

**Designing Place Specificity
in a Rural Coastal Community**

by

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ABSTRACT

This thesis explores how place specificity can lead to new economic opportunities and act to strengthen community. Place specificity refers to the morphological and climatic qualities of a given site, and how human activity engages with it.

The testing ground is Port Medway, Nova Scotia, Canada. This town is situated within a series of interconnected conditions that have effect at different scales, informing the qualities of its place. Located along the North Atlantic coast, the Medway Harbour's geography protects both its waters and its settlements from the forces of the ocean. Port Medway sits therein, facing a major river mouth where it converges with the ocean; this condition was the town's lifeblood. Various events severed this connection to the river and harbour, and with it socioeconomic stability. This thesis proposes re-linking the town to this specificity of place as a means to achieve economic and community growth.

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CHAPTER 1: INTRODUCTION

Vernacular Architecture and Place

For many rural coastal communities in Nova Scotia, the tourism industry is one of the only economic forces. This industry is focused on selling a constructed historical image of towns “frozen in time” in a preindustrial age.¹ Often architectural endeavours in such towns face pressure to fit an aesthetic palette that does not go beyond referencing supposed preindustrial forms and materials - a “vernacular” appearance. By following this palette, the architecture is no longer operating in terms of its connection to place, either functionally or aesthetically. Its attempt to fit the vernacular palette has therefore ironically disconnected it from its site.

The concept of vernacular architecture can be applied in various ways; vernacular architecture theorist Kingston Wm. Heath defines “vernacular” as follows:

The vernacular threshold is crossed when there is a discernible and consistent variation of previous rules of thought and behavior conducted simultaneously by regional inhabitants in direct response to new or changing forces within a locale.²

The vernacular, according to this definition, is not frozen in time, but rather is a dynamic concept. Heath categorizes vernacular architecture into several categories. First, is personal or symbolic regionalism in which the architect syncretizes vernacular features together in a way that perhaps only the architect understands, as is the case with

1 Ian McKay, *The Quest of the Folk: Antimodernism and Cultural Selection in Twentieth-Century Nova Scotia* (Montreal: McGill-Queen's UP, 1994), 275-276.

2 Kingston Wm. Heath, *Vernacular Architecture and Regional Design: Cultural Process and Environmental Response* (Oxford: Elsevier Ltd., 2009), 11-12.

the “New Vernacular” architects who pick a feature and hyperbolize it in their designs, representing “highly personal design statements of what the locale meant to the architect, speaking to other architects.”³ Next, is nostalgic regionalism through which one attempts to recreate a perception of the past, often erroneously. Lastly, is situated regionalism which is the thoughtful application of the vernacular to one’s design, which can manifest itself in different ways, be it through response to the environment, response to culture, or response to the landscape.⁴

Situated regionalism echoes some of Kenneth Frampton’s tenets of critical regionalism, which he defined years before Heath. Frampton argues that the post-war advent of the high-rise and the freeway, products of increasingly globalized economies and societies, has decimated the urban form and fabric, and in particular culture, of cities and created a placeless and meaningless existence for their inhabitants.⁵ He offers “arrière-garde” architecture as a solution, meaning an architecture that neither espouses the Enlightenment myth of progress nor the postmodernist tendency of regression into preindustrial nostalgia and aesthetic.⁶

This arrière-garde approach to architecture is meant to mitigate the placeless effects of globalization on the architecture of a particular site by responding to the peculiarities of that site. Critical regionalism is meant to

3 Ibid., 40.

4 Ibid., 40-48.

5 Kenneth Frampton, “Towards a Critical Regionalism: Six Points for an Architecture of Resistance,” in *The Anti-Aesthetic: Essays on Postmodern Culture*, ed. Hal Foster (Seattle: Bay Press, 1983), 17.

6 Ibid., 18-20.

be equally critical of global and local practices and apply regionally appropriate parts of both to a design. This does not equate to “simple-minded attempts to revive the hypothetical forms of a lost vernacular”, which is similar to Heath’s nostalgic regionalism and against which critical regionalism must guard itself.⁷

Christian Norberg-Schulz makes a similar argument regarding vernacular architecture in much of his writing. Norberg-Schulz argues that the architectural expression of *genius loci* (“spirit of the place”) has diminished to the point that thought and feeling have been separated, leading to a meaningless existence. To create a more comprehensive sense of existence, one must reinstil a sense of place.⁸ Norberg-Schulz sees vernacular architecture as primarily a rural endeavour “intimately connected with a particular situation.”⁹ However, he does assert that “to respect the genius loci does not mean to copy old models. It means to determine the identity of the place and to interpret it in ever new ways.”¹⁰

Whatever their differences in ideology, Heath, Frampton, and Norberg-Schulz all have four things in common: an architectural response to place is important; this response is evident in the vernacular construction of that place; the vernacular is not static, but rather is dynamic and ever-changing in response to its environment; and the architectural response is not achieved through a superficial application of

7 Ibid., 21.

8 Christian Norberg-Schulz, *Architecture: Presence, Language, and Place* (Milan: Skira editore, 2000), 310-312.

9 Christian Norberg-Schulz, *Genius Loci: Towards a Phenomenology of Architecture* (New York: Rizzoli, 1980), 170.

10 Ibid., 182.

an idealized static vernacular character, but rather through an understanding of the logic behind the vernacular.

This thesis takes these commonalities as its architectural position. There are lessons to be learned from the built response to the surrounding environment, but it is misguided to simply replicate vernacular forms to evoke a sense of a common thread connecting through a community and through time. Rather, an understanding of place specificity and critical application of the principles behind the local built environment can lead to a design that recognizes the unique qualities of site and responds to them appropriately.

Thesis Question

Can a community be revitalized through creating an architecture that reconnects it economically and collectively to the importance of the specificity of place?

CHAPTER 2: CONTEXT

The Medway Harbour

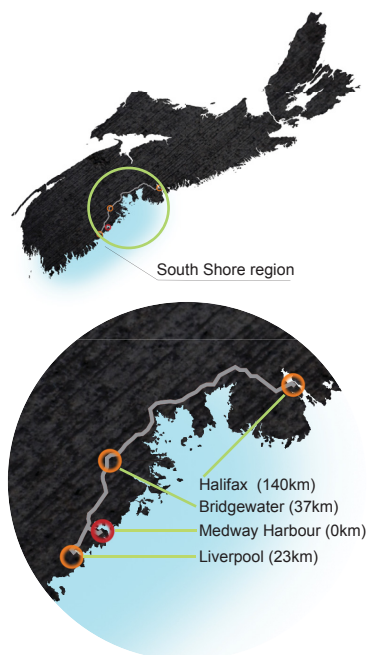


Fig. 1. The Medway Harbour in relation to nearby towns; base map data from Province of Nova Scotia, “Free Maps;” highway data from Google Maps, “Map of Nova Scotia.”

Nova Scotia’s Medway Harbour is located on the province’s South Shore, some 140 kilometres southwest of the capital city of Halifax (figs. 1, 2). The seawater along the South Shore is unique in that average water temperature is lower and salinity levels higher than in areas around the rest of the province (fig. 1).¹¹ The harbour, located within this specific water condition, is home to several small fishing communities including Port Medway, the oldest and formerly most prominent town in the harbour. Although some shore fishing is carried out, tourism is the main economic driver. Many residents of these towns must commute to nearby Liverpool and Bridgewater daily for work (fig. 1).

The geography and bathymetry of the Medway Harbour creates several different conditions including direct exposure to the ocean (fig. 3, A), variable protection around the harbour perimeter with a shallow underwater shelf (B), a freshwater zone at the river estuary (C) and lastly a bowl condition created by the point on which the town was settled (D). This is where fresh and salt water mix, and is also the deepest point in the harbour (in orange). The deep, narrow trench leading from this point out of the harbour was historically the only part deep enough for large ships to navigate. Port Medway benefitted from its location at the river mouth because from there people collected lumber that was floated downriver and shipped it out to international

11 Bénédikte Vercaemer et al, “Genetic Diversity of the European Oyster (*Ostrea Edulis* L.) in Nova Scotia: Comparison with other Parts of Canada, Maine and Europe and Implications for Broodstock Management,” *Journal of Shellfish Research*, 25, no. 2 (2006): 2.



Fig. 2. The Medway Harbour; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and "NSTDB10000_Lunenburg2012.gdb."

