>
<tr>
<td>5th</td>
<td>335</td>
<td>5,000-6,000</td>
<td>Post-Panamax-Plus (2000-)</td>
</tr>
</tbody>
</table>

*Panamax refers to the largest vessels capable of transiting the Panama Canal. Post-Panamax and Post-Panamax-Plus vessels cannot pass through the Canal.

Source: Vickerman, 1992, 335

While the above table indicates that in 1992 the fifth generation of container vessels was not expected until 2000, it may in fact be emerging already. In the fall of 1996, the Orient Overseas Container Line launched the first of its new five thousand TEU vessels, while other lines have placed orders for vessels of 5,500 TEU (AAPA Advisory 1996). More recently, P&O Containers placed orders for two 6,674 TEU container ships which will become the world's largest (Ryan 1996). These giants are surpassed only in concept by plans of a German shipbuilder for vessels up to eight thousand TEU (AAPA Advisory 1996).

2.2.2 Port structural changes

What may not be apparent from the discussion on changes in ship size and cargo handling is that new demands are being placed on ports through the direct
requirements of shipping lines. To meet these challenges ports are being forced to adapt their physical structures in ways that are significantly altering our urban waterfronts. Although the changes occurring in ports are evolutionary, their effects on the urban waterfront can be considered to be revolutionary.

Based on his observations of British river ports, Bird (1971) developed his “Anyport” model to describe the sequential development of ports and their terminals. The six stages of the model represent successive phases of port development, each precipitated by changes in ship size, cargo handling innovations and growing congestion in the harbour. These stages can be summarized by the gradual downstream movement of port facilities from the original port city core and the modification of port structures first through the maximization of berths, then by modification of the berth structures from piers to linear wharves and to specialized deep-water berth structures. Although based on river ports, the fundamental aspects of Bird’s model also hold true for seaports.

Initially, the structure of the traditional port core was based not only on the previously discussed close association of port and urban functions but on the nature of shipping and cargo handling requirements of that time. With the relatively small size of general cargo ships, increased shipping activity depended on a larger number of ships creating the need for a considerable number of berths in ports. To maintain close proximity to the urban core and to maximize the number of berths, ports relied on the construction of numerous ‘finger piers,’ each with its own cargo
shed, projecting from the shore. Hilling (1987) recounts that in the early 1900s over seven-hundred and sixty piers could be found along the Manhattan and Brooklyn waterfronts of New York City. This structure was the most efficient for traditional cargo handling as it minimized the distance for multiple cargo movements between ship and shore.

Bird’s model suggests that as the availability of the inner urban waterfront declines with increasing pier development, new port facilities are forced to locations away from the original core. This migration allows for additional pier construction in areas less constrained by growing congestion and also meets the demands for deeper draught with the introduction of larger ships. Locations away from the inner harbour also have the benefit of additional upland area which becomes increasingly important with the growing scale of shipping and the requirements of new handling methods, particularly containerization.

One of the greatest impacts of modern shipping is the changing configuration of port facilities toward linear wharf structures and land extensive terminals. The linear wharf, characteristic of modern bulk and container terminals, results from requirements for longer deep-water berths and large storage and handling areas.\(^5\)

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\(^5\) Takel (1981) describes four main functions of storage areas: a ‘surge bin’ between ship and shore, allowing for steady cargo transfer; a holding area for customs and cargo documentation to take place; an area of consolidation allowing for more efficient loading and distribution; and storage area minimizing the effects of land transfer delays.
Modern container terminals require berth lengths from two-hundred and fifty to three hundred metres (IAPH 1993) and from twelve to twenty hectares of back-up land for each berth compared to one hectare for a conventional cargo terminal (Hoyle & Hilling 1984). The large land areas result from not only the need for ample container storage, but also from terminal gate, terminal equipment maneuvering, freight consolidation, maintenance and apron areas. These space requirements can translate into huge terminal areas, often necessitating extensive and costly filling of water areas to create additional land. Recent container terminal examples include a ninety-one hectare terminal at the Port of Los Angeles and a sixty-nine hectare terminal at the Port of Long Beach (Burnson 1997).

Figure 2.1 illustrates a combined container and RO-RO (automobile) terminal layout at the Manzanillo International Terminal near the city of Colon in Panama. Compared to the terminals in Los Angeles and Long Beach and many other major container ports around the world, the Manzanillo terminal is not large; however, the terminal does show the linear orientation of modern container terminals and the length of wharf needed to accommodate container vessels. The layout also shows another important element in container terminal design, the option of future expansion.
While road and rail access to marine terminals has been critical for many decades, the importance of intermodalism⁶ and its dependence on efficient land side access to ports grew dominant in the 1980s (Hayuth 1987). Hayuth notes that intermodalism stresses organizational means to achieve the seamless transfer of cargo between land and water; however, the physical means through which this

⁶Intermodalism refers to the transferability of cargo, largely in containers, between different modes of transport. Apart from the physical structures required, intermodalism depends upon inland transportation routes, marketing and integrated pricing schemes, and efficient (often electronic) information and documentation processing (Hayuth 1987).
transfer takes place has spatial implications for ports. The changes evident in container ports include the growing spatial needs for truck gates and on- or near-dock rail transfer facilities, improvements to nearby road and rail corridors, as well as the further suburbanization of container terminals to escape the road congestion of urban centres.

2.3 The changing port-city relationship

One question arising from the dramatic changes occurring in the urban port structure is the effect they are having on the port-city relationship. Hoyle (1988) addresses this question by building on Bird’s ‘Anyport’ model to illustrate that the changes occurring in ports also correspond with evolutionary stages of port city development, each based on the increasing spatial separation between port and urban functions. Along with the spatial changes on the urban waterfront, Hayuth (1988) suggests that shifts in port economics and heightened community awareness of quality of life issues have loosened the ties between ports and cities, resulting in not only objections to port operations but also demands on the allocation of waterfront land (Figure 2.2). The conclusion to be drawn from these models is that the port-city relationship has changed and has “now become a major issue in major ports around the world” (Hoyle 1988: 15).
2.3.1 Separation of port and city

The changing configuration and scale of port facilities is causing a separation between the port and its adjacent urban area on two main fronts: the changes in port structures and their movement away from the original port city core. Through
expansion of port structures and construction of their land side transportation facilities, a greater physical distance has emerged between the city and its water’s edge. Slack (1975) suggests that port issues of security and operational efficiency, manifested in the erection of fences, restricted access and road and rail corridors, have effectively cut-off cities from their waterfronts. Liburdi’s (1994: 315) contention that in earlier times New York residents could “reach out and touch” the working waterfront no longer holds true.

The spatial separation is further enhanced by the migration of port facilities to sites with ample space and which are free of the land and water congestion of the inner harbour. Following the mid-1940s, port growth in Montreal was constrained in its original location and as congestion grew in the city port industries began to abandon the waterfront in favour of sites downstream (Bailly & Weiss-Altaner 1981). McCalla’s (1983) study of the Halifax and Saint John waterfronts reveals the emergence of separate and specialized areas of port and urban activity. Other well known examples include the cases of New York and San Francisco where their traditional core areas have been abandoned for New Jersey and Oakland respectively.

Another source of port-city separation is along economic and functional lines. Over
time, ports have developed a greater independence from their host cities as they compete on national and international scales while becoming proportionally less dependent on the local hinterland market for both labour and cargo (Hoyle & Pinder 1981b; McCalla 1983). With the clear trend toward mechanization of cargo handling, capital is increasingly being substituted for labour. Referring to Canadian cargo statistics, the Ministry of Urban Affairs (1978) found that with the introduction of containerization labour requirements may have decreased by twenty times; others claim as much as a ninety percent decrease in the required workforce (Evans quoted in Hilling & Hoyle, 1984: 10). The substitution of capital for labour is highlighted by the fact that while the port workforce has declined substantially, cargo volume has increased.\(^8\)

The decreased local labour requirements of ports are compounded by spatial shifts in traditional warehousing and freight consolidation activities and reduced demand for port related services. The MSUA (1978) study notes that functions such as the loading and unloading of containers and the associated customs clearance have moved away from the port toward the source and destination of cargo. The advent of the inland container depot\(^9\) in the early 1980s to address issues of port city development of containerization at the Port of Halifax provides a useful example of port capitalization: the creation of the Halterm container terminal in 1969 required an investment of nearly one hundred thousand dollars for each job; as traffic increased by one hundred and twenty percent between 1971 and 1975, employment fell by twenty-three percent (Norcliffe 1981).

\(^8\)Development of containerization at the Port of Halifax provides a useful example of port capitalization: the creation of the Halterm container terminal in 1969 required an investment of nearly one hundred thousand dollars for each job; as traffic increased by one hundred and twenty percent between 1971 and 1975, employment fell by twenty-three percent (Norcliffe 1981).

\(^9\)Typical functions of an inland container depot include warehousing, consolidation, packing, marshaling yard, storage, inventory control, freight forwarding,
congestion and high land costs led to facilities being located well inland of ports. An early example is the Butte, Montana container depot which serves the Port of Seattle over nine hundred kilometres away (Hayuth, 1987: 109). Canadian examples include Toronto, Winnipeg, Edmonton and Calgary, all located well inland of major deep-sea ports.

Requirements for port related services have declined in recent years through restructuring of shipping activities. As vessel time in ports has decreased dramatically with mechanized cargo handling (twenty-four to forty-eight hours as compared to one week with conventional cargo handling) and vessel crew size has decreased proportional to ship size, demand for crew services has declined (Hayuth 1988). Other ship equipment suppliers have also been adversely affected as larger ships call at fewer ports and shipping lines are meeting much of their own supply needs by integrating these services in their operations (Slack 1989).

With increased trade and improved transport links, ports have enlarged their hinterlands beyond the local or regional market to the national and even international realms (Boschken 1988). Ports may still capture a significant proportion of regional bulk and semi-bulk traffic, but break-bulk and unitized cargo have become less dependent on the local port (Hilling & Hoyle 1984). Ports have become transshipment points in the larger transportation network, particularly in the customs clearance, container repair and linkages to inland transportation systems (Hayuth, 1987).
case of containers where boxed cargo can be sourced and destined thousands of kilometres from the transshipment port. Bassett & Hoare (1996) describe the weak local cargo links in Bristol, pointing out that ninety percent of timber, car, coal and oil imports and sixty-five percent of feedstuffs pass through the port destined out of the region for consumption and processing elsewhere.

2.3.2 Changes in community perceptions

Along with the physical alienation of the waterfront through large port structures, Cau (1996) suggests that community attitudes to urban waterfronts have changed since the 1960s. Cau and others (Tunbridge 1988; Breen & Rigby 1994; 1996) cite many reasons for the change: the environmental and historical preservation movements of the 1970s; increases in urban living standards and the resulting demands for leisure, open space, tourism and quality of life considerations; and a growing service-based economy less dependent on industrial sectors. A reasonable argument can be made for a diminished connectivity between the urban community and the port with a decline in port-related employment. These and other factors have refocused attention on the waterfront and have brought into question the desirability of continued port use in inner harbour areas. “The era of unquestioned public support [for the port] has been replaced by one of community influence” (Pinder 1981: 182).

10 Typical quality of life issues related to ports include noise, pollution (e.g., odour, dust, air emissions), traffic, aesthetics, views, glare, safety and effects on property value.
Pinder (1981: 197) describes the concept of a "community tolerance limit" to port activity which tends to be reached quickly with perceived impacts on quality of life factors, recreation opportunities and environmental quality. Cau (1996) also emphasizes the strength of perception by suggesting that perceived impacts are typically greater than measurable impacts and can lead to conflict if they are beyond the community's tolerance limit, regardless that they may be within legal limits such as a municipal noise by-law.

The result of the 'new community attitude' is that in some cases ports have been faced with either abandoning expansion plans or incorporating major changes. For example, Pinder (1981) found that public opposition led to the termination of ambitious port of Rotterdam expansion plans and compromises in other developments given environmental and aesthetic issues. Overall, Pinder suggests that the form and extent of the Rotterdam port has been significantly influenced by organized interests and community attitude, and that evidence from elsewhere suggests similar results.

2.3.3 Land use change on the waterfront

As the result of growing congestion in inner harbour areas and the growing space needs of modern terminals, many former port city core areas cannot accommodate further port use and have therefore been abandoned in favour of other more suitable sites. Port migration has paralleled the general de-industrialization of inner
cities leaving opportunities for re-use not only along the waterfront but in immediately adjacent areas. Given the changes in community waterfront attitudes discussed above, communities are increasingly seeking alternatives to industrial waterfront uses.

One change along urban waterfronts has been an increasing diversity of uses. In his study of waterfront land use in four Canadian cities, Forward (1969) found a range of uses including primary industry, maritime activities, retail, commercial and other services, and residential and recreational development. Another Canadian study (Norcliffe 1981) documents the growth of three main non-port industries along the waterfront: city-serving functions such as local truck transport and various suppliers; noxious industries which take advantage of being buffered from residential areas; and labour intensive uses seeking lower wage labour of the inner city. Perhaps more importantly, Norcliffe also noted that many of the new uses may not rely on water transportation, the principal benefit of a waterfront location.

Swelled by concerns over the decaying condition of abandoned port areas and the public's renewed interest in the waterfront's potential, another wave of physical change began to hit port cities all over the world by the mid-1960s. Linked partially to urban renewal efforts particularly in the United States, cities began to focus on their shorelines giving rise to the waterfront revitalization or redevelopment
Although waterfront schemes vary enormously in focus and scale, cities are using them as opportunities to re-establish their relationship with the sea through the creation of tourist zones (including hotels, convention centres, and retail activities), parks and walkways, and other cultural and public facilities (Montanari 1988). The re-use of the waterfront for more urban uses is widespread, particularly in North America where Breen and Rigby (1996) estimate that since 1965 possibly several thousand projects have been undertaken in Canada and the United States.

2.3.4 Conflicts at the port-city interface

The processes affecting port city waterfronts are leading to conflicts between the port and the adjacent urban area. A 1993 study by the Committee for Study on Landside Access to U.S. Ports, which evaluates the impediments to port access and opportunities to address these issues, reports the results of a 1991 American Association of Port Authorities (AAPA) survey of public ports. Fifty-four ports of eighty-five participated in the survey including many of the largest U.S. ports such as Los Angeles, Long Beach, Oakland, Seattle, Tacoma and New York/New Jersey. The survey results, some of which are shown in Table 2.3, are indicative of the kinds of pressures and conflicts being experienced within the port-city interface.

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11 For a full discussion on the waterfront development phenomenon, the reader is encouraged to refer to Breen and Rigby (1994) as well as the numerous works and proceedings published by the Washington, D.C. based Waterfront Center.
Table 2.3 Examples of port-city conflicts identified in AAPA survey

<table>
<thead>
<tr>
<th>Nature of Conflict</th>
<th>Container Ports (n=25)</th>
<th>All Ports (n=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition increasing for available land</td>
<td>21 84</td>
<td>40 74</td>
</tr>
<tr>
<td>Restricted access improvements due to lack of land</td>
<td>11 44</td>
<td>17 31</td>
</tr>
<tr>
<td>Truck routes usually or always congested</td>
<td>16 64</td>
<td>27 50</td>
</tr>
<tr>
<td>Numerous at-grade rail-highway crossings</td>
<td>14 56</td>
<td>25 46</td>
</tr>
<tr>
<td>Regulations in place or proposed to restrict truck or rail operations</td>
<td>4 16</td>
<td>5 11</td>
</tr>
</tbody>
</table>

Source: AAPA quoted in Committee for Study 1993.

In Figure 2.3, Hoyle illustrates the influence of various factors on the spatial development of the port city. More specifically, he identifies the port-city interface, or what is commonly referred to as the waterfront, as the zone in which port-city conflicts and, where the challenge is undertaken, cooperative efforts are realized. Within this zone, the issue of land use is particularly acute and is manifested in interrelated conflicts based on land use competition, community values and land side access.
Land use competition along the waterfront is driven by the difference between the potential intensity of port-related development and other urban development (which can expand vertically and obtain higher economic returns) as well as the inherent value of waterfront property given its amenity and scarcity (Goodwin 1988). The result of this intense competition is a decreasing supply of waterfront land in port
areas that is available for port uses and the concurrent rise in land value which displaces those industries unable to afford the economic rent.\(^{12}\) Referring also to the same 1991 AAPA survey, a United States Department of Transportation (1992) study states that sixty-one percent of American ports are experiencing growth of non-cargo activities in port areas and that fifty-five percent of the responding ports are witnessing an increase in property value.

Community value conflicts are also rising with the changing allocation of waterfront property. As discussed above, new community attitudes toward the waterfront and port industry are challenging the viability of port operations and their future growth. The community perception is further guided by the increasing gentrification of the waterfront through market forces but also the policy objectives of municipal governments seeking a more pleasing waterfront environment and higher tax revenue (Slack 1989). It is clear that in many port cities, the community vision of its waterfront has transformed into one which emphasizes the clean and orderly appearance associated with recreational, commercial and residential development.

The higher-order services of the new port city waterfront are also bringing about increases in traffic which are causing congestion in port areas (Goodwin 1988).

Even during the early phases of containerization, one of Kenyon's (1968)

\(^{12}\)The U.S. Department of Transportation (1992) illustrates the land economic situation of ports by noting that at one U.S. port land values have increased to between one and two million dollars per acre, while annual port revenues are estimated between forty thousand and one hundred thousand dollars per acre (37).
conclusions was that the mixture of waterfront uses is inefficient and, given its impacts on goods movement, represents one influence in the departure of port activities to outer areas. The other main issues related to congestion are the impacts on port terminal efficiency given the increased time to access the port as well as the associated increase in trucking costs (Committee 1993).

2.4 Summary

The once close physical, functional, economic and social solidarity between ports and cities has diminished through port structural changes largely responsive to external economic imperatives. Increased waterborne trade and the increasing costs of shipping have brought about changes in shipping and cargo handling which have reduced the need for port-related services and labour previously supplied by the urban areas immediately surrounding the port. As port structures have grown to meet the demands of increasing vessel size and have gradually relocated to areas outside of the inner harbour, ports and cities have become increasingly separated spatially. This separation is exacerbated by changes in social priorities for the allocation of urban waterfronts and heightened interest in quality of life issues associated with ports. The result of the processes affecting the urban waterfront is a strained port-city relationship and conflict largely on the basis of land use.
3.0 PORT-CITY PLANNING PRINCIPLES

With the changes taking place at the port-city interface, the question is what can be done to alleviate or at least mitigate the conflicts. In the past, ports and cities were seen as integral to one another and common goals were pursued; today, ports and cities seem to strive for opposing objectives. This portion of the study will discuss the role of ports and the challenges of ports and cities in their planning efforts. The chapter will conclude with a look at planning principles that may offer insight into how the port-city planning relationship can be improved.

3.1 Port authority role and structure

Ports provide a range of functions far beyond the simple transfer of cargo between land and water transportation modes. Schwimmer and Amundsen (1973) suggest that along with the cargo and shipping related activities discussed above, ports promote commerce, trade and employment. These effects illustrate the public benefits that ports provide and are in addition to the financial benefits that accrue to port and shipping related businesses. As a result, ports serve a vast constituency that encompasses not only local producers, labour and consumers but others found regionally, nationally and even across international boundaries.

With their many stakeholders, ports require a form of administration that can provide a suitable level of accountability for a variety of interests which, according to Price (1981), includes not only those benefitted but also those adversely affected by ports.
This distinction is noteworthy as it draws attention to the fact that a port's benefits and impacts are not evenly distributed among its constituents. This situation is clear where, for example, a petroleum terminal may serve a producer and consumers hundreds or thousands of kilometres from the port while local residents might unwillingly bear its associated impacts such as odour, traffic and safety risks (both real and perceived).

The attempted balancing of a port's commercial and public objectives are reflected in its administrative structure. Schwimmer and Amundsen (1973) note that most ports are under some form of public administration ranging from local, through regional to national control.\(^{13}\) The authors cite two main reasons for public control of ports: given low or no profit, port administration does not attract private investment; and the orderly development of ports requires some form of government control. The specific form of port administration varies\(^{14}\) though the overall role is typically one of public enterprise.

Essentially, port authorities are relatively autonomous enterprises set up by governments to manage public ports in a commercially oriented manner (Table 3.1

\(^{13}\) Although the majority of ports, at least in North America, are publicly administered, private industry also owns and controls some single-purpose terminals, such as those handling liquid or dry bulk cargo, which may be the only facilities in a small port (Hershman 1978).

\(^{14}\) Ports are often organized as operating ports, in which the port administration operates port terminals, landlord ports, in which the port administration leases its property to private terminal operators, or some combination of these types.
describes the basic public and enterprise properties of ports). The autonomous nature is important as it allows ports to build and maintain an equal relationship with other government bodies (Price 1981). Olson views public enterprise as a hybrid organization which “combines in one institution what are otherwise thought to be quite unlike and even incompatible structural arrangements” (1988: 310).

Notwithstanding the structural difficulties in combining public and commercial administrations, port authorities face the difficult accountability issues and policy decisions that accompany the often conflicting demands of competing interests.

<table>
<thead>
<tr>
<th>Nature</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>public</td>
<td>formed by government</td>
</tr>
<tr>
<td></td>
<td>statutory powers</td>
</tr>
<tr>
<td></td>
<td>public ownership</td>
</tr>
<tr>
<td>enterprise</td>
<td>market efficiencies</td>
</tr>
<tr>
<td></td>
<td>commercially defined goals</td>
</tr>
<tr>
<td></td>
<td>financially self-sufficient</td>
</tr>
<tr>
<td></td>
<td>non-political(^{15})</td>
</tr>
</tbody>
</table>

Source: Olson 1988.

\(^{15}\)Although port authorities are typically run with commercially driven mandates and often at ‘arms length’ from government they, unlike private commercial enterprises, are subject to political pressures. This is particularly evident in the make-up of their board of directors where, in the case of Canadian Local Port Authorities, directors are appointed by the federal government or, in some American ports, port commissioners are directly elected by the local population.
3.2 Port planning challenges

With the port authority's dual role, that of protector and benefactor of the public good and that of a commercially driven business, the port often finds itself in both an internal and external state of conflict. The growing demands of public interest groups and governmental agencies with different objectives are often in conflict with the port's traditional focus on goods movement and trade, on the one hand, and its more diffuse socio-economic concerns, on the other hand. As a result, Boschken believes that ports are being forced into "managing social conflict in the coastal zone" (1982: 223). Hershman (1988a) agrees and notes that the issue of accountability is increasingly important to the local community as ports make decisions about the allocation of public waterfront land and public finances.\(^\text{16}\)

Stromberg reinforces the depth of the challenge by suggesting that "in the United States and Canada, the tension brought about by the port's national benefits and localized costs is one reason why ports are so much more politically visible and vulnerable today" (1994: 289).

As a result of the port's public nature and its growing impacts on local populations, ports are increasingly being subjected to public scrutiny and demands for participation in decision-making. In a 1992 article evaluating the predictive capability of public participation in water related issues, Syme and Nancarrow make

\(^{16}\text{In addition to the port's responsibility to the local community, Olson (1988) notes that issues arise with concerns over ports' accountability to the general public interest which extends beyond their local setting, their supervisory governments and internally between a port's management and its governing board.}\)
several general conclusions regarding public involvement in government decision-making. They suggest that, in addition to specific interest groups, public processes must be open to the average citizen and, of particular significance to ports, if this condition is not met the community will respond to conflicts between commercial and social objectives. Ultimately, this means that public involvement must become part of the port development decision matrix with a resulting increase in complexity and uncertainty (Boschken 1988).\(^\text{17}\)

Against this backdrop of social considerations, ports must deal with the challenges created by their commercial operations and, in particular, the difficulties in planning for an industry with high service expectations yet inherent uncertainty. Hilling and Hoyle (1984) suggest that port development in the past was largely undertaken in an unplanned manner with incremental changes being made to meet short term demand. This approach did not always lead to success: the long lead time needed for the construction of port terminals along with their relative permanence and, in some cases, their incompatibility with new technologies meant that ports were often either under- or over-equipped to meet the requirements of fluctuating trade in different cargoes (Hilling & Hoyle 1984). The same trade and technological pressures that have influenced the overall structure of ports in the past few decades have also brought a new emphasis on planning for port development.