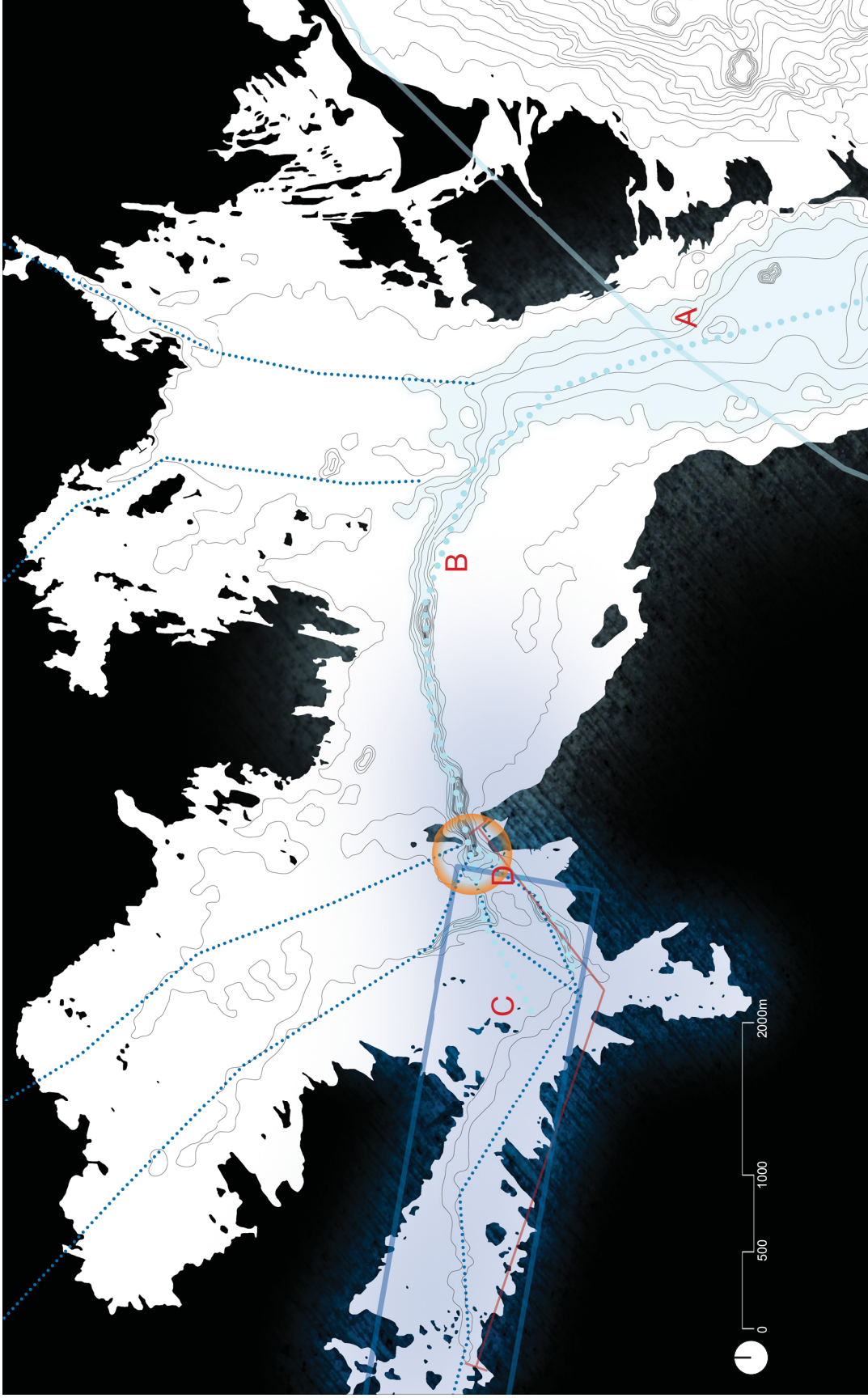


Fig. 3. Medway Harbour bathymetry; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and "NSTDB10000_Lunenbourg2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

markets. In fig. 3 the red line shows the extent of wharf development at the peak of Port Medway's shipping/shipbuilding industry in the mid-1800's, from the town point four kilometres upriver.¹²

Settlement of Port Medway

Permanent settlement began in 1759 with a group from Massachusetts. They were part of the now-called "Planters," a migration wave of thousands of New Englanders to Nova Scotia during the 1760s, who came to repopulate Acadian lands left vacant by *Le Grand Dérangement* (fig. 4, below).¹³ Although the Acadians knew Port Medway as "Port Maltois", they had no permanent settlement there.¹⁴ The settlers chose what became the town point as the first permanent settlement in the Medway Harbour because they were aware of the special condition there. New Englanders already knew the harbour as "Port Jackson" before settlement, and lifelong resident and historian Marguerite Letson states that proximity to the river was important to settlers in order to engage in international timber trade.¹⁵

The north side of the harbour was not settled for another 10-20 years. This land was part of the New Dublin township, granted in 1760 to a group of Planters from Connecticut who did not settle in the harbour, but instead at two other river estuaries at the Lahave River and Petite Riviere (fig. 4, below). By the time the government re-granted empty

12 E. Marguerite Letson, *Port: A Short History of Port Medway, Nova Scotia* (Port Medway: Duncan Harper, 1991), 38.

13 Phillip A. Buckner and John G. Reid, eds., *The Atlantic Region to Confederation: A History* (Toronto: University of Toronto Press, 2005), 151-152.

14 Letson, *Port*, 7.

15 Ibid., 13, 17.

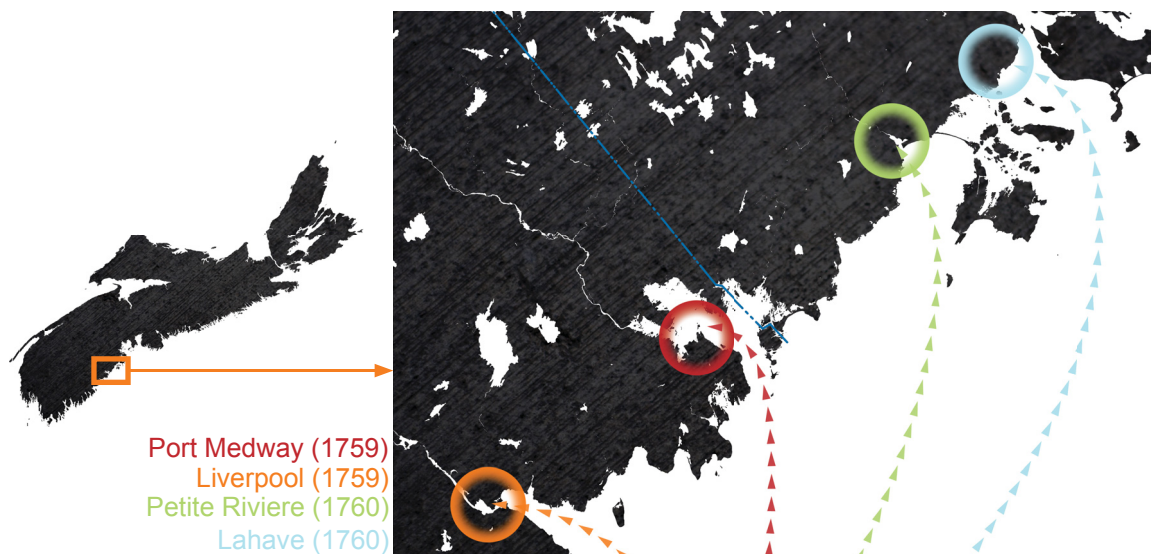


Fig. 4. Migrations from New England; base map data from Province of Nova Scotia, “Free Maps,” Dalhousie University GIS Centre database, “NSTDB10000_Queens2012.gdb” and “NSTDB10000_Lunenburg2012.gdb.”

harbour lots in the 1770’s and 80’s, Port Medway was the only permanent settlement there.¹⁶

In contrast, settlement of the river began soon after that of the harbour. In 1764, a mill was built upriver specifically to provide lumber resources for Port Medway’s budding export industry. The mill quickly grew into Mill Village (fig. 2, above), and by 1829, Nova Scotia politician and author Thomas Chandler Haliburton noted that it was home to “several respectable and wealthy families.”¹⁷ The early 1800’s saw the development of several lumbering communities in the county interior along the Medway River and its tributaries, all of which relied on the river as infrastructure and Port Medway as market access, while Port Medway relied on the supply of lumber from the river communities to provide for its shipping and shipbuilding industries.

¹⁶ Thomas C. Haliburton, *An Historical and Statistical Account of Nova-Scotia*, vol. 2 (Halifax: Joseph Howe, 1829), 141.

¹⁷ *Ibid.*, 144.

Early Prosperity

In the same year that Port Medway was settled, so too was nearby Liverpool (fig. 4, above), which was made the county seat and set up as a 100,000 acre township, engulfing Port Medway.¹⁸ Vacant land in Port Medway was re-granted to Liverpool settlers, and despite being a separate community, Port Medway fell under the jurisdiction of Liverpool. Many settlers from Liverpool gained lots in both communities and carried on business in both places.¹⁹ In the 1820's, Haliburton described Liverpool as Nova Scotia's "second commercial town", its "best-built town", and as having the coast's best lighthouse.²⁰ Although both towns engaged in international trade and shipbuilding, Port Medway was initially in the shadow of Liverpool.

Nevertheless, Port Medway prospered in its own right. This prosperity appeared disproportionate to the town's activity; at one point the surveyor-general of Nova Scotia implied that the residents were engaged in smuggling, stating that it was beneficial to the residents that they had no customs official.²¹ Shipbuilding was underway as early as the 1760's, and by 1802, Liverpool-based merchant Simeon Perkins recorded the founding of a shipping and shipbuilding company in Port Medway.²² Marguerite Letson's *Port* documents 150

¹⁸ Ibid., 146.

¹⁹ See for example Simeon Perkins, *The Diary of Simeon Perkins*, vols. 1-5 (Toronto: Champlain Society, 1948-78). Perkins was a notable Liverpool merchant. Although he lived in Liverpool, Perkins and his family were prominent business leaders in Port Medway.

²⁰ Thomas Chandler Haliburton, *A General Description of Nova Scotia; Illustrated by a New and Correct Map* (Halifax NS: Royal Acadian School, 1823), 88; Haliburton, *Historical and Statistical Account*, vol. 2, 145-146.

²¹ Letson, *Port*, 29. The date of the letter is unknown but was likely the late 18th century.

²² Simeon Perkins, *Diary*, vol. 4, 372.

ships built in the town between 1808 and 1900.²³ Aside from shipbuilding, the town engaged in trade, largely in the West Indies, deep-sea fishing in Labrador, and served as the departure point for the river's international lumber industry.²⁴ Whether actually true or not, Letson states it was a "fact" that half of Nova Scotia's pine exports passed through Port Medway.²⁵

Growth was slow but steady. In 1788, Port Medway elected its own magistrate, complaining of the inconvenience of having to rely on Liverpool for one.²⁶ In 1812, the town elected its own overseers of highways, and in 1831, it was divided into two school districts.²⁷ In 1850, the port was granted its own customs office.²⁸ As late as 1873, Port Medway was described as a "thriving settlement."²⁹ By the time the first detailed map of Port Medway was made in 1886, the town had an array of amenities strung along the Commercial Street axis, which culminated at a number of wharves facing the river (fig. 5, below). It was evidently said that up to the 1880's, Port Medway was "second only to Yarmouth"³⁰ in shipbuilding and shipping.³¹

There was a cosmopolitan ambiance to Port Medway. Regarding the town during this boom time, Letson states:

23 Letson, *Port*, 107-109. The list was compiled by the publisher Harper and is likely incomplete, as Harper notes difficulties in collecting the records.