\(^{17}\)Clearly, ports are not alone in the move toward increased public accountability and participation in their decision-making frameworks. However, the issue for ports is significant given the inherent conflicts within their public enterprise structure.
According to Beth (1978b: 328), “planning implies the ability of a port to adapt to future developments. This is the reason why planning, not so much in the short term, but in the mid and long term has to be flexible”. Bird (1984) suggests that the concept of flexibility is enshrined in port planning practice as port authorities must often adjust to the overwhelming influence of external factors. He draws this conclusion from the results of a survey of eighty European port and shipping executives undertaken between 1978 and 1980 which revealed many planning difficulties for port development (some of which are noted in Table 3.2).

Table 3.2 Selected port planning and development issues

- movement of ports seaward (linear expansion cheaper than greenfield sites)
- provision of suitable water approaches
- obtaining land for port development
- high cost of speculative provision of infrastructure
- problem of obtaining future guarantee from users
- short term changes in shipping and trade versus long term changes in ports
- necessity for flexible response to technological change
- inaccurate forecasting
- short term profitability for ports versus development to attract trade
- increasing congestion


Recent changes in the shipping industry, particularly in container shipping, are also causing additional uncertainty for ports and enhancing inter-port competition.
Containerization itself has brought changes to port facility planning; wherein the past port terminals were built to meet average demand, container terminals are based on the largest expected demand plus an additional margin to accommodate other system problems, often despite no guarantee of usage (Beth 1978a). However, terminal capacity is only one aspect that attracts container lines which are also looking for highly efficient intermodal facilities which reduce the turn-around time of vessels (Mongelluzzo 1997). While ports can assume some role in the provision of intermodal facilities, ultimately they are dependent on road and rail authorities to make the capital investments in the desired infrastructure.

Another challenge for port authority planning is the growing concentration of container activity in fewer shipping lines and ports (Marcus 1989). As shipping lines merge into large consortia, they increase their influence over ports in terms of the facilities they demand and the cargo trade they control (Bird 1971). The concentration of container loading and unloading at fewer large ports, known as 'load centres,' is also a response to shipping companies' concerns over growing costs. The result is that ports are being forced to either increase capital

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18Citing statistics from Containerisation International in 1995, AAPA Advisory notes that the top 20 container lines accounted for over half the available container slots worldwide (1996: 20). In 1995, the top ten container ports handled almost forty-five percent of the world's container trade with the top two ports, Hong Kong and Singapore, together accounting for twenty-one percent of the world total (Cargo Systems cited in The world's 1996: 8).

19At operating costs of up to forty thousand dollars per day, time is a critical factor in the profitability of container shipping. Therefore shipping companies minimize their costs by reducing the number of ports they call and by seeking ports which require the
investment in new infrastructure or face losing business to other ports. One early successful port in the container trade, Oakland, is now seen at a crossroads at which significant investment is required if it is to maintain its competitive position on the West Coast of North America (Tirschwell 1997). This challenge is being made difficult by the increasing investment in container facilities at Los Angeles, Long Beach, Seattle, Tacoma and to some extent Vancouver.

The net result of all the uncertainty surrounding a port's future is that port authorities are in the unenviable position of planning for the long term with only some assurance about the short term. This clearly creates difficulties for ports as public enterprises as they strive to meet the expectations of the local community, wider public interest and their commercial customers. With all the complexities facing ports, it is understandable that an adaptable planning approach is preferred:

Open-ended flexible planning in stages is surely the only possible strategy for a phenomenon such as a seaport, itself dedicated to an open-ended gateway function throughout the hours of any one day, so that open-ended development becomes the guiding theme as the seaport grows or changes over both spatial and temporal scales (Bird 1984: 39).

It should be acknowledged, however, that a fully open-ended, flexible approach may not be sustainable over the long term. With the high cost of port facilities, a

least amount of time in harbour (Hayuth 1987).
shrinking land base, growing land and water congestion, and increasing pressure from local residents, ports will undoubtedly be forced to plan more strategically and make difficult choices about their land use and development priorities. Not every port can be a load centre, yet there are other important regional and niche roles that ports can assume (Stromberg 1994). Therefore, port planners and decision-makers will be looked upon to more clearly define their port’s future in terms that take into account their competitive position and local environment.

3.3 City waterfront planning challenges

As is the case with port planning, city waterfront planning is undertaken in a complex decision-making environment comprising many social, economic and political interests. Moreover, unlike a port’s more limited mandate, municipal authorities are concerned with a wider geographical area (as opposed to market area) and a host of interrelated issues (Takel 1974). Land use, transportation, housing, recreation, employment and economic development are some of the primary considerations for municipal authorities which extend to all parts of a city and inevitably influence their perspective on waterfront use. As the relative importance of the port has declined

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20 The idea of a shrinking land base is founded on two factors: competition for waterfront land and the growing constraints presented by environmental regulations on creating new land through land fill.

21 The process of determining priorities is known as ‘strategic planning.’ The interested reader is referred to Chasan and Dowd (1988) for a review of the factors driving ports to strategic planning, the process and some illustrative examples. Boshken (1988) is also a valuable reference for those interested in the application of strategic planning and the organizational requirements necessary for its success.
over time, the port function has become only one of a number of interests which cities must consider along the waterfront and within the greater urban context.

While ports have been influenced by economic and technological changes, many large North American port cities have come to experience significant economic restructuring and changing land use demands (Moss 1976). With growth in service-based industries and a decline in traditional industry, port cities are likely to be affected by increasing pressure for the conversion of industrial areas. Former or declining port areas are attractive for conversion given their proximity to the urban core, lower land prices relative to the CBD and, where abandonment is prevalent, ease of land assembly. With these pressures, it is understandable that land developers and municipal authorities may seek higher uses and, in the process, the rejuvenation of marginal industrial land.\textsuperscript{22}

Another challenge for municipal authorities in many port cities is the existence of a separate body having jurisdiction over at least some portions of the waterfront. In many countries port authorities are established by senior levels of government and are endowed with substantial powers over urban waterfronts which supersede those of local governments. Port authority control over the waterfront can reduce land use competition while increasing pressure on cities to maintain adjacent areas for more

\textsuperscript{22}The case of the redevelopment of Toronto's harbourfront is particularly illustrative of the political and economic forces leading to the reuse of former industrial waterfront land. Interested readers are directed to the 1989 work of Desfor, Goldrick and Merrens.
marginal uses which are not affected by the port's off-site impacts (MSUA 1978). In other cases, cities may be relatively powerless to influence port authority development decisions that are likely to impact adjacent uses such as residential areas. The inter-jurisdictional difficulties have led Slack (1975: 4) to conclude that, "The physical barriers that are cutting off the citizens from the waterfront are mirrored by the separate administrative jurisdictions [of ports and cities]."

3.4 Need for port-city cooperation
As ports and cities become further disconnected and as each experiences its own waterfront challenges, these realities lead one to question whether there is anything to be gained by the two authorities working cooperatively on waterfront policy and planning. The preceding discussion provides some insight into the issues and challenges that both ports and cities face along the urban waterfront. What should be apparent is that many of these are shared concerns and that their successful resolution depends upon the coordinated actions of ports and cities.

Throughout this paper and in many of the works cited, what is commonly known as the 'waterfront' has also been referred to as the 'port-city interface.' While 'waterfront' suggests the physical region where land or city and water meet, the latter refers more to the functional interaction between port and city. We have seen the dynamic nature of this interface and the processes affecting its character. While much of the discussion has focussed on the waterside changes reflected in the port
structure, clearly this region has also been affected by landside changes originating in the city. This suggests that the urban waterfront can benefit from a holistic perspective that draws upon the knowledge and abilities of those directly involved in the management of change at each side of the interface.

Anderson et al. (1981) suggest that the traditional approach to port-city relations has been on the basis of a zero-sum game in which each competes for a portion of the total benefits available, that is, when one gains, the other loses. This approach ignores the fact that given the interdependencies between port and city, mutual benefits and efficiencies can be gained through cooperative efforts. For example, in most cases port growth not only benefits port industry but also has a positive economic impact on the local region. In another example, the port and city which cooperate in transportation planning can not only improve landside access to the port but may also reduce congestion on city streets.

Ultimately, the need for cooperation between ports and cities is best reflected in the trade-offs required between the port’s national mandate and the needs of the local community. The argument of Anderson et al. (1981) that ports and cities have many mutual benefits holds true in many situations. However, the most difficult situation arises when, for example, a port’s expansion plans benefit not only the nation’s trade and regional employment but has concentrated impacts on a single community or neighbourhood. In these situations, the port and city must work together to not only minimize impacts but to define the best common good.
The characteristics of cityports will continue to reflect the evolution of maritime technology (it is hardly possible even to guess what new systems lie over the horizon) and cityports themselves will continue to affect the patterns of spatial organization within the areas served. The cityports of the future must therefore respond to technological, demographic and socio-economic evolution, and their response must be conditioned by efficient and integrated planning mechanisms designed to reflect not only the interdependence of ports and cities but also the intricacies of the global economy (Pinder and Hoyle 1981: 336).

3.5 Port-city planning principles

If we accept the premise that there are compelling reasons for ports and cities to undertake joint efforts in planning for the urban waterfront, the next issues to consider are the principles under which this planning should take place and the strategies and mechanisms available to implement the various principles. The following presents a discussion of some of the pertinent principles that need to be addressed by ports and cities along with some examples of potential methods. The methods are offered for illustration and are not intended to comprise an exhaustive list. Another caveat to note is that not all mechanisms may be achievable in all jurisdictions given differing legislation and institutional structures.

**Principle 1: ports and cities must promote mutual understanding**

Some of the reasons for cooperating were highlighted above; however for cooperation to begin, there must be communication between port and city that allows for the effective sharing of pertinent information. In his study of harbour redevelopment in Canada, Slack (1975: 33) found that “The lack of contact between
the city, and its planning department in particular, and the port authority is striking. Mechanisms for the exchange of ideas are rarely in place, and as a result there is little interaction.” Given their interdependencies, ports and cities owe it to themselves to enhance their communication and knowledge of each other.

Anderson et al. (1981) suggest that participation in each other’s planning will allow ports and cities to gain the essential knowledge and exert influence regarding their respective waterfront perspectives. However, an ongoing flow of information between the two authorities through both informal and more formal channels can also prove beneficial in reducing the information gap (Boyd-Brown 1995). Options include port-municipal liaison committees, advisory planning committees--with a broad representation from the port, municipal and regional authorities, port industry, rail and highway concerns--or working groups established for particular issues, such as transportation, or projects. Economic development committees can also be a useful forum to stress the port’s role and to seek avenues for cooperation.

**Principle 2: ports are a scarce and valuable resource to the local, regional and national economies**

The significance of the harbour for port uses and their benefits must be reflected in land use policy. The national importance of ports is apparent through the services they provide to producers and consumers across their respective countries, and the positive influence on trade and the domestic economy. Stromberg (1994: 286) notes that "Deep-water ports, especially those with good landside transportation
connections, are among any country's most valuable and scarce resources." This is particularly true for a country like Canada, which relies on a few large ports for its international maritime trade.

Considering the port's value, shoreline areas with suitable physical conditions should be reserved for water-dependent uses. Takel (1981: 67) observes that "If national and regional considerations imply that the port and its industry are to be fostered and encouraged, it necessarily follows that the port must acquire or retain space for present and future needs." Hayuth and Hilling (1992) also emphasize the protection of the industrial waterfront by suggesting that waterfront areas which are converted to non-maritime uses are unlikely to be recovered for port use in the future. Slack (1989) cautions that this principle also applies to those areas which accommodate the port service industry, which if not protected may lead to a detrimental impact on the port as well as the city. Special port districts, protective zoning for water dependent uses and land banking are potential mechanisms to help preserve waterfront land for port uses.

The issue of land use protection for ports also extends beyond the immediate shoreline zone. Cities and ports also need to coordinate the planning of adjoining areas to minimize the adverse impacts from incompatible uses. Although uses such as light and heavy industries and some commercial activity can coexist near ports, other uses, especially residential communities, make poor neighbours. The concern regarding encroaching residential areas is that, over time, the residents may
become organized and begin to resist the businesses they chose to live beside, citing impacts such as noise, odour, glare, views and traffic (Goodwin 1988). Pesquera (1996) suggests the maintenance of a transition zone made up of light industry as a buffer between the port and residential areas. Where the economic viability of these areas is uncertain, other mechanisms such as overlay zoning, tax abatement and purchase or transfer of development rights may need to be investigated to prevent conversion to incompatible uses (Goodwin 1988).

The final point to made regarding the significance of ports is that recognition of this concept depends upon the ability of the port to foster knowledge of its activities within municipal authorities and local communities and the port's own actions to further the goals of the local community. Konvitz (1982: 32) believes the "image that people have of the port helps shape their image of what the work of the port means in their, and their nation's life." Liburdi (1984) notes that a community's increased knowledge of the port will promote a positive attitude and renewed identification with the port, its economic importance and maritime culture. Measures such as economic impact statements are useful (Suykens 1989), though if the port is active in pursuing other socially-oriented goals these may not give the full story (Randall 1988). Outreach programs should also stress the importance of the port to local history and culture (Pesquera 1996).

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23It is interesting to note the success of some ports in this regard. A recent survey of 30,000 residents of the city of Yokohama, Japan found that seventy-four percent of the respondents valued the port as a symbol of the city (Yasutake 1996).
Principle 3: **ports and cities must seek an appropriate balance among waterfront interests**

With a sound knowledge of related issues, ports and cities should consider how the harbour can be planned in a holistic manner to address land use allocation and to accommodate a balance of interests on the waterfront. Hershman (1988a) suggests that ports have traditionally focussed on their cargo activities and financial bottom line and have viewed public benefits such as public access as costly overhead. However, it is understandable that, as the local authority, the city would seek a balance between the port and local interests (Takei 1974): just as the port sees the harbour as a valuable transportation resource, the city also views the harbour as a resource in its own terms (Tessier 1991). In many cases, this balance is attempted through bargaining with the port for the city’s needs (Riley & Shurmer-Smith 1988).

According to Olson (1988) the port’s commercial and public objectives do not need to be mutually exclusive; a number of relatively successful ports have maintained their primary goal of maximizing cargo while affirming their secondary social goals which are often in competition for harbour resources. Moreover, attention to the public benefits may be necessary for ports to realize their primary commercial goals. For example, the Port of Melbourne Authority has recognized its need to incorporate additional components into its harbour planning; these include a landscape strategy and a public access strategy (Jordan 1984). In other jurisdictions, legislation requires the provision of public access to the shoreline, even in port areas provided
that safety issues can be addressed. Given the tangible nature of public benefits such as recreation facilities, ports stand to gain much with the local community by planning for and, where appropriate, making the necessary investments in space and facilities.

**Principle 4: inactive port areas should be used to the benefit of both port and city where maritime re-use is unlikely**

A potential dilemma for ports and cities is what to do with maritime sites or zones no longer in active use. Charlier (1992) notes that Bird's 'Anyport' model does not assume that as port facilities migrate away from the inner harbour, the older areas would cease their port functions. He further suggests that these areas need to be considered firstly for port uses given the scarcity of waterfront sites and the potential for extending the life of port facilities through either general or more specialized cargo functions. Maritime re-use is also supported by van der Knaap and Pinder (1992), given the relatively lower cost to activate existing facilities and the decreased potential for conflict with adjacent uses, which may be prevalent in newer port areas. Goodwin (1988) adds an economic rationale to the argument for maritime re-use: many port-related businesses have a basic economic function or are export oriented and therefore contribute to the city's economic growth through new capital, employment and spending.

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24 Muretta and Price (1980) review the case of California where under the provisions of the California Coastal Act of 1976 ports must make the same allowances for access to the shoreline as in all other public shorelines except where public safety will be jeopardized. Public access is also one of the fundamental components of the United States Coastal Zone Management Act of 1972.
Keeping in mind the principle relating to a balance of waterfront interests, ports need to be realistic in their demands for preserving waterfront areas where future port use is unlikely or not feasible. These spaces, typically located adjacent to the city core, can be used to the benefit of both in that the port can achieve a financial return through alternative uses on an otherwise uneconomic site, and the city can meet its objectives for a public oriented site on the waterfront. In these situations, the port and city have a valuable opportunity to develop a shared vision for a particular site or zone and may even work together in developing the site. Many waterfronts, such as those in Toronto, Baltimore, San Francisco and elsewhere have redeveloped in this manner. In these cases, the urban port was incapable of meeting the changing requirements of shipping.

**Principle 5: ports must recognize and accept their role in the urban environment**

At the 1996 annual convention of the American Association of Port Authorities, Bernie Groseclose of the South Carolina State Ports Authority commented on the Authority’s experience in its consultation process for a new automobile terminal in Charlestown, South Carolina (Groseclose 1996). Despite early difficulties with the city, staff of the two authorities managed to work out their differences and proceeded to Council for its approval. To the surprise of both authorities, the community rose in opposition to the project mainly on the basis of a road closure. After the Council turned down the proposal, the port authority took over the process and began working with the residents and other community groups. By the time the
project went back to the Council almost two months later, the community supported the project and viewed it as a positive contribution. Groseclose (1996) suggested that the port learned a number of valuable lessons, including the need to take a long term view regarding community relations by providing a credible consultation process and the need to build trust.

An argument was presented earlier for the recognition of the port's role in the local and national economies; however, unless the port assumes its "role as a citizen" within its urban setting, it is unlikely to gain the support it needs to continue to grow and pursue its commercial objectives (Slack 1975: 34). It is therefore critical that ports initiate effective ways to obtain a sound understanding of their surrounding communities and their development concerns (Cau 1996). The National Research Council (1979) emphasizes the need to involve the public early in planning processes to ensure that relevant issues can be determined.

Beatley (1994) believes there is an ethical responsibility for authorities to consider the impacts of their land use decisions that have cross-jurisdictional implications. In the case of ports and cities, each has an obligation to minimize the adverse effects of its decisions on the other, even to the extent that sacrifices may be required regardless of the other's potential unwillingness to compromise. This responsibility implies that ports must make reasonable efforts to reduce the effects of impacts such as noise and traffic. These impacts can begin to be addressed through coordinated land use and transportation planning. Other issues such as aesthetics
and views can either be addressed through general guidelines or in specific project planning.

**Principle 6: ports and cities must develop a shared approach for urban waterfront planning**

Boschken's 1988 study of Pacific coast ports' organizational responses to change reveals some interesting concepts in the area of inter-jurisdictional relationships. Although he focusses on the relationship between ports and environmental agencies, the lessons are equally valid for ports and cities. Boschken concludes that the ports most successful in meeting their objectives have abandoned their past power stance on issues for a more proactive approach in response to the wider distribution of influence among agencies, political and community interests. The benefits of such an approach include "mutual respect, better communication, delineation of issues in specific rather than ideological terms, and improved compromises" (Hershman 1988a: 10). Boschken found that the ports studied fit somewhere on a continuum between highly coordinated and conflict based strategies (Figure 3.1).
Rafferty’s (1996) description of the planning for the re-use of a former naval shipyard south of Boston highlights the importance of a well-formulated, coordinated planning strategy. Following initial conflict between industrial development and community objectives, a process evolved to allow for the identification of shared goals and the evaluation of alternatives through a development committee with representation from all relevant interests. The process proved successful through representation of affected parties, agreement on goals and commitment to the planning process.

The higher level agreement described by Rafferty has wide applicability for port cities especially in the area of land use: it suggests that consensus on land use and process are fundamental to effective solutions for dealing with conflict between ports and cities. In her review of various coordinated harbour planning initiatives, Boyle (1990) found a number of key components that led to their success. Among these are that the process to achieve consensus on harbour use goals requires the
participating bodies to recognize the authority of each, particularly that of the port. This respect for authority is clearly basic to establishing a meaningful working relationship. The processes evaluated also revealed that the results will not be supported by those excluded from participation and therefore must be inclusive. The implication for ports and cities is that each must consult with and seek the participation of the other in their respective planning processes. In addition, goal setting processes need to include provisions for the participating parties to ratify the results and review them in the future. The benefit of this is to solidify support for the plan and to provide for review and amendment which are key to any planning process.

According to Boschken (1988: 97), “Achieving consensus requires carefully worked out compromises in which the interests of agencies are protected by such instruments as memoranda of agreement.” These agreements can establish the parameters for land use and development, and the applicable planning and permitting processes. The longer term benefits include reduced conflict and uncertainty for each signee and, where flexibility is built in, the ability of the port to react quickly to the ever-constant change and challenges of its business environment.

Where conflicts arise and consensus cannot be easily reached, Godschalk (1992: 376) recommends the integration of an “effective conflict management capability.” In other words, inter-jurisdictional issues, such as those between ports and cities,
require adaptable mechanisms not based on traditional bureaucratic, positional responses to conflict. More specifically, Godschalk (1992) suggests the need to establish procedures for the ongoing early recognition of potential conflictual situations and the commitment to deal with these issues by professionals trained in principled negotiation. The result is a problem-solving perspective that helps build a stronger inter-jurisdictional relationship.

3.6 Summary

Ports and cities each face significant challenges in planning for the urban waterfront. Ports are faced with the demands of a wide and varied constituency, the balancing of its commercial and public goals, enhanced accountability and a highly uncertain and rapidly changing industry. Cities must contend with many interests beyond the waterfront, a host of inter-related issues that affect the waterfront, changing social and economic priorities and conflicts with senior jurisdictions. In some cases these challenges are being met by the separate actions of ports and cities; however, given the linkages between many of port city issues, there is much to be gained through the effective coordination of efforts based on shared planning principles listed in Table 3.3.
<table>
<thead>
<tr>
<th>Principles</th>
<th>Policy Objectives</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ports and cities must promote mutual understanding</strong></td>
<td>• establish effective communication through ongoing liaison</td>
<td>liaison committees, advisory planning committees, working groups, economic development committees</td>
</tr>
<tr>
<td><strong>Ports are a scarce and valuable resource to the local, regional and national economies</strong></td>
<td>• foster recognition and support for port</td>
<td>protective zoning, special districts, transition zone, overlay zoning, tax abatement, purchase and transfer of development rights, community outreach programs, economic impact studies</td>
</tr>
<tr>
<td><strong>Ports and cities must seek an appropriate balance among waterfront interests</strong></td>
<td>• preserve waterfront land for water-dependent uses</td>
<td>consultation and participation in planning processes, public access plan and development of recreational facilities</td>
</tr>
<tr>
<td><strong>Inactive port areas should be used to the benefit of both port and city where maritime re-use is unlikely</strong></td>
<td>• protect areas for port service industry</td>
<td>protective measures as above, joint planning and development</td>
</tr>
<tr>
<td><strong>Ports must recognize and accept their role in the urban environment</strong></td>
<td>• ensure compatibility of adjoining uses</td>
<td>credible public involvement programs, ongoing liaison with community groups, citizen advisory committees, surveys, coordinated transportation planning, consideration of aesthetics in development decisions</td>
</tr>
<tr>
<td><strong>Ports and cities must develop a shared approach for urban waterfront planning</strong></td>
<td>• port to be planned in a holistic manner to address land use allocation</td>
<td>memoranda of understanding, training in negotiation, clear procedures for conflict identification and resolution, working groups for specific issues</td>
</tr>
<tr>
<td></td>
<td>• promote local interests</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• promote maritime re-use where possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• develop shared vision for redevelopment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• create open and accountable community relations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• establish sound understanding of local community</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• minimize impacts on residents’ quality of life</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• adopt partnership approach that recognizes respective jurisdictions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• seek consensus on land use and process with provisions for mutual ratification and review</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• maintain some flexibility in light of port planning challenges</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• promote negotiation to deal with conflicts</td>
<td></td>
</tr>
</tbody>
</table>
4.0 VANCOUVER CITYPORT

This chapter will review the findings of the previous two literature-based chapters within the context of a dynamic and vibrant port city. The Port of Vancouver and its surrounding communities of Vancouver, Burnaby, District and City of North Vancouver, and Delta provide a valuable case to study port-city challenges, given the rapid growth of both the port and its urban region. The following sections will briefly review the historical development of the port to reveal similarities with the changes identified in Chapter 2 and, based on the results of interviews with port and municipal representatives and related examples, reveal planning principles from the Vancouver cityport. The intent of this chapter is not to critique the planning processes in the Vancouver cityport but rather to evaluate the validity to the study cityport of the planning principles revealed by the literature in Chapter 3.