24 *Ibid.*, 37.

25 *Ibid.*

26 James F. More, *The History of Queens County N.S.* (Halifax: Nova Scotia Printing Co., 1873), 62-63.

27 Letson, *Port*, 31, 66.

28 *Ibid.*, 35.

29 More, *History of Queens*, 63.

30 Yarmouth, NS was also a Planter settlement.

31 Letson, *Port*, 37.

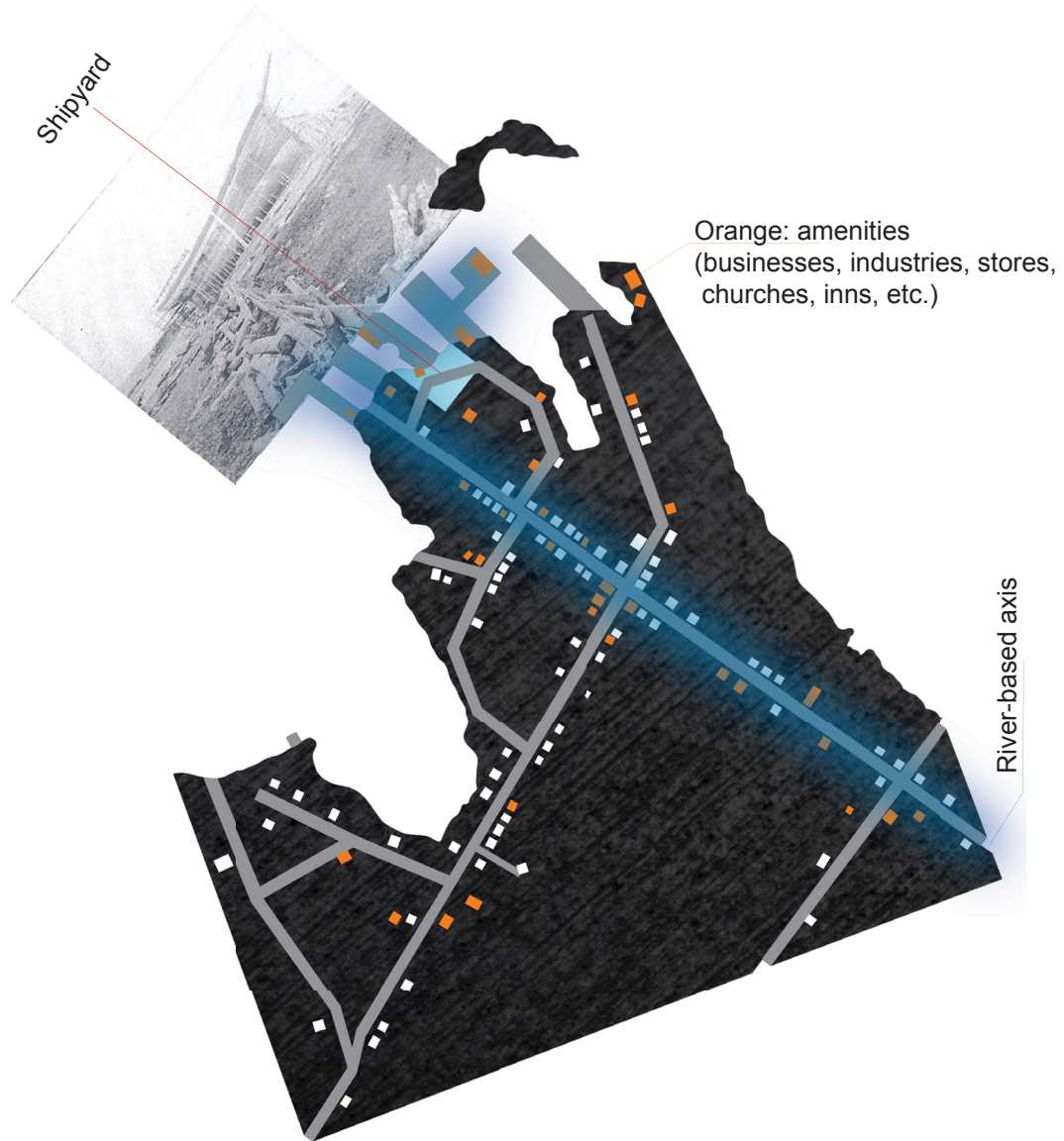


Fig 5. Port Medway, 1886; base map data from Church, *Map of Queens County*; photo from Letson, *Port*, 92.

The River from Dock Cove to the Narrows bristled with wharves crowded with shipping, with ships anchored in the stream awaiting a berth. Ships barques, barkentines, brigs, brigantines, later schooners, four or three or two masted, skiffs and pleasure boats, the shouts of sailors, the clank of hammers, the smell of lumber, of tar and rope, of molasses and rum, West India sugar and tamarinds, cocoanuts and oranges – bearded sailors with gold earrings, tall Norwegian and Danish Captains, English, Scotch, Irish; all the sights and sounds and smells of the sea – these were the atmosphere and life of Port Medway.³²

Hard Times

Despite Port Medway's prominence as a shipping/shipbuilding centre, three factors contributed to the slow demise of the community: the development of roads, a corresponding shift in industry, and out-migration of the younger population.

The development of roads began very slowly. From 1759 until the early 1800's there was one road out of Port Medway and it led to Liverpool (fig. 6, below, orange and green respectively). Early road development (fig. 7) favoured communities on the north side of the harbour (light blue) and Mill Village (orange), bypassing Port Medway. In the 1830's (fig. 8), a new interior road superceded the coastal road and saw the growth of interior settlements (dark blue). Sometime between the 1830's and 60's a road finally connected Port Medway to Mill Village and the main road (fig. 8).³³ In the 1930's, the main road was paved and rebranded a highway to make way for the new tourism industry, and in the 1970's, the highway was rerouted in

³² Ibid, 38.

³³ Joan Dawson, *Nova Scotia's Lost Highways: The Early Roads that Shaped the Province* (Halifax: Nimbus, 2009), 73-78.

Fig. 6. The 1760's; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and "NSTDB10000_Lunenburg2012.gdb."

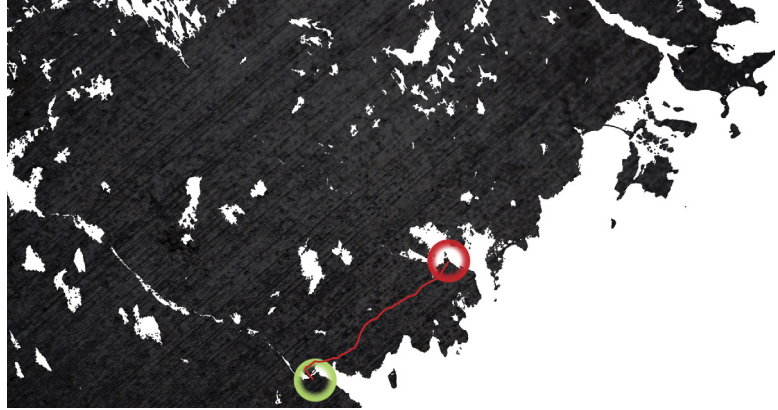


Fig. 7. 1800; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and "NSTDB10000_Lunenburg2012.gdb."

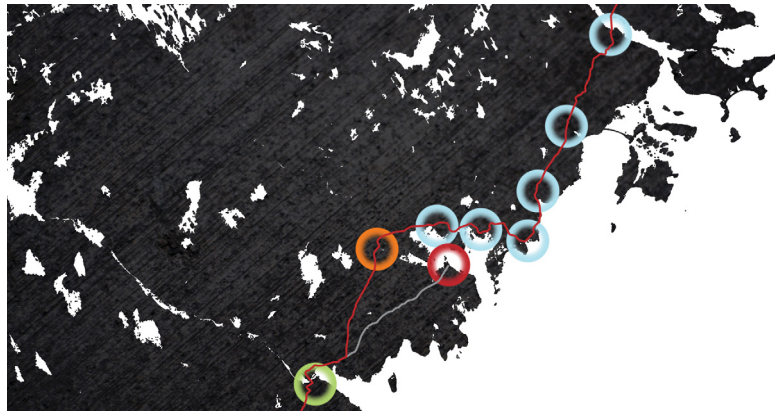


Fig. 8. The 1830's - 60's; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and "NSTDB10000_Lunenburg2012.gdb."