4.1 Development of the Port of Vancouver

Following the first recorded European visit to Burrard Inlet by the Spaniard Narváez in 1791, the first comprehensive survey of the Inlet was undertaken a year later by the English Captain George Vancouver. Unlike Narváez, Captain Vancouver brought his vessel into the present site of the Port of Vancouver sailing through the

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25 The Port of Vancouver is bordered by eight municipalities. In addition to the five listed above, the City of Port Moody, Village of Belcarra and the Municipality of West Vancouver border the port. These three are not included in the analysis as their waterfront issues are either represented adequately by the other municipalities or the waterfront issues, such as private recreational docks, may not be applicable.

26 Among the available sources on the history of the Port of Vancouver, interested readers are referred to Hacking (no date) and McKee 1978.
First and Second Narrows and up the north arm, now known as Indian Arm. Both explorers noted the bounty of trees covering the nearby slopes, foreseeing the first cargoes of the port nearly seven decades later.

With its deep sheltered harbour and sources of water energy, sawmills began to appear on the Burrard Inlet waterfront in the early 1860s. Beginning with the Pioneer Mills (to be renamed Moodyville Sawmill) located on the North Shore in 1863, a shipment of lumber to New Westminster became the first port cargo. A year later, the first export cargo consisting of lumber and pickets was shipped to Australia following nearly two months of loading time at the mill. The first mill on the South Shore, to become known as the Hastings Mill (at what is now the Centerm container and general cargo terminal), began operations in 1867 leading to increasing business in the harbour. In 1896, approximately three-hundred and sixty deep sea ships visited the growing port which then boasted four mills.

During these formative years, small settlements grew around the sawmills both on the north and south shores of the inlet at locations which would become the City of North Vancouver and the City of Vancouver respectively. Along with the mills on the waterfront, other industries such as the British Columbia Sugar Refinery emerged while shipping companies and warehouses located in the Water Street area of Vancouver. However, until the late 1800s, Victoria and New Westminster remained the major urban centres in the region with their higher population, commercial and port activity. It was not until the 1887 arrival of the Canadian Pacific Railway into
what is now Coal Harbour that both the City of Vancouver and the port grew significantly and surpassed their respective urban and port rivals (Forward 1982).

While lumber continued its strong growth in both domestic and export markets, other port industries began to flourish by the early 1900s: domestic shipping companies prospered in both coastal and trans-Pacific passenger services; ship building and repair facilities sprang up in Coal Harbour, False Creek and North Vancouver; and, with the opening of the Panama Canal in 1914, the grain trade between Vancouver and Western Europe was made possible and was supported by the development of a government terminal elevator and others in the next few decades. The eastern movement of Canadian grain was soon followed by the opening of markets in countries on the opposite side of the Pacific.

Forward (1982) notes that the economic growth of the western Canadian provinces also fueled a surge in general cargo imports up until World War II. This growth was evident with the construction of numerous finger piers and the 1914 development of the port’s first modern concrete pier located east of the Hastings Mill by the newly formed Vancouver Harbour Commission. This pier now forms part of the Vanterm container terminal. Other significant developments include the completion of Ballantyne Pier in 1923, then thought to be one of the finest facilities of its time; the Canadian Pacific Railway Pier B-C to serve passenger traffic; and Terminal Dock for the Robin Hood flour mill. It is also worth noting that while the port was experiencing steady growth, the population of the surrounding urban area was also increasing
rapidly; in the first decade of the 1900s, Vancouver’s population grew from 26,000 to 100,000 (McKee 1978).

The opening of the Second Narrows rail and road bridge in 1925 precipitated terminal development on the North Shore. The Vancouver Harbour Commission played a key role by extending the rail to the foot of Chesterfield Avenue or what is now the City of North Vancouver’s core waterfront area. This area began to attract more development including the construction of Japan Dock and a major shipyard. Access roads were extended from city streets across the rail tracks which encircled the foreshore on both sides of the inlet. Beginning in the late 1920s, the port area was expanded with fill, pushing port facilities outwards from the original shoreline creating not only additional land area but improving water depths at dockside for larger vessels.

Following the depression years and World War II, the port entered a new phase of development which increased both the diversity of cargoes and scale of development to the present day. On the strength of exports of bulk commodities such as coal, potash, grain and sulphur from British Columbia and the other Western provinces, the port became Canada’s largest in terms of tonnage by the late 1950s despite the loss of some domestic traffic to other ports in the region (Forward 1982). Forward (1982: 43) goes on to note that “Expansion of port facilities [in the Port of Vancouver] has been carried out on a larger and more spectacular scale than in [other major Canadian ports], owing to the immense
tonnage that had to be accommodated.” Hardwick (1974) notes that this period also saw the introduction of new mechanized cargo-handling methods which were paralleled by increasing vessel size, decreasing labour requirements and a shift in the layout of port terminals away from the traditional finger pier design of earlier decades. In fact, one of the port’s few remaining finger piers, Ballantyne Pier--currently a combined forest products and cruise facility--will be joined to the adjacent Centerm through a seven acre infill project by 1999.

Some examples of major port terminals constructed following WWII are listed in Table 4.1. Not included in this table are the various petro-chemical refineries and terminals, such as Chevron, Shell, Westridge, Petro-Canada and Imperial Oil located in Burnaby and Port Moody, which range in size from fifteen to two hundred and twenty acres (MSUA 1978); and grain terminals, such as Alberta Wheat Pool, Saskatchewan Wheat Pool, Pioneer Grain and Pacific Elevators, which were also developed over the last few decades in both Vancouver and North Vancouver. The extent and location of terminal development in the Burrard Inlet portion of port can be found on the map (provided courtesy of the Vancouver Port Corporation) in Appendix A.
<table>
<thead>
<tr>
<th>Terminal</th>
<th>Year Opened</th>
<th>Current Commodities</th>
<th>Location</th>
<th>Area (acres)</th>
<th>Berth Length (m) / Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centerm</td>
<td>1958</td>
<td>forest products, containers, general cargo</td>
<td>Vancouver</td>
<td>65 (72 in 1999)</td>
<td>1113 (6)</td>
</tr>
<tr>
<td>Pacific Coast Terminals</td>
<td>1960</td>
<td>sulphur, ethylene glycol, styrene monomer</td>
<td>Port Moody</td>
<td>108</td>
<td>382 (2)</td>
</tr>
<tr>
<td>Vancouver Wharves</td>
<td>1960</td>
<td>mineral concentrates, liquids, methanol, forest products, potash, sulphur, fertilizers</td>
<td>North Vancouver</td>
<td>163</td>
<td>944 (5)</td>
</tr>
<tr>
<td>Neptune Bulk Terminals</td>
<td>1968</td>
<td>coal, potash, feed pellets, fertilizers, canola oil, phosphate rock</td>
<td>North Vancouver</td>
<td>70</td>
<td>453 (3)</td>
</tr>
<tr>
<td>Westshore Terminals</td>
<td>1970</td>
<td>coal</td>
<td>Delta</td>
<td>100</td>
<td>480 (2)</td>
</tr>
<tr>
<td>Seaboard International</td>
<td>1971</td>
<td>forest products</td>
<td>North Vancouver</td>
<td>55</td>
<td>600 (3)</td>
</tr>
<tr>
<td>Vanterm</td>
<td>1975</td>
<td>containers, forest products, general cargo, tallow and canola oil (for West Coast Reduction)</td>
<td>Vancouver</td>
<td>76</td>
<td>1074 (5)</td>
</tr>
<tr>
<td>Lynnterm</td>
<td>1975</td>
<td>forest products, general cargo</td>
<td>North Vancouver</td>
<td>86</td>
<td>915 (4)</td>
</tr>
<tr>
<td>Canada Place</td>
<td>1986</td>
<td>cruise passengers</td>
<td>Vancouver</td>
<td>NA(^\text{27})</td>
<td>775 (3)</td>
</tr>
<tr>
<td>Deltaport</td>
<td>1997</td>
<td>containers</td>
<td>Delta</td>
<td>100</td>
<td>670 (2)</td>
</tr>
</tbody>
</table>

Sources: McCague 1996; MSUA 1978; Hacking.

\(^\text{27}\)The area for Canada Place is not provided as cruise facilities require only a small amount of onshore facilities. Cruise terminals can often re-use original finger piers and in some cases rely on even narrower docking facilities. Canada Place was constructed on the original Pier B-C which dates from 1927.
4.2 Port city change

In many ways the changes that have taken place and those that are occurring in the Vancouver port city are illustrative of the trends discussed in Chapter 2, though in some respects there are some important differences. As Table 4.1 suggests, the Port of Vancouver is subject to the same technological changes in the shipping industry: the virtual disappearance of traditional finger piers and their replacement by large scale linear wharf facilities with extensive berth lengths and back-up land areas. Given their spatial needs, most of these terminals were developed by extensive filling of the harbour, resulting in a greatly reconfigured shoreline far beyond the original high water mark.

The size of the port's bulk and forest products terminals and the introduction of container terminals in the mid-1970s also indicate an increasing reliance on mechanized cargo handling. As can be expected, the increasing substitution of capital for labour is also evident in the Port of Vancouver. Between 1975 and 1995 total tonnage handled at the port more than doubled from 34.9 million tonnes to 71.5 million tonnes (Port of Vancouver cited in Acres 1980; Vancouver Port Corporation 1995). During this same period direct port employment fell thirty percent from 15,300 to 10,700 jobs (Port of Vancouver 1976; Vancouver Port Corporation 1995).

Notwithstanding this decline, the port's economic impact, which includes $710 million in wages and salaries and payments of $520 million to the federal, provincial
and local governments, remains significant (Vancouver Port Corporation 1995). Stark (1997) suggests that the decline in employment, while apparent in earlier years of mechanization, is now less significant. Moreover, the increasing reliance on intermodal logistics in containerization, creates three times the direct employment of bulk operations for the same cargo volume while relying on more skilled workers with higher wages (Vancouver Port Corporation 1995; Stark 1997). The port's significance is also illustrated by its sheer volume and continued success over recent years as conveyed in Figure 4.1 below.

**Figure 4.1 Port of Vancouver cargo and passenger traffic**

![Graph showing Port of Vancouver cargo and passenger traffic from 1992 to 1996.](image)

- **Total Tonnage (million tonnes) (Y1)**
- **Containers ('000 TEUs) (Y2)**
- **Cruise Passengers ('000s) (Y2)**

Source: Vancouver Port Corporation 1996.

The port development models investigated in Chapter 2 suggest a growing physical separation between port and city not only with the modification of the shoreline but
also through the movement of port terminals away from the city's core. Throughout the Port of Vancouver's development, port facilities have spread along the waterfront from the original port city cores on both the south and north shores of Burrard Inlet. Conditions that have influenced migration in other ports have also encouraged the development of port terminals away from Vancouver's Inner Harbour, which lies between the First and Second Narrows, to areas east of the Second Narrows and as far as Roberts Bank, located thirty-eight kilometres to the south of the Inner Harbour.

Nonetheless, the initial port sites within the Inner Harbour have not been abandoned by port uses but rather currently hold some of the port's largest terminals. As a result, much of the Inner Harbour accommodates the most intensive port use.

Three fundamental reasons may account for the enduring presence of port terminals on this urban waterfront: ownership of most of the waterfront land by the federally-controlled port; the continued success of the port in transhipping growing cargo volumes; and the lack of alternative locations for major deep-sea terminals.