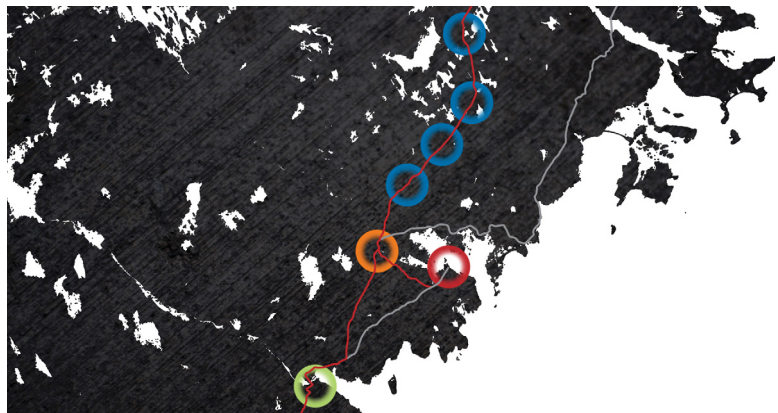
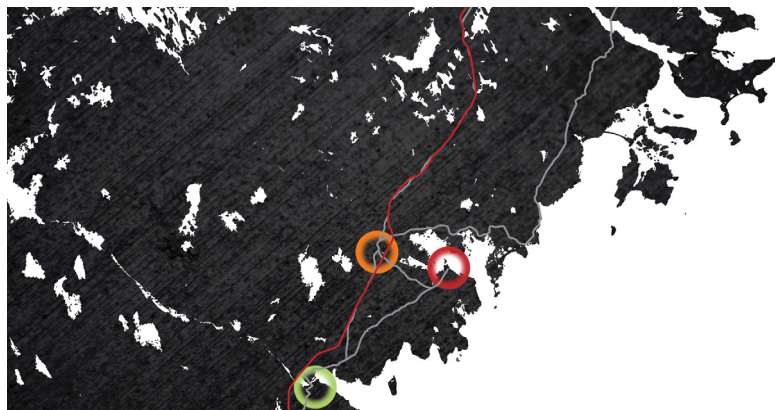


Fig. 9. The 1930's - present; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and "NSTDB10000_Lunenburg2012.gdb."



places and upgraded (fig. 9).³⁴ These advances benefitted Mill Village and other highway communities, for whom the road became the main infrastructure. This was a detriment to Port Medway because the highway superseded the river as infrastructure, severing the bond between economy and place.

The development of roads coincided with a shift in industrial aspirations. By the late 1800's, many of the shipping and shipbuilding magnates in town were dying off or retiring. Retirees were content to either sit on their wealth or invest it outside of Port Medway, rather than to invest in the future of the town.³⁵ If there were opportunities to regain economic stability, no one took them.

Compounding the effects of this shift in industry and infrastructure was the region-wide trend of out-migration. Atlantic Canada historian Patricia Thornton estimates that between 1881 and 1931, 600,000 people left the Maritime provinces, resulting in a net loss of 470,000, or 50% of the Maritimes' population in 1931.³⁶ Even as early as 1840, out-migration of the younger population to New England was so commonplace that it was simply accepted as a fact of life; this was initially understood as part of the relationship

34 "Nova Scotia's 'Paving Programme': Highway Reconstruction in the 1930s," Nova Scotia Archives, last modified July 30, 2014, <http://novascotia.ca/archives/virtual/highways/background.asp>.

35 Eric W. Sager, Lewis R. Fischer, and Rosemary E. Ommer, "Landward and Seaward Opportunities in Canada's Age of Sail," in *Merchant Shipping and Economic Development in Atlantic Canada*, ed. Fischer and Sager (St. John's: Memorial University, 1982), 18-19, 22-26.

36 Patricia Thornton, "The Problem of Out-Migration from Atlantic Canada, 1871-1921: A New Look," in *The Acadiensis Reader: Volume Two*, 3rd ed., eds. Buckner, Campbell and Frank (Fredericton: Acadiensis Press, 1999), 13.

between New England and the Planters.³⁷ This left many communities in Nova Scotia with few young people to take up industrial opportunities left vacant by retirees.

The effect of out-migration on Port Medway is difficult to determine with accuracy due to inconsistent census records.³⁸ Early records from 1861 (a century after settlement) to 1881 show an average population of 750. Despite inconsistencies in district boundaries and the occasional spike in population, available data from 1871-2011 show an overall trend of depopulation, including during mid-century boom years (fig. 10, below).³⁹ While provincially population has grown steadily (fig. 10, orange), Queens County has seen only slight overall growth (blue), Liverpool almost no overall growth (green), and the Port Medway district a drop of 100% (red). It is important to note that out-migration was already well entrenched in the region by 1871, so population loss had occurred even before then. By 2013, the town (as opposed to the census district) of Port Medway had approximately 200 year-round residents and 100 seasonal residents.⁴⁰

37 Marcus Lee Hansen and John Bartlet Brebner, *The Mingling of the Canadian and American Peoples*, vol. 1: Historical (Toronto: Ryerson Press, 1940), 120-123.

38 Prior to 1851, censuses were not conducted regularly and many are lost or incomplete. Available county censuses from 1787 and 1838 do not specify districts. The 1851 census was lost, and from 1861-2011 the electoral district boundaries changed with every census, skewing the numbers.

39 See bibliography for census data sources, 1861-2011.

40 Vicki Grant, "Creative Catalysts: Port Medway is More than Country Music," *Chronicle-Herald* (Halifax), July 22, 2013, <http://thechronicleherald.ca/artslife/1143681-creative-catalysts-port-medway-is-more-than-country-music>.

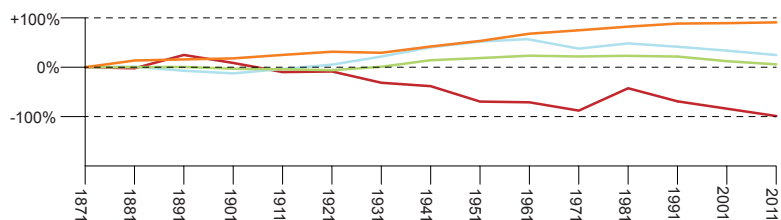


Fig. 10. Population growth by percent, 1871-2011; data from Canada, Census Office; Canada, Census and Statistics Office; Canada Department of Agriculture; Canada, Dominion Bureau of Statistics; and Statistics Canada (see bibliography).

Port Medway Today

Having lost the river/ocean connection, industrial aspiration, and a good portion of the younger population, Port Medway has all but dried up. The river-oriented axis has been replaced with a road-oriented one, which is a weaker axis in that it has fewer amenities and terminates at a view of an old building and a graveyard, rather than at the water (fig. 11, below). Almost all amenities achieved during the 1800's are now gone, although the ones remaining still follow the old axis (fig. 11). The customs office closed in the 1910's; by the 1950's, the two schools were reduced to a single two-room house that taught only to grade 8.⁴¹ Today, there is no school in Port Medway; the nearest school was in Mill Village and taught only to grade 6, and closed in 2014. The industrial wharves all disappeared, save for a single government wharf at Foster's Point, which serves both industry and the general public (fig. 11).

New economic opportunities developed not in Port Medway, but in Liverpool and Bridgewater along the highway. In 1956, Letson noted that shore fishing provided livelihood for some in Port Medway, while others worked as tradespeople,

⁴¹ Letson, *Port*, 41, 67.

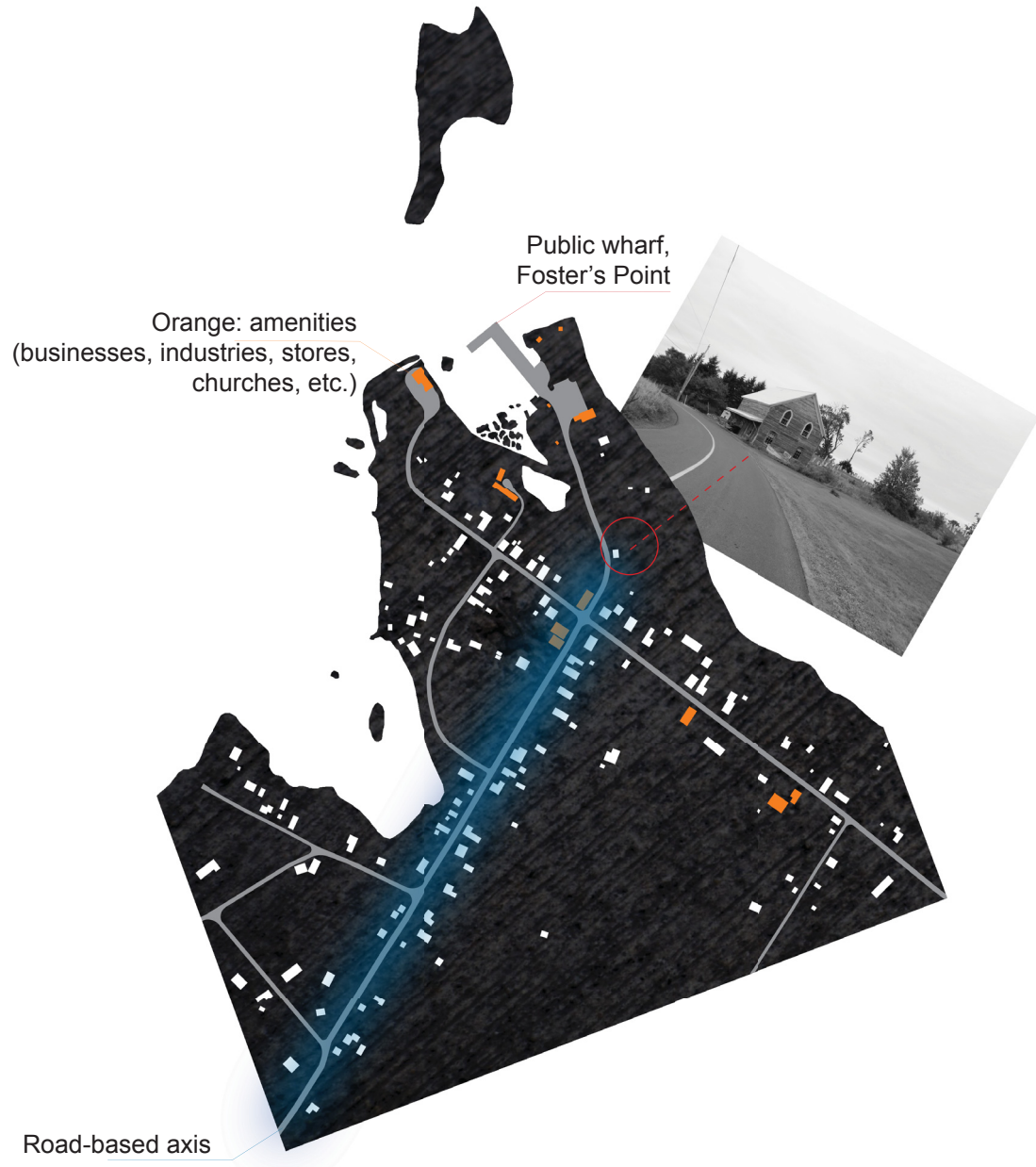


Fig 11. Port Medway, 2015; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb."

mostly at Steel & Engine Products Ltd. in Liverpool and the Mersey paper mill in Brooklyn next to Liverpool – both since closed.⁴² Dependent upon Liverpool for jobs, Port Medway had once again fallen into the shadow of its sibling community.

Attempts at an ocean-based industry lingered until the 1990's (figs. 12-14, below). In the 1980's, the industry seemed promising, as two fish plants were in operation at the town point: the plant on the west side of the point began infilling the water to expand the land and the plant. Between the two plants, the government rebuilt and extended the public wharf, and added a new, larger boat slip (fig. 12). The 1990's started out well, as the larger plant on the east side built a new warehouse (fig. 13, orange), but by the mid-90's both plants shut down (fig. 13, green). By the 2000's, fundraising efforts helped the municipality to purchase the larger plant lot and demolish the plant, and the property was landscaped into a public park. A historic lighthouse on the premises was moved away from the coastline and restored, and the seawall along the coast was extended to provide protection for the lighthouse. The warehouse was kept and turned into an ad-hoc summer exhibition space for local artists.⁴³ Meanwhile, the other plant has sat in disrepair and the infill has been slowly eroding (fig. 14). What fishing is still carried out from the government wharf is not a unique industry, as many communities around the harbour engage in shore fishing. Furthermore, the fish is neither processed nor sold in town.

42 Ibid., 42.

43 Wilfried Kalinowski et al, "Port Medway Lighthouse, Nova Scotia Canada," accessed February 25, 2015, <http://www.lighthousefriends.com/light.asp?ID=1366>.

Fig. 12. Ocean-based industrial development, 1980's; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

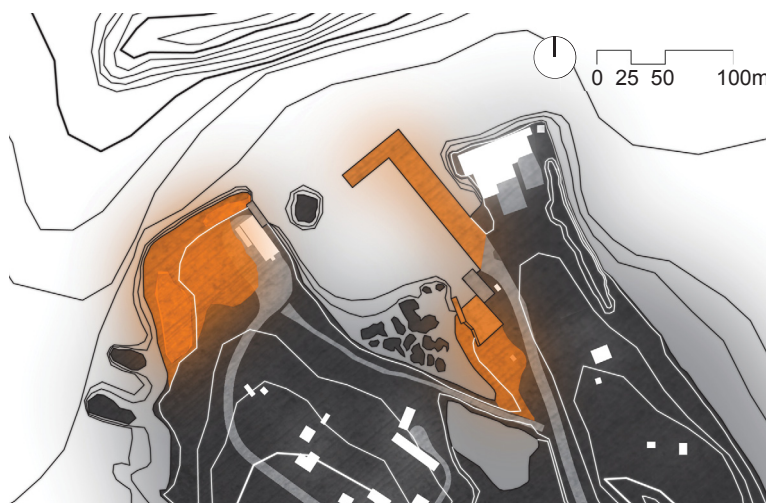
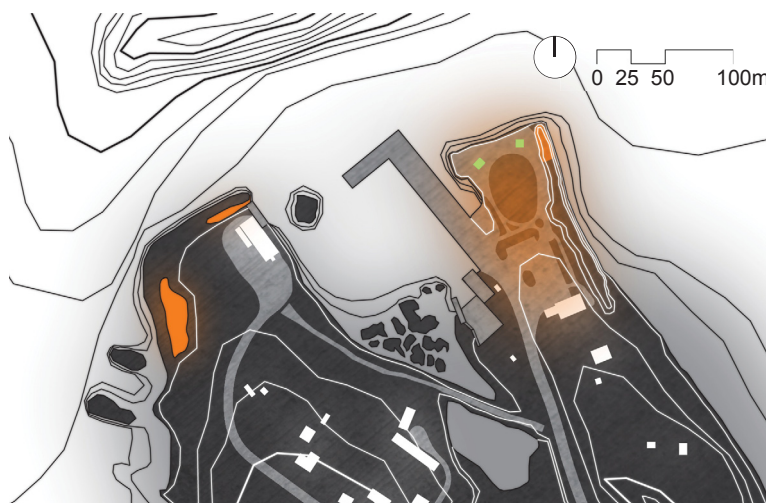


Fig. 13. The 1990's; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."



Fig 14. The 2000's; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."



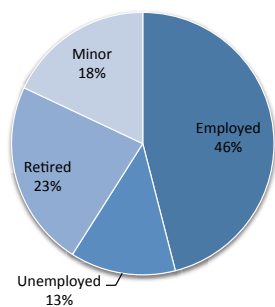


Fig. 15. Employment; data from Province of Nova Scotia, “Community Counts.”

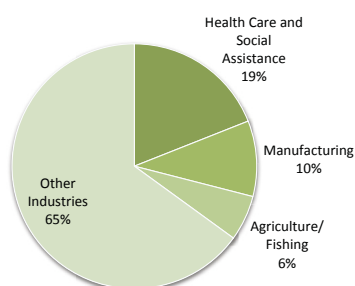


Fig. 16. Industry; data from Province of Nova Scotia, “Community Counts.”

Figs. 15 and 16 show employment and industry data for Port Medway and surrounding communities. Only 46% of the community is employed, with 18% being too young, 23% retired, and 13% unemployed. It should be noted that facilities for the two largest industries, health care/social assistance and manufacturing, are located in Liverpool and/or Bridgewater. It is also important to note that this data was compiled from the 2011 census and precedes the 2012 closure of the mill in Brooklyn, undoubtedly affecting the percentage of people engaged in manufacturing. Most activities and amenities in town are seasonal and/or tourist-oriented, and almost all are located within a half-kilometre radius of the centre of town. Fig. 17 (below) shows public amenities (orange) and public outdoor space (green) in relation to this radius. The one building not in the radius is a seasonally operated single-employee Meeting House museum.

New life for Port Medway is heavily reliant upon the seasonal population. As early as the 1950’s, Letson noted that retirees were buying up and modernizing old houses in town. Seasonal residents have been instrumental in instilling new life into Port Medway. Fundraising societies, of which there are many, have been either founded by or received much support from seasonal residents, including successful initiatives to landscape the lighthouse park, restore the lighthouse, restore the Meeting House museum, and purchase the town’s other lighthouse from the federal government.⁴⁴

These activities mark a return of an enterprising spirit to Port Medway, but they are all reliant upon a regionally

⁴⁴ Grant, “Creative Catalysts.”

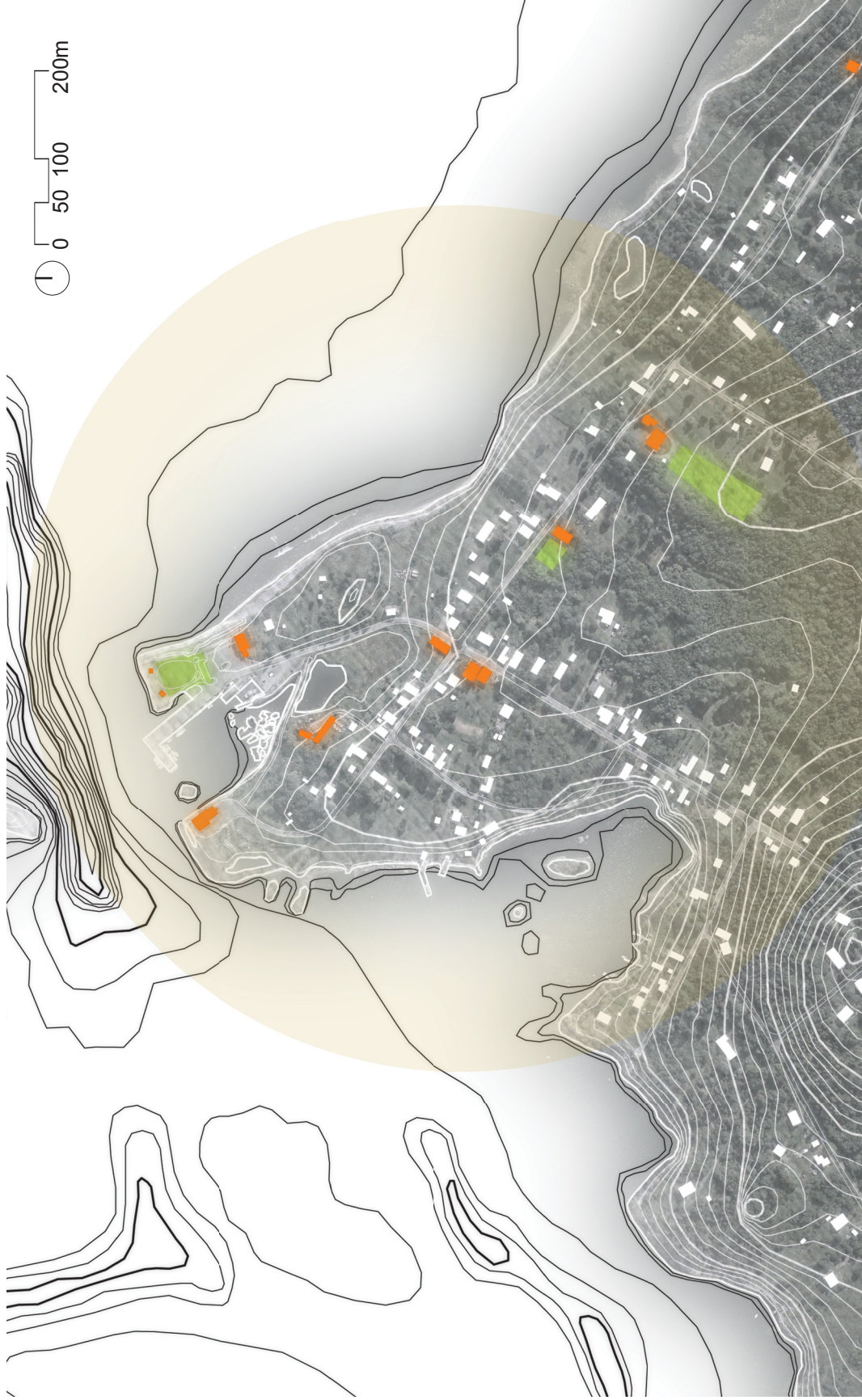


Fig. 17. Port Medway, industry, amenities, and public outdoor space; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets;" satellite imagery from Google Maps, "Map of Port Medway."

struggling tourism industry. Because Port Medway lies on Nova Scotia's "Lighthouse Route," a driving circuit aimed at providing views of quaint coastal villages for tourists, much effort goes into constructing an image of the past. The restoration efforts in particular are backward-looking in scope, preserving the town's past as an idyllic seafaring village.