Consistent with other urban waterfronts, the Vancouver waterfront has been shaped by the movement of the past few decades toward redevelopment and revitalization. Beginning with development of medium-density housing, commercial uses, parks and the Granville Island public market in False Creek, the waterfront redevelopment trend in the Vancouver area has spread to much of False Creek, Coal Harbour and the Lonsdale Quay area in North Vancouver all of which have received mixed urban
uses. Various factors such as the decline of marine-related facilities and other industry, removal of rail facilities and the initiative of land owners, such as the City of Vancouver on the south side of False Creek, led to the redevelopment of the different areas. Generally, these developments have occurred on lands owned by interests other than the port and in areas somewhat removed from the industrial port. A notable exception is the Central Waterfront, located between Canada Place and Main Street and owned by the Vancouver Port Corporation, where the Port and the City have jointly identified the area for a variety of urban and port uses in recognition of its urban context (City of Vancouver & Vancouver Port Corporation 1994). One significant result of the renewed interest in the waterfront has been increasing pressure for the conversion of industrial lands near the port to other higher order uses such as live-work housing (Beasley 1997; Crandles 1997; Smith 1997).

Also similar to other port cities, the community's perception of the waterfront is undergoing change. According to Beasley (1997) there exists some sense of support for the port and an understanding of its significance given the community's recognition of its place on the burgeoning Pacific Rim. The port also appeals to people for different reasons: it creates employment; it is a source of revenue; it has

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28 This area was initially part of a waterfront use study jointly initiated by the City of Vancouver and the federal Ministry of State for Urban Affairs and completed in 1974. In response to the concerns of the port and other interests over the study's findings an advisory committee was struck to develop area policies resulting in the redesignation of land use from industrial to urban uses (City of Vancouver 1990).
historical value; and according to Masterton (1997), its activity, architecture and overall aesthetic can be of great interest to certain members in the community. Nonetheless, Dickinson (1997), Smith (1997) and Stenson (1997) note that this support is tempered by the community’s enhanced appreciation of quality of life and ecological issues resulting in increased public scrutiny over waterfront use and development. Beasley (1997) and Dickinson (1997) suggest that apart from societal changes, the community’s consciousness has been affected by a legacy of past port developments that did not respond well to community concerns and interests.

Another notable waterfront change is a more formalized waterfront environment. Beasley (1997) and Stenson (1997) believe that the modern waterfront is structured around distinct uses and institutionalized relationships. The result is a waterfront with a rigid functional form that effectively separates uses and eliminates informal public access enjoyed by earlier residents. This modern reality is reinforced by heavy industrial roads, railway lines and fencing to protect both the public from unsafe conditions and the operator from unwelcome intrusion and liability.

In summary, it is apparent that many of the changes that have affected and continue to influence the Vancouver cityport are consistent with the port city trends discussed earlier in this paper. Perhaps one significant difference is the continued existence of major port terminals within the Inner Harbour. This area is surrounded by some of the most intensive urban use in the region with high density housing, office towers, hotels, tourist facilities, major parks and transportation services. Placed in this
context, the potential for conflict between Canada's largest port and the adjacent municipalities can be considered high.

4.3  Vancouver port-municipal relationships

4.3.1 Institutional framework

Responsibility for port city planning in the Vancouver region is set out in legislation at the federal and provincial levels of government. As elsewhere in Canada, municipalities in British Columbia are not formally recognized under the Canadian constitution but rather are established for local administration by the Provincial Government. Under the Municipal Act and special charter for the City of Vancouver, municipal governments in British Columbia are granted a relatively high degree of local autonomy for planning, zoning, subdivision and development control with virtually no involvement of the province (Romanelli & Marchand 1991). Regional coordination in the Vancouver area is undertaken by the Greater Vancouver Regional District for strategic planning, transportation planning and development services. Planning decisions at the regional level are not binding and their success depends upon the consensus and supporting initiatives of local governments.

Under the Canadian Constitution Act ports, harbours, navigation and shipping are the responsibility of the federal government. Since the creation of the Vancouver Harbour Commission in 1913, the port of Vancouver has been recognized as a national transportation resource and its management and control have remained
under some agency of the federal Crown. The original Commission operated under relatively complete autonomy until 1936 when control of most major Canadian ports was centralized under a federal Crown corporation known as the National Harbours Board. This board maintained virtually complete command of the nation’s largest and most important ports from its offices in Ottawa. However, under strong pressure for more local autonomy from shipping and business groups around the country, in 1971 the federal government created Local Port Authorities in some ports, including Vancouver, and eventually overhauled the ports system in 1983.

Through the Canada Ports Corporation Act, a number of Local Port Corporations were established in ports of national or regional significance including the port of Vancouver. These federal crown corporations exemplify the functions typical of public enterprises in that they are required by the Act to be “an effective instrument of support for the achievement of Canadian international trade objectives and of national, regional and local economic and social objectives” (Canada 1985). Other significant provisions emphasize the commercial nature of Local Port Corporations as well as their autonomy. Ultimately these organizations are responsible for the administration, management and control over the lands vested in title to the local body by the parent Canada Ports Corporation. This power includes control over the use of these lands and any construction works thereon. As a result, municipal

29 Other Canadian ports were to become administered under the provisions of the Harbour Commissions Act (including the Fraser River ports) and Public Harbours and Wharves under the direct control of Transport Canada.
controls such as planning and zoning do not apply to lands controlled by Local Port Corporations.

In the case of Vancouver, the Vancouver Port Corporation has extensive waterfront holdings which include all lands (460 hectares) and submerged lands (6,000 hectares) below the historic high water mark roughly east of the First Narrows in Burrard Inlet (Vancouver Port Corporation 1994). In practical terms, these lands can typically be found shoreward of the rail lines around the port. Throughout the port there are exceptions held by private interests, municipalities, the province and First Nations. The Corporation also administers the 100 hectare terminal site, connected to the shore by a 4.8 kilometre causeway, at Roberts Bank. In addition, the Corporation administers a wide navigation area extending throughout Burrard Inlet, English Bay, False Creek, Indian Arm and near shore areas southwards to the Canada-United States border. The Port Corporation’s jurisdictional area is illustrated in Figure 4.2.
The two bodies of legislation effectively put the Vancouver Port Corporation and its adjacent municipalities in a potentially conflictual relationship juxtaposing the port's federal and regional interests with adjacent local land use control and locally derived issues. While the municipalities surrounding the port have no regulatory control
over port areas, they can have a significant impact on port operations through their decisions on land use, transportation and economic development within their boundaries. The port’s mandate requires some sensitivity to local interests though this is further complicated by the port’s public enterprise role with its associated competing social and commercial objectives and a wide range of constituents stretching throughout Western Canada and beyond. Unfortunately, the Vancouver Port Corporation and its adjacent municipalities cannot rely on their collective legislative framework to establish the cooperation necessary to deal with each other’s spillover effects and identify and pursue common interests.30

4.3.2 Vancouver port-city planning principles

This section is based on the results of in-depth interviews with senior planning staff representing the City of Vancouver, City and District of North Vancouver, City of Burnaby and Municipality of Delta. In addition to these five, two interviews were held with senior staff from the Vancouver Port Corporation. Prior to the interviews, which were held over a two-week period in August 1997, each interviewee was presented with some background material including the list of planning principles derived from the literature in Chapter 3 (refer to Appendix B). Questions focussed

30 Proposed changes to the port’s governing legislation introduced in 1995 and later passing through Parliament as the Canada Marine Act, though dying in the Senate prior to the 1997 federal election, would allow for direct municipal representation on the port’s board of directors. As a new Local Port Authority, the port’s board would be made up of nine members, one each appointed by the federal government, provincial government, local municipalities as a group and the three prairie provinces combined, and five from port user groups. The port would maintain its federal status along with an even stronger commercial focus.
on the port-municipal relationship, planning principles and relevant examples.

**Principle 1: Ports and cities must promote mutual understanding**

All interviewees reinforced the need for increased mutual knowledge and its importance in helping to resolve specific issues. The port respondents note an apparent lack of knowledge by municipalities, perhaps reflecting past independent approaches, especially in terms of the geographical and environmental constraints on port developments (Crandles 1997; Stark 1997). Beasley (1997) acknowledges that the City of Vancouver could benefit from more information about the nature of the port, its changing industry and challenges.

Beasley (1997) and Stark (1997) suggest that the education process needs also to extend to the wider community. Stark (1997) highlights the importance of community education by noting that the economic significance of the port is not well understood and, as a result, the port is often seen only for its adverse impacts rather than its benefits, many of which are local. Stenson (1997) notes the need for a visible presence by the port and ongoing liaison with residents to help gain and maintain understanding and support. Liaison committees, staff meetings, port industry speakers were noted as possible means to improve communication. Another mechanism mentioned was the role of other coordinating bodies such as the Greater Vancouver Gateway Council.

The Gateway Council is an organization made up of senior representatives from the
major transportation interests in the Greater Vancouver region which was established in 1994 following previous work on regional transportation and trade objectives and issues (Greater Vancouver Gateway Council 1996a). Recognizing the economic significance of the various regional gateway components (ports, airports, road and rail transport) and the impressive opportunities for growth, the Council has become a strong advocate for increasing the competitiveness of the region. One of the areas in which the Council has identified needing improvements is regional goods movement which suffers from congestion and a lack of emphasis in municipal and provincial transportation planning (Greater Vancouver Gateway Council 1996b). This issue will become particularly important in the future: rail car loads to the Inner Harbour terminals are projected to increase from 370,000 in 1994 to 420,000 in 2005; vehicles trips are to increase from 274,000 to 362,000; and truck volumes at Deltaport are to reach 95,000 by 2005 (Greater Vancouver Gateway Council 1996b).

**Principle 2: Ports are a scarce and valuable resource to the local, regional and national economies**

Most of those interviewed agree that the port is an important resource to the economy; however, it was suggested that its development should not be to the exclusion of other interests (Stenson 1997). More specifically, there is a consensus among the port and municipal representatives regarding a heightened interest for public waterfront access. Beasley (1997) points out that the renewed interest in the waterfront as an amenity and as a unique feature with the potential to shape urban
form and community identity means that waterfronts are also an important resource to the local population.

An area in which there is some debate is compatibility of adjacent uses. It was noted earlier that there is increasing pressure for the conversion of industrial land adjacent to the port for other more urban uses. The response recommended by the literature is to maintain an industrial buffer adjacent to the port to protect it from conversion pressures and the potential impacts from incompatible land uses. Figures 4.3 to 4.7 illustrate the waterfront usage around the port and confirm, for the most part, that many port areas are buffered from residential areas by industrial uses. Notable exceptions in the Inner Harbour include the residential area (shown as mixed use on Figure 4.3) between Victoria Drive and Renfrew Street in Vancouver and the residential areas (also shown as mixed use on Figure 4.6) north of the port area between Cassiar and Neptune terminals in North Vancouver.
Figure 4.3 Port of Vancouver land use (South Shore, west of Second Narrows)

Source: Vancouver Port Corporation 1994.
Figure 4.4 Port of Vancouver land use (South Shore, east of Second Narrows)

Source: Vancouver Port Corporation 1994.
Figure 4.5 Port of Vancouver land use (North Shore, east of Second Narrows)

Source: Vancouver Port Corporation 1994.
Figure 4.6 Port of Vancouver land use (North Shore, west of Second Narrows)

Source: Vancouver Port Corporation 1994.
Figure 4.7 Port of Vancouver land use (Roberts Bank)

Source: Vancouver Port Corporation 1994.
Beasley (1997) believes that the changing nature of work and households means that there will be a demand for more affordable locations in which city residents can live and set up small businesses, and that in recognition of this zoning controls will need to become less exclusionary and more inclusive in terms of land use. The City of Vancouver has responded to these demands by allowing for the introduction of a number of artist live-work developments on light industrial lands immediately adjacent to the port.

Others expressed a concern for the potential loss of an industrial buffer around the port. Masterton (1997) notes that the maintenance of the light industrial buffer in the District of North Vancouver has helped to minimize the impacts of port operations on residents. He also fears the impacts of gentrification and displacement which would affect both the port and other industrial users within the buffer. Crandles (1997) and Stark (1997) also emphasize the importance of protecting port industry from the potential political pressure of new residents and the creation of physical access problems through road congestion especially with the growth of containerization in the port.