Fig. 18. Foster's Point lighthouse and park.

An example of this is the lighthouse at Foster's Point (fig. 18). The lighthouse was built in 1899 at the tail end of Port Medway's life as a shipping port. It was decommissioned in 1989 and sat for years on privately owned fish plant property (see figs. 12-14, above). After the plant closed, the lighthouse was summarily saved and restored. Despite both the lighthouse and the plant being in disrepair, the plant was not spared. There were undoubtedly pragmatic reasons for this, including the lighthouse being the smaller and cheaper building to restore.

Yet, there were other reasons, which allude to the nostalgic gaze of the tourism industry. The lighthouse fit into the tourist-focused image of a quaint, picturesque coastal town frozen in time, a vestige from an era of which no living person has memory. Conversely, for tourist and local alike, the fish plant instead represented the sting of a much more recent failed economic venture, and the reality of the town's current struggles. Thus, the plant was razed and the land transformed into a park in an attempt to erase this chapter of the town's history. Despite all this effort, the town's other closed lighthouse still stands in view of the park (fig. 19).



Fig. 19. Abandoned fish plant.

The tourism industry has grown increasingly unstable and has proven a poor long-term economic solution for many

communities. As residents, both permanent and seasonal, struggle to identify their community and themselves with constructed images of a preindustrial past, the town itself continues to flounder in the face of an uncertain future.

Having lost the river-ocean connection that was the very reason for Port Medway's settlement and the medium for its economic prosperity, the town has faced crises of economy and community for over a century. Letson, however, recognized that prosperity lay in the specificity of this place:

Only the ruined wharves and the silted up docks remain of what was once a thriving harbour [fig. 20]. But the channel is just as deep and the harbour just as land-locked and safe, the broad estuary just as capable of great things as it ever was. Now the grass grows to the edge of the shores where once great ships rocked gently at their safe moorings.⁴⁵



Fig. 20. Coastline where wharves stood.

⁴⁵ Letson, *Port*, 48-49.

CHAPTER 3: DESIGN

A Local Industry: European Oysters

Growth for Port Medway lies not in preserving an image of the past, but rather in recognizing the historically significant qualities of place specificity for contemporary utilization. These qualities, mentioned by Letson above, have not gone completely unnoticed. A small oyster hatchery specializing in the European oyster (*Ostrea edulis*, L.) has operated in Port Medway since the 1990's, and its existence is directly a result of the condition of the seawater along the South Shore, and Port Medway's location therein where fresh and salt water mix.⁴⁶

The European oyster was first introduced from Europe to the United States in the 1940's. In the 1970's, after decades of acclimatization, Dalhousie University in Halifax imported stocks from Maine as part of a research program. The oysters displayed remarkable resilience and adaptability, but after the deadly parasite *Bonamia ostreae* appeared in American waters, import of further European oysters was prohibited. The cultivation of this oyster in Nova Scotia gained research value because this region is one of the few places left worldwide where *B. ostreae* is not found. From 1989 to 1994, the university transferred the oysters to four commercial hatcheries, including the one in Port Medway.⁴⁷



Fig. 21. Oyster hatcheries in Nova Scotia; base map data from Province of Nova Scotia, "Free Maps."

Nova Scotian oyster farms specializing in the American oyster (*Crassostrea virginica*, L.) are far more prevalent than those raising European oysters (fig. 21). The green circles show areas where the more than forty American

⁴⁶ Vercaemer et al, "Genetic Diversity," 2.

⁴⁷ Ibid., 2-5, 20.

oyster farms are concentrated; none are present on the South Shore, where the four European oyster hatcheries (orange and red) are found. This is because the high salinity and low temperature of the region's water is inhospitable to American oysters, but are the only conditions in the province suitable for cultivating the acclimatized European oysters.⁴⁸

Oysters also rely on the exchange of fresh and salt water for growth.⁴⁹ The Medway River's confluence with the ocean, protected deep within the harbour by the bowl formation of the point (see chapter 2 fig. 3), makes Port Medway one of the most optimal sites in the region for cultivation of the European oyster.

Global Context

Worldwide European oyster production has been miniscule compared to American oyster production (fig. 22, below, orange and green respectively). The former dropped from a peak 30,000 tonne output in 1961 to 2,200 tonnes in 2013. This drop in output happened because of massive mortalities in the 1970's due to *B. ostreae*. Since then, global output has been extremely slow to recover. Because of this, the European oyster has a market value 3-5 times higher than other oysters and is considered a niche market delicacy.⁵⁰

48 Ibid., 2.

49 Wendell J. Lorio et al, "The Cultivation of American Oysters (*Crassostrea virginica*)," California Aquaculture University of California, Davis, accessed October 21, 2014, <http://aqua.ucdavis.edu/DatabaseRoot/pdf/432FS.PDF>.

50 P. Gouletquer, "Cultured Aquatic Species Information Programme. *Ostrea edulis*," FAO Fisheries and Aquaculture Department, last modified January 1, 2004, http://www.fao.org/fishery/culturedspecies/Ostrea_edulis/.

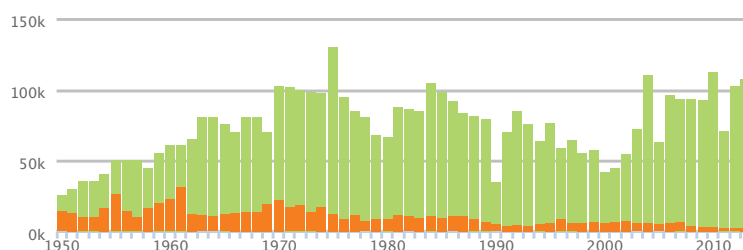


Fig. 22. Global American and European oyster production, 1950-2013; data from P. Gouletquer, “Cultured Aquatic Species Information Programme. *Ostrea edulis*” and V.S. Kennedy, “Cultured Aquatic Species Information Programme. *Crassostrea virginica*.”

Local Context

In Nova Scotia, shellfish aquaculture provides a disproportionately high number of jobs compared to its output (figs. 23-24, below). Shellfish production, of which American oysters comprise 4% and European oysters are not even accounted for, comprises 20% of all aquaculture output, yet shellfish production employs 54% of all aquaculture workers.⁵¹ On a national scale, in 2013 Nova Scotia’s oyster output accounted for 3.7% of the national total, but profits accounted for 5.4%, making Nova Scotian oyster production disproportionately profitable.⁵² Over the past few years, oyster production in Nova Scotia has increased both in volume and profitability, with several applications in 2014 to open or expand hatcheries. Local

51 Nova Scotia Fisheries & Aquaculture, “2013 Production and Sales Figures,” accessed February 25, 2015, <http://novascotia.ca/fish/documents/aqua-stats/2013Production.pdf>; and “2013 Employment Statistics,” accessed February 25, 2015, <http://novascotia.ca/fish/documents/aqua-stats/2013Employment.pdf>.

52 Percentages derived from “2013 Canadian Aquaculture Production Statistics,” Fisheries and Oceans Canada, accessed February 25, 2015, <http://www.dfo-mpo.gc.ca/stats/aqua/aqua13-eng.htm>.

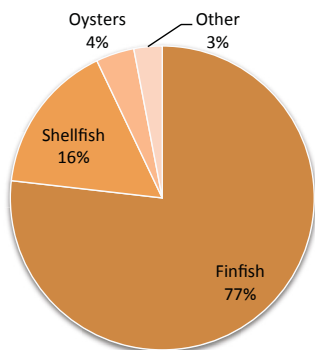


Fig. 23. Aquaculture output in Nova Scotia; data from Nova Scotia Fisheries & Aquaculture, “Aquaculture Production and Sales 2013.”

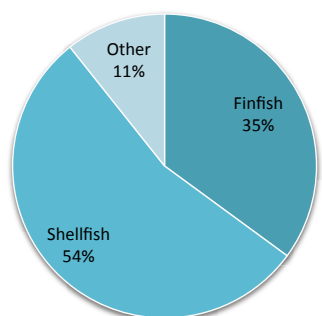


Fig. 24. Aquaculture employment in Nova Scotia; data from Nova Scotia Fisheries & Aquaculture, “Nova Scotia Aquaculture Employment Statistics 2013.”

restaurateurs have seen an exponential increase in oyster demand in the last year alone as the popularity of oysters continues to rise.⁵³

Port Medway has an opportunity to foster an industry that is ecologically afforded to very few places. From an economic perspective, a European oyster hatchery offers a unique opportunity in a growing market. Furthermore, because of the absence of *Bonamia ostreae*, cultivating the European oyster gains tremendous research value. This industry is a means for Port Medway to recognize and utilize its unique water conditions. The water, which once was the vehicle for the town’s industry, can be used in a new way to once again support a local industry.

Site

Fig. 25 (below) shows the proposed hatchery (green) at the site. The hatchery’s grow-out operations (red) are situated specifically at points of convergence between fresh water (dark blue lines) and salt water (light blue lines). The hatchery extends into the water for access to the seawater. The orange line shows the building’s connection back through the town.

⁵³ Bruce Erskine, “The World is their Oyster,” *Chronicle-Herald* (Halifax), August 1, 2014, <http://thechronicleherald.ca/business/1226950-the-world-is-their-oyster>.



Fig. 25. Site plan; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

Operation of an Oyster Hatchery

The operation of an oyster hatchery changes with the seasons as it follows the life cycle of the oyster (fig. 26).⁵⁴ Access to seawater of a consistent quality is paramount for a hatchery to operate properly, and for this reason, it needs to be either on or nearby the ocean to access seawater. For example, during the larval stage (discussed below), the hatchery needs to collect 11,000L of seawater every 2-3 days and heat it to 18°C.⁵⁵

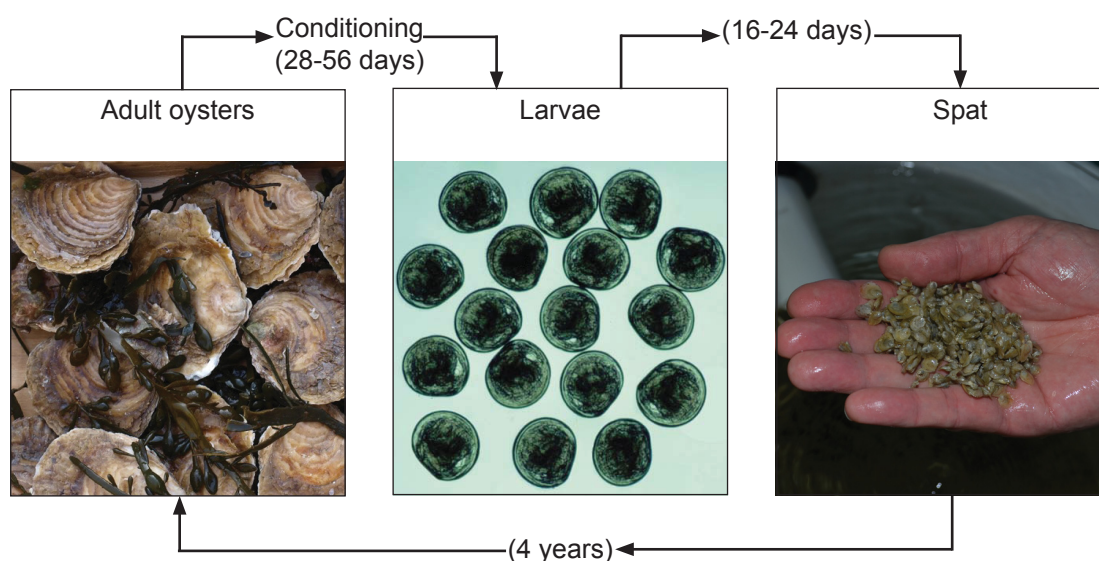


Fig. 26. European oyster life cycle; images from (L-R) Le Bon Marché, "Flat Belon;" Lovatelli, *Hatchery Culture*, 72; and Marine Innovation Southern Australia, "Best Close Up Pix Flat Oysters 5 Months."

A hatchery must also grow algae for oyster feed. A master stock of algae is kept in a small climate-controlled room, and from this, algae are grown in tanks (fig. 27, below). The tanks must receive direct solar exposure for algal growth and be illuminated when not in direct sunlight, including overnight, by means of fluorescent lights placed directly in

⁵⁴ Alessandro Lovatelli, ed., *Hatchery Culture of Bivalves: A Practical Manual* (Rome: Food and Agriculture Organization of the United Nations, 2004), 8, 12-16, 136.

⁵⁵ Ibid., 6-7, 14, 85, 111-112.



Fig. 27. Algae being grown by fluorescent illumination; from Lovatelli, *Hatchery Culture*, 47.



Fig. 28. Larval tanks; from Doiron, *Reference Manual for Oyster Aquaculturists*, 24.

the tanks. Algae are produced in February and March as conditioning feed for broodstock, and in greater quantities in April as feed for larvae.⁵⁶ Excess algae can be grown year-round and sold for other uses, in particular to local farms as fertilizer or feed.⁵⁷

A broodstock of mature oysters is kept year-round, breeding them each year for a new stock of oyster larvae. They are stored in the hatchery in regularly maintained containers, and fed algae during conditioning, the intensive feeding and temperature control period to spur fertilization.⁵⁸

After fertilization, the larval stage lasts 16-24 days.⁵⁹ Larval storage methods differ depending on hatchery management, but they are commonly kept in low densities in 1,100L fibreglass tanks (fig. 28).

After the larval stage, the oysters enter the juvenile or “spat” stage. Due to the oysters’ rapid growth, it is economically desirable to place them in their natural environment, and thus, eliminate dependence on algal feeding.⁶⁰ In this region, spat are set in the water in May when the water warms up.⁶¹ It is important for fertilization to occur early in the year to maximize the time during which spat can grow in

⁵⁶ Lovatelli, *Hatchery Culture*, 13.

⁵⁷ “If You Think Algae Is Just For Oysters You Should Read This,” New Jersey Aquaculture Innovation Center, accessed June 7, 2015, <http://aic.rutgers.edu/algae-for-oysters.html>.

⁵⁸ Lovatelli, *Hatchery Culture*, 59-65, 69.

⁵⁹ E. Bataller et al, *Evaluation of Spawning Period and Spat Collection of the Northernmost Population of European Oysters (Ostrea edulis, L.) on the Canadian Atlantic Coast* (Moncton, N.B.: Department of Fisheries and Oceans Canada, Gulf Fisheries Centre, 2006), 2.

⁶⁰ Lovatelli, *Hatchery Culture*, 14.

⁶¹ Sylvio Doiron, *Reference Manual for Oyster Aquaculturists* (Fredericton: New Brunswick Department of Agriculture and Aquaculture, 2008), 30.

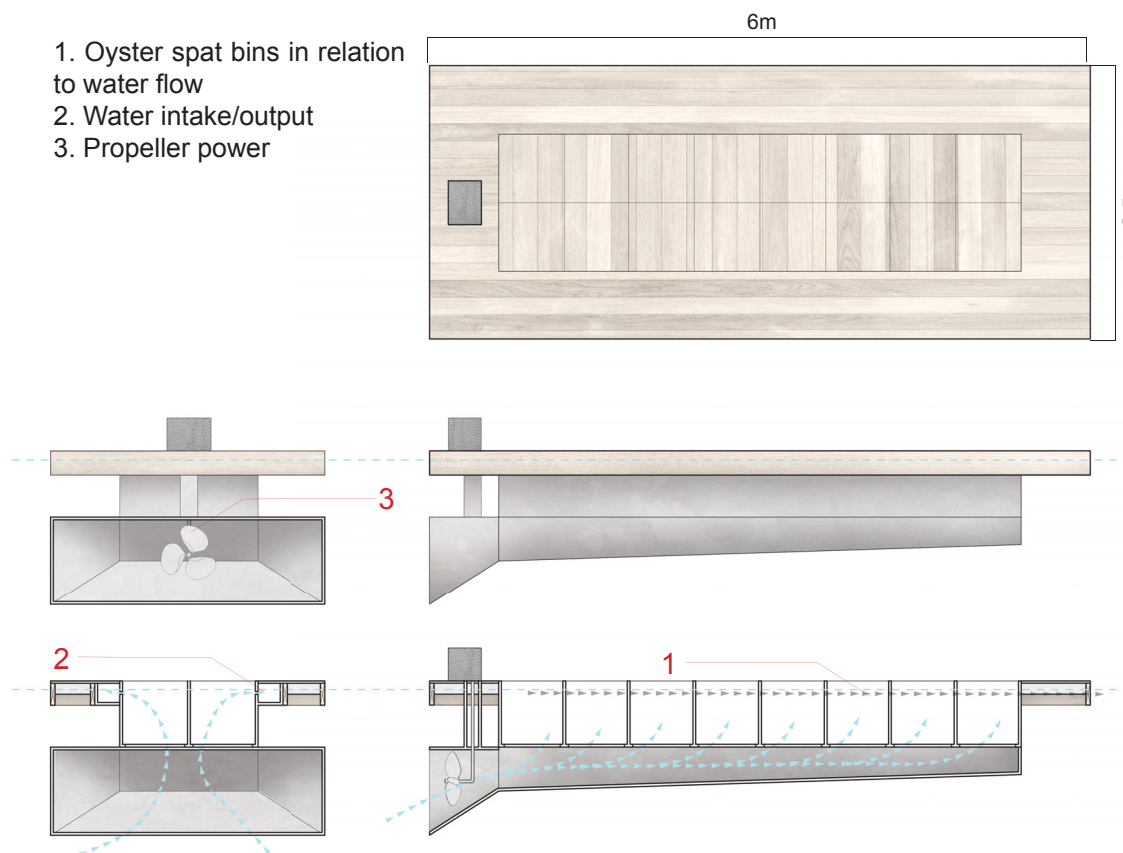


Fig. 29. Flupsy; derived from Hadley et al, "Hard Clam Hatchery and Nursery Production."

their natural environment before overwintering.⁶² There are a number of ways to raise the oyster spat, but the proposed method is the flupsy ("floating upweller system", fig. 29).⁶³ A flupsy is a wooden raft in which bins of spat are placed (fig. 29, 1). The flupsy is moored in the ocean current and the "tidal scoop" under the raft funnels seawater up into the bins, where the spat feed on phytoplankton. Spent water travels through outflow troughs (2) and is taken away by the tide. In times of low tidal strength, a motor-powered propeller can draw in water (3).⁶⁴

⁶² Ibid., 44.

⁶³ Lovatelli, *Hatchery Culture*, 164-165.