The issue of compatible uses has also been raised recently in the City of North Vancouver where the City, Vancouver Port Corporation and receiver for the former Versatile Shipyard site near the foot of Lonsdale Avenue are undertaking a land use study for the area. At the time of writing, a proposed concept plan which provides for an urban mixed use development has been prepared and is available for public
review. One of the proposed planning principles to guide the use of the lands recommends avoiding land use conflicts with the adjacent heavy waterfront industry to the east which accommodates an active shipyard and large dry-dock (City of North Vancouver 1997). Notwithstanding this principle, the City and Port Corporation are continuing their discussions over the appropriate buffer and with whom responsibility rests in creating this buffer (Smith 1997).

**Principle 3: Ports and cities must seek an appropriate balance among waterfront interests**

One of the areas of greatest concern to both port and municipal representatives is how to achieve a balance of uses on the waterfront which not only recognizes the wider role of the port but also addresses local needs. Crandles (1997) comments that the lack of a common vision for the harbour is a problem, perhaps not so much where the port already is intensively developed but in areas where additional port facilities could be considered. Stark (1997) suggests that the problem stems from a disjointed approach in which development is considered on an incremental basis. Beasley (1997), Smith (1997) and Stenson (1997) agree that there is a need to obtain a general agreement on land and water use which addresses competing demands and considers all port municipalities. This agreement would allow for greater land use certainty for all and provide the necessary support for port use of the waterfront where appropriate.

The concept of a balance of uses became a major issue for the Vancouver Port
Corporation on a small waterfront site in Burnaby known as Berry Point. The site had been the home of a log export business for nearly thirty years before this operation shut down in the early 1990s. The site remained under-utilized until the Port Corporation initiated the review of a specific project which proposed a number of small scale marine uses over the entire site. The City of Burnaby and local residents reacted unfavourably to the project given their concerns over potential community impacts and the fact that no public access was contemplated. Recognizing these significant concerns, the Port Corporation withdrew the project and initiated a process with the City of Burnaby and the local community to identify guidelines under which the site should be developed. A new concept providing for port use, environmental enhancement and public access was developed in conjunction with the City and presented for review at public workshops in the spring of 1997. Although the process has yet to conclude, Stenson (1997) suggests that the new concept reflects a balanced approach to the site.

The port representatives stressed the need for municipalities to take a regional perspective regarding the port. Crandles (1997) and Stark (1997) suggest that port issues are typically dealt with in a localized manner which does not acknowledge the potential impacts on the port as a whole. Just as the municipalities participate in the Greater Vancouver Regional District to ensure coordination of local decisions regarding growth and transportation, they must also consider how their local decisions on issues such as land use and transportation can affect the port as a whole. A regional perspective on ports can assist to define and improve linkages
within the system and begin to address allocation issues. A regional perspective becomes particularly important given the enhanced demand for public waterfront access, the questions over the continued presence of bulk facilities in the Inner Harbour (Masterton 1997), and the constraints on port growth and lack of alternative development locations. With its multiple local jurisdictions, an outcome of this regional perspective in the Vancouver port city could be that each municipality may not be able to achieve all of its localized waterfront use objectives as the port is encouraged to develop where the land and water sites are best suited.

**Principle 4: Inactive port areas should be used to the benefit of both port and city where maritime re-use is unlikely**

The applicability of this principle in the Vancouver cityport was found to be limited. Given that the Port Corporation holds much of the developable waterfront in the Inner Harbour and the port continues to experience growth, there are unlikely to be many situations where maritime re-use is not possible. The exceptions include False Creek and Coal Harbour which continue their transformation to urban uses. The Central Waterfront area, however, is one where the city and port agreed on the general direction for the site, resulting in a planning award from the Canadian Institute of Planners for inter-governmental cooperation (Beasley 1997). Generally, the objectives for the area provide for a continued transportation role for the area,

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31 The lack of suitable alternative sites in the Port of Vancouver is clear given that east of the Second Narrows, much of the waterfront land is at a slope of fifteen percent or greater (Forward 1968). The cost of creating land through fill in much of these areas is prohibitive given the steep profile of the seabed. The environmental regulatory constraints need also to be acknowledged.
recognizing the important cruise facilities of Canada Place, and a variety of urban uses.

Dickinson’s (1997) perspective is that all port areas, whether active or not, should benefit both the port and municipality. He points to the example of the development of the Deltaport container terminal and proposed grain facility at Roberts Bank through which the municipality and the Port Corporation signed a $3.2 million partnership agreement. The money will provide for community benefits such as parks, educational, recreational and cultural amenities. Another significant result from the Deltaport project is the construction of road improvements that will facilitate local traffic flow following the extension of the access road to the port facilities. Crandles (1997) suggests that municipalities should not view ports as traditional developers in attempting to extract as many community amenities as possible. Rather, ports should be recognized for their public enterprise role which brings local benefits through the pursuit of their dual economic and social bottom line.

**Principle 5: Ports must recognize and accept their role in the urban environment**

The municipal interviewees agree that the port needs to recognize its role as a citizen in its local setting. It was suggested by Stenson (1997) that the port’s sense of local accountability may at times be overshadowed by its wider mandate. Beasley (1997) and Smith (1997) agree with Stenson and cite the past development of a grain transfer facility across from a residential area in Vancouver (Elder’s Grain)
and a tall transit shed in North Vancouver (Neptune Terminals) as examples where the port overrode local decisions and by-laws in favour of these projects.

Crandles (1997) and Stark (1997) submit that the port has a responsibility to address its development and operational impacts on the local community. Crandles cites two examples, among others, in which the port has been successful in addressing local concerns:

- the retention of significant heritage features of Ballantyne Pier in its redevelopment for cruise and forest products handling resulting in a heritage award from the City of Vancouver; and
- the construction of a new road overpass in cooperation with the City of Vancouver which will redirect port traffic from a local neighbourhood to a dedicated port roadway.

Another significant contribution by the port is the provision of a number of waterfront parks throughout the various municipalities and the establishment of the Maplewood South Wildlife Conservation Area in association with Environment Canada and the District of North Vancouver. The District and the Port Corporation also collaborated on the development of Harbour View Park adjacent to the Lynnterm cargo terminal. Masterton (1997) views the development of this park as the result of a successful partnership which came together to meet a local need.

This collaboration also hints at the role cities can play in helping ports achieve their
objectives. Stenson (1997) and Crandles (1997) believe that the municipalities should consider what actions they can take to assist the port as there are often reciprocal benefits. Ultimately this perspective leads to one which not only recognizes mutual benefits from cooperation but also a responsibility to assist in addressing the needs of the other. Clearly, this is a longer term view which goes well beyond the limitations of the zero-sum approach.

**Principle 6: Ports and cities must develop a shared approach to urban waterfront planning**

Through the Port Corporation's development of its PORT 2010 Land Use Management Plan, it assumed control of development decisions on port lands with the introduction of its Project Review Process (Vancouver Port Corporation 1994). Stark (1997) feels that this was a positive step in order to provide the necessary perspective on port development and to deal with the port's wide constituency. However, as the pressures continue to grow in the region, Stark recognizes that a partnership approach will become more important.

Dickinson (1997) observes that finding common ground depends on an agreeable process which allows for the municipality and the port to be equal players. This approach was followed for the planning of the Central Waterfront in which both the

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32Prior to this plan and the Neptune and Elder's Grain projects, the Port Corporation directed its tenants to obtain permits from the adjoining municipalities. These two projects, as discussed earlier, gave the Corporation the incentive to take responsibility for development decisions. The Project Review Process does provide for municipal consultation prior to any project decision.
City of Vancouver and the Port Corporation had a decision-making role (Beasley 1997). Dickinson (1997) and Crandles (1997) also point to the development of the review process for the proposed grain facility at Roberts Bank as a success. In this case, the municipality and the Port Corporation cooperated on finding a meaningful role for the municipality throughout the review process.

However, for the cooperative approach to be successful it requires the commitment of each to involve the other in appropriate planning processes. The municipalities generally recognize the evolving change in the Port Corporation's approach which is creating more opportunities for cooperation and involvement. However, the municipalities must also open their processes to provide the Port Corporation with an effective role. There are examples such as the City of Vancouver Blueways study which was established to address water usage around the city. From the beginning of the process, the authority of the Port was recognized and two seats on the steering committee were made available to Port representatives. However, in other cases municipalities have proceeded with planning processes on port lands without allowing for the appropriate involvement of the Port Corporation (Stark 1997). The recent development of the second phase planning study for the District of North Vancouver waterfront was one in which the Corporation had to lobby for changes that respected its interests and those of waterfront industry (Crandles 1997).
4.4 Summary

Over its relatively short history, the Vancouver cityport has experienced changes and challenges similar to other ports throughout the world. While its structure has adapted to technological developments in shipping, it has also evolved to mirror societal values regarding waterfront land. It is clear that the pressures on the Vancouver cityport waterfront have increased and indications are that they will continue to influence the relationship between the port and its adjacent municipalities. With these realities, the port and its surrounding municipalities may feel compelled to adopt planning principles to guide their future relations. Evidence from the interviews of senior representatives from municipal planning departments and the port reveal that such an approach has merit.
5.0  ANALYSIS AND CONCLUSIONS

On the basis of the preceding discussion, it is clear that the ongoing development of ports and cities is creating significant challenges over the future of urban waterfronts and, in particular, the port-city interface. The literature investigated suggests that the pressures ports and cities face will likely intensify as the scale of port facilities grows at the same time as local interest in the waterfront for alternative uses increases. The difficulty for ports and cities is to mesh their seemingly opposing waterfront mandates in a manner that achieves the best overall benefit. This question is not unlike a typical resource allocation issue; however, in the case of Canadian ports, the 'rights' to the port city waterfront resource are somewhat prescribed by legislation.

To achieve the best overall benefit, ports and cities need to initiate a dialogue that recognizes their mutual interests and challenges and their opportunities for cooperation. The literature revealed several principles that might apply to port cities. These were tested in the Vancouver cityport on the basis of a number of interviews with port and city representatives and relevant examples. Throughout the interviews it was clear that the notion of planning principles for ports and cities was supported. Most of the principles were found to be acceptable in concept, though the observations provide insight into ways some could be expanded, improved or reorganized. The following section will re-assess these principles in an attempt to ascertain their applicability to port cities in general. Based on some of the issues
raised in the Vancouver cityport and elsewhere in this paper, the remaining sections will consider specific recommendations for port city planning and areas for further research.

5.1 Re-evaluation of port-city planning principles

The role of education was stressed by the interviewees, some of whom commented that information sharing must extend beyond the port and municipal organizations to local communities. This concept was noted in the original set of principles but was included under the statement regarding the port as a scarce and valuable resource (Principle 2) rather than the promotion of mutual understanding (Principle 1). To clarify the role of education, the points regarding education and communication should be incorporated into Principle 1.

The literature and interviews have clearly established how the urban waterfront and public attitudes to the waterfront have changed. Essentially, the change relates to the rediscovery of the waterfront amenity by residents, cities and developers and the resulting physical development of mixed uses and public access. The waterfront holds a strong attraction because of its ability to provide visual relief to the urban landscape; connect residents with an aspect of the natural environment; remind port city dwellers of their maritime culture through ongoing marine activity; and provide opportunity for leisure and recreational pursuits. With these characteristics in mind, the idea that the waterfront is also a scarce and important resource to the urban
community should be reflected in a waterfront planning principle. The objective of such a principle is to find a place on the waterfront to accommodate community objectives, not to the exclusion or perhaps even detriment of port activity, but rather to acknowledge and legitimize community needs. Ways of achieving this are evident in many ports, including the Vancouver cityport, and may involve the development of a waterfront access plan and the provision of waterfront parks and other access points.

The principle calling for an appropriate balance among waterfront interests raises the question of what constitutes 'appropriate'. There is no formula on which to base this assessment; nevertheless, ports and cities must arrive at a common vision that results in a general consensus on land use. An appropriate balance does not imply equal representation of land use but rather applies the concepts of utility, function and advantage to determine what areas are best suited for certain uses. As was revealed in the interviews with port representatives, a perspective of the port that extends beyond the local is required to take into account the port’s constraints and the potential negative effects of incremental local decisions on the port as a whole.

Owing to the changing demands of shipping, areas in many ports may become inactive and threatened with redundancy. In these situations, the literature suggests that ports and cities should seek redevelopment that benefits both. In the case of Vancouver, there are relatively few areas in the Inner Harbour that have become redundant and therefore the relevant principle (Principle 4) has limited application.
Perhaps the most pertinent aspect of this principle relates to the idea of pursuing mutual benefit. Reciprocity was also reinforced through the interviews and the literature, which suggest that not only are there mutual benefits to be gained by ports and cities but that each has a role to play in supporting the objectives of the other. In as much as ports and cities can coordinate their responses to matters of land use planning, transportation planning and economic development they stand to achieve synergistic results. This concept appears to have wider applicability than that restricted to marginal port areas as presented in Chapter 3.

Evidence from the interviews does not indicate any need for material change to the final two principles from the literature (Principles 5 and 6). Interviewees recognize the importance of the port addressing local impacts and both adopting a partnership approach in light of the growing pressures on the port and urban areas with the resulting increased potential for conflicting waterfront objectives. The partnership approach will require concerted action in finding meaningful roles for both the port and the municipal jurisdictions that acknowledges their respective interests. The approach must also emphasize a mutual commitment to collaborate where required and to adhere to the adopted principles through future decisions and actions. In other words, principles have no value unless there is a commitment to put them into practice.

On the basis of the above assessment of the planning principles suggested by the literature, Table 5.1 presents a revised version that draws on the Vancouver cityport
experience. The reader will note that the principles have not required significant modification, though the application of the original principles to the case study and their subsequent improvement should prove to create a more robust construction and widen their applicability.
<table>
<thead>
<tr>
<th>Principles</th>
<th>Policy Objectives</th>
<th>Implementation</th>
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| **Ports and cities must promote mutual understanding**                   | ▶ establish effective communication through ongoing liaison  
▶ foster recognition and support for port  
▶ obtain sound understanding of local community                                                                                       | liaison committees, advisory planning committees, working groups, community outreach programs, economic impact studies                                               |
| **Ports are a scarce and valuable resource to the local, regional and national economies** | ▶ preserve waterfront land for water-dependent uses  
▶ protect areas for port service industry  
▶ ensure compatibility of adjoining uses                                                                                      | protective zoning, special districts, transition zone, overlay zoning, tax abatement, purchase and transfer of development rights                                      |
| **Urban waterfronts are an important amenity and resource to local communities.** | ▶ acknowledge and promote local interests                                                                                                                  | public access plan and development of recreational facilities, consideration of aesthetics in development decisions                                                    |
| **Ports and cities must seek an appropriate balance among waterfront interests** | ▶ port to be planned in a holistic manner  
▶ seek consensus on land use allocation                                                                                                                     | consultation and participation in planning processes, regional based planning of land use and port-city linkages                                                       |
| **Cities and ports must support efforts to achieve mutual benefit**       | ▶ promote maritime re-use where possible  
▶ develop shared vision for redevelopment                                                                                                                   | protective measures as above, joint planning and development, coordinated transportation planning, economic development committees                             |
| **Ports must recognize and accept their role in the urban environment**   | ▶ create open and accountable community relations  
▶ minimize impacts on residents' quality of life                                                                                                         | credible public involvement programs, ongoing liaison with community groups, citizen advisory committees, surveys                                                  |
| **Ports and cities must develop a shared approach for urban waterfront planning** | ▶ adopt partnership approach that recognizes respective jurisdictions  
▶ adopt processes with provisions for mutual ratification and review  
▶ maintain some flexibility in light of port planning challenges  
▶ promote negotiation to deal with conflicts                                                                                     | memoranda of understanding, training in negotiation, clear procedures for conflict identification and resolution, working groups for specific issues |
5.2 Conclusions and recommendations

Throughout this work, ports and cities have been shown to experience a variety of planning challenges that have evolved from change within the shipping industry and urban society itself. It has been argued that cooperation based on agreed planning principles, such as those derived from the literature and case review, will assist cities and ports in addressing their mutual issues. The following presents the main conclusions and recommendations that flow from the preceding discussion.

5.2.1 Conclusions

The principal conclusions to be drawn from this work are that, given the potential conflicts between cities and ports, not only is there a need for cooperation between the two, there are also many benefits with increased cooperative efforts. The interviewees clearly acknowledged the value of working together to achieve common goals and spoke of a number of achievements resulting from a shared approach. The need for and benefits of collaboration were also supported by the literature.

Another important conclusion to be drawn is the answer to the research question which asks what are the appropriate planning principles, strategies and approaches that effectively address the problems and land use conflicts experienced between cities and ports along their interface? The resulting principles listed in Table 5.1 stem from an exploration of the changing port city environment, the challenges this
change brings to both ports and cities and an evaluation of a particular port city. While the results cannot address all planning problems that ports and cities collectively face, they do suggest possible approaches to some of the significant issues that are common to many port cities. Perhaps even more fundamental than the content of specific principles is the apparent worth of planning principles as a means to improving port-city cooperation.

It was suggested in Chapter 3 that the basis for cooperation should be a set of planning principles acceptable to both ports and cities. All interviewees agreed on the value of adopting planning principles with at least one suggesting they are essential (Stark 1996). Their value lies in establishing the general parameters within which land use and other planning processes and decisions are to be based. Without prescribing rigid boundaries, they create greater certainty for both ports and cities and thus allow each to pursue actions with known support. The principles also have the benefit of providing a valuable reference to guide future decisions and ensure both ports and cities are following the agreed course. Finally, they provide a basis for an improved port-city inter-organizational relationship which, in many cases, may be strained from different mandates and inter-jurisdictional conflicts. However, as suggested by some interviewees, none of these benefits will occur unless there is a commitment throughout the municipal and port organizations not only to adopt the principles but to support them through appropriate actions and decisions.
5.2.2 Recommendations

The following recommendations are based on the findings of the literature and interviews and are intended to apply to all city ports. While the principles and related policy objectives identified in this chapter could form an overall recommended strategy, the following are suggested as specific actions that may deserve particular attention given the growing pressures on the port-city interface.

**Recommendation 1:** *Ports and cities should adopt processes for improved communication.*

This recommendation follows the notion that cooperation requires communication, which itself will enhance mutual knowledge and positively affect decision-making. Vehicles for communication should be both informal, in the manner of casual contact and working groups, and formal, by way of advisory committees and high level port-city meetings.

**Recommendation 2:** *Cities and ports should jointly develop strategies to address land use in adjoining areas.*

In particular, the role and value of a buffer needs to be better understood by both cities and ports. This understanding requires, among other things, better knowledge about the available land supply; demand for this land by port related and other industries; changing industry requirements; conversion pressures and their impacts on land values; and traffic issues. With this knowledge, ports and cities can implement effective strategies to manage these areas over the long term to the
benefit of both.

**Recommendation 3:** *Ports and cities should seek general agreement on harbour-wide land use.*

One of the principal areas in which cities and ports are likely to continue to encounter difficulty is in waterfront allocation. The important aspect to consider in this issue is what is best for the harbour as a whole as opposed to what suits individual local areas. As national and regional resources, port areas must be considered on a wider basis to avoid the potentially negative impacts of short-sighted decision-making. This recommendation is particularly important in port areas with multiple local jurisdictions. A public access plan should also be considered on this basis.

**Recommendation 4:** *Ports and cities should adopt mutually agreeable planning principles.*

For the reasons cited above, planning principles should be adopted by ports and cities to guide future actions and decision-making. Although their adoption could take many forms, such as inclusion in each other's plans, there was interest among the interviewees for a more formalized mechanism such as a memorandum of agreement or an accord. The notion of adoption presumes that the principles would then be implemented through appropriate action and decisions.
5.3 Areas for future study

The issues raised in this paper point the way to many topics in which further study may be warranted. A simple extension to this current work would be to evaluate the extent to which the principles developed are reflected in current Vancouver port city planning policy and processes. This analysis could also be applied to another port city to provide a useful comparison.

This work concludes that both port-city cooperation and the adoption of planning principles are beneficial to ports and cities. These conclusions could be tested by comparing the relative success, however defined, of port cities in which cooperation exists to varying degrees. A writer attempting this type of analysis would benefit from reviewing Boschken's 1988 work, Strategic Design and Organizational Change: Pacific Rim Seaports in Transition, which would provide some useful insight into establishing a suitable evaluative framework.

Another area which may be of interest is how existing legislation could be amended to improve coordination between ports and cities in Canada. This topic would also necessarily need to consider the questions of whether modification is warranted, given the role of ports, and to what extent coordination should be encouraged. This study may also benefit from reviewing legislation in another country to determine other possible approaches.
The potential benefits of regional port coordination, especially in terms of waterfront allocation and facility siting, were suggested by some of those interviewed for this paper. This matter could be further explored to fully understand the benefits, issues and potential structures under which enhanced coordination could occur. Again, examples from other jurisdictions would improve the analysis.

Many estuaries, inlets and other water bodies are increasingly being placed within an integrated environmental planning framework to address water quality and marine wildlife issues. In the Vancouver area, the Fraser River falls within the Fraser River Estuary Management Program and Burrard Inlet is the concern of the Burrard Inlet Environmental Action Program. Both of these programs involve ports and cities in the role of environmental management along with federal and provincial environmental agencies. The United States has a relatively long history in coordinated shoreline planning under its federal Coastal Zone Management Act and related state legislation. However, where programs such as these do not exist, it may be useful for ports and cities to also consider adopting environmental principles to guide their land use and related decisions.

5.4 Concluding remarks

As ports and cities continue to face ever-increasing pressures over the role and function of the urban waterfront, the success of their planning efforts will depend on their ability not only to reconcile competing interests but to re-build a relationship
upon a common vision and commitment to pursue appropriate actions and mutual benefits. Port and city planners can look for inspiration in the past where ports and cities co-existed and grew in mutual support. Although much has changed, a symbiotic relationship between ports and cities still exists. The challenge for port and city planners is to recognize the significance of this relationship and to fully develop its potential.
REFERENCES


**Improving your waterfront: a practical guide.** Washington, D.C.: Department of Commerce.


Appendix A: Background information provided to interviewees
INTERVIEW OUTLINE:
Planning principles for the port-city interface

Background
Throughout history, port cities have experienced significant structural changes; the pace of change has accelerated over the past few decades largely through technological improvements in the shipping industry. Physically, ports and cities have become increasingly separated as port terminals have grown in size and have moved away from the urban core. In socio-economic terms, ports have become relatively less significant in their urban settings as their labour requirements have decreased through automation and their hinterlands have expanded beyond the local market. Despite these changes, ports remain an important resource to their national, regional and local economies.

The fundamental difficulty for ports and cities is to provide for a healthy port while addressing the needs of the local population. This dilemma has often resulted in conflicts between port and municipal authorities over their respective objectives for the urban waterfront. To reduce the potential for conflict, ports and cities need to find ways of cooperating in waterfront planning. A crucial first step is to determine the principles under which this cooperation should take place.

Interview Questions:
1. Existing port-city relationship
   How has your waterfront changed? How have community attitudes toward the waterfront changed?

   As a municipality (port), what challenges do you face regarding waterfront use?

   How would you characterize your relationship with the port (municipalities)?

   Mutual Exchange..............................................Power Dependency
   perceive joint benefit                                zero sum outcomes
   through cooperation &                                through conflict &
   problem-solving                                      formal bargaining

   In what areas do you experience land use conflict or differing objectives? Where do you find common ground?
2. **Planning principles**
   Is there value in adopting planning principles with the port (municipalities)?

   Do you agree with the planning principles suggested? How should they be changed? What principles are missing?

   **Port-city planning principles**

   - Ports & cities must promote mutual understanding
   - Ports are a scarce & valuable resource to the local, regional & national economies
   - Ports & cities must seek an appropriate balance among waterfront interests
   - Inactive port areas should be used to the benefit of both port & city where maritime re-use is unlikely
   - Ports must recognize & accept their role in the urban environment
   - Ports & cities must develop a shared approach for urban waterfront planning

3. **Application of principles & examples**
   Are these principles being applied and, if so, where?

   If any are not practiced, what reasons can you suggest?

   Where are there opportunities to apply these principles?
Appendix B: Map of the Port of Vancouver

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Please file into
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Master
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Richard

Colin, Lindsay

Colin L. J.
Spring 1998
Appendix B
M.A. (Planning)

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