⁶⁴ Hadley, Nancy et al, "Hard Clam Hatchery and Nursery Production," Southern Regional Aquaculture Center, accessed October 21, 2014, <https://srac.tamu.edu/index.cfm/getFactSheet/whichfactsheet/198/>.

Spat are kept in the flupsies until as late in the year as possible to maximize growth. The site's water temperatures allow transfer as late as December.⁶⁵ They are then transferred to a grow-out site located where the fresh river water and salt ocean water mix (see fig. 25, above). Grow-out methods also vary, but here a floating net "longline" system is preferred for increased oyster growth rate (figs. 30-32, below).⁶⁶ Longlines consist of 100 floating nets of oysters per line, tensioned with galvanized steel or aluminum rods and anchored at either end to a helical pile driven into the harbour floor (figs. 30, 32). The size of the grow-out fluctuates throughout the years as oysters grow and are shuffled around to keep densities low. A standard grow-out site of 4,000 nets supports an annual production of 500,000 oysters; before harvest during the fourth year, a single grow-out has two million oysters (fig. 31). Fig. 31 also shows the growth of the grow-out by year: after the hatchery's first year only the dark blue longlines are present. By the end of year two, the light blue longlines have been added. By the end of year three all 4,000 nets are present. By the end of year four, the combination of removing 500,000 market-size oysters and adding 500,000 juvenile oysters means the grow-out shrinks back to the dark and light blue longlines. While in the nets, oysters must be regularly rearranged and cleaned year-round to ensure they are not overcrowded and are healthy.⁶⁷

Finally, from October to December, hatchery employees harvest the market-size oysters from the longlines, clean and

65 Doiron, *Reference Manual*, 44. The manual states that oysters enter hibernation below 4°C and average water temperature at the site in December is 5.7°C.

66 Ibid., 6.

67 Ibid., 36-40.

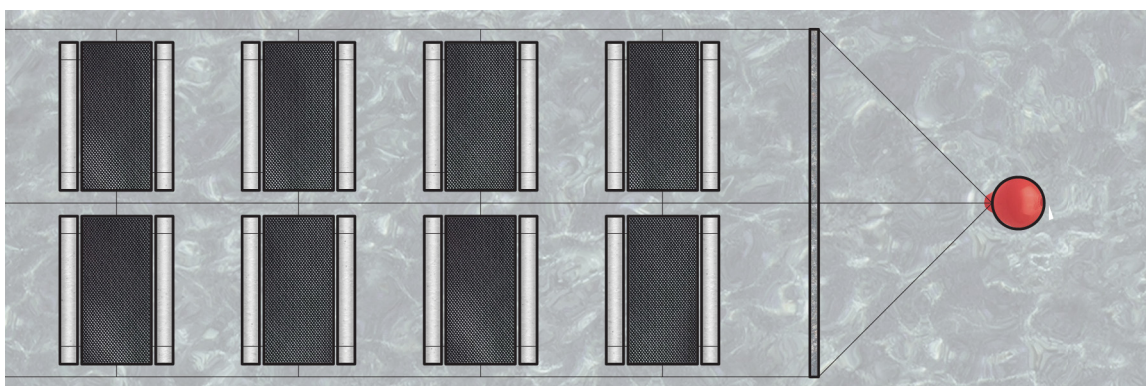


Fig. 30. Longline example; derived from Doiron, *Reference Manual*, 38.

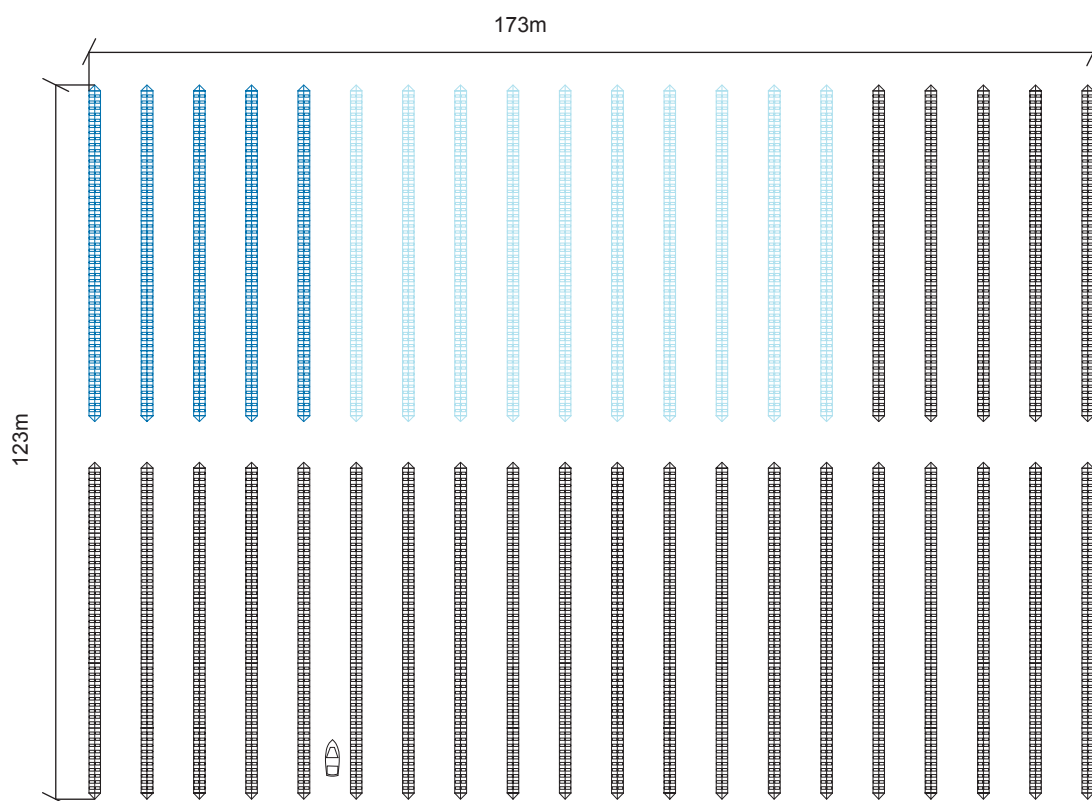


Fig. 31. Longline grow-out; derived from Doiron, *Reference Manual*, 38-40.

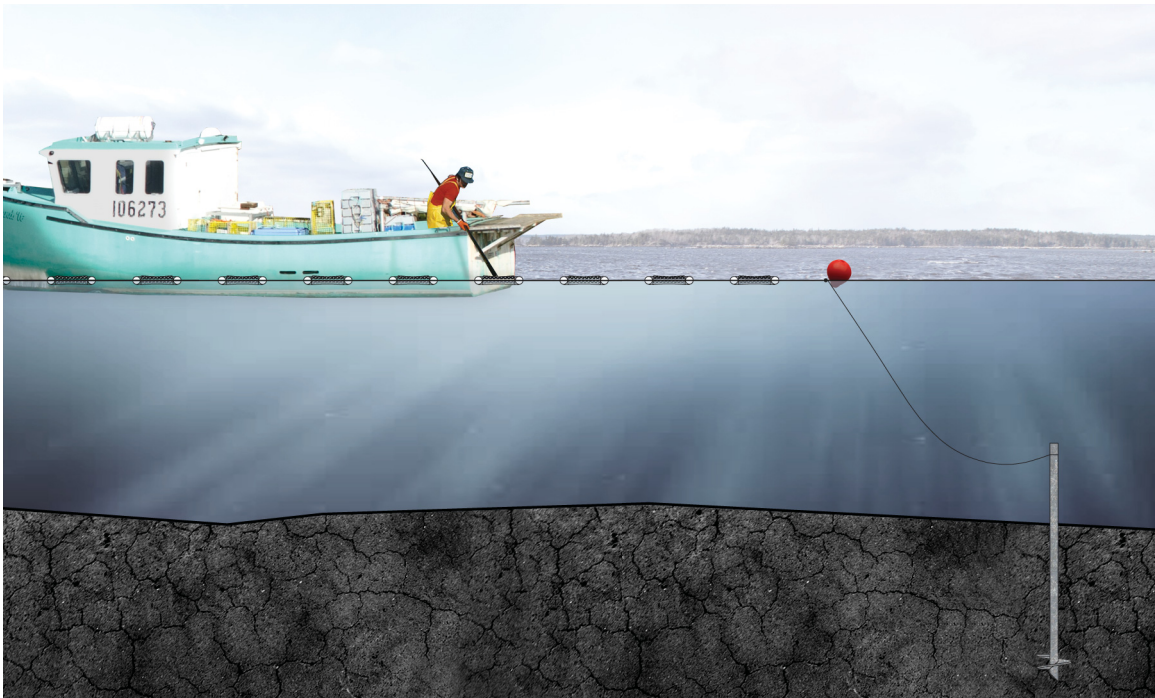


Fig. 32. Longline section; derived from Doiron, *Reference Manual*, 39.

grade them, and pack them for shipment. Although market-size oysters can be harvested year-round, traditionally they are purchased in the late fall/early winter.⁶⁸

The operation of an oyster hatchery is one of constant seasonal change. This is outlined in figs. 33-36 (below). Fig. 33 outlines hatchery operations in winter, including broodstock conditioning (orange) and algae grown in the climate-controlled master stock room (dark green). Maintenance of the grow-out site continues throughout all seasons.

Fig. 34 shows the hatchery in spring during the larval stage (orange). Seawater is collected in the basement and heated (light blue) in the same sunny “algae wall” space that the algae tanks sit in. Algae is grown in large quantities (green) in the algae wall space.

Fig. 35 shows summer activities with the flupsies in use (orange). In addition to grow-out maintenance, workers also conduct tours of the hatchery and out to the grow-out sites. Algae are grown (green) for sale.

Fig. 36 shows hatchery use in fall, when the oysters are processed and shipped (orange).

68 Ibid., 55-61.

1. Broodstock conditioning
2. Algae culture room
3. Algae wall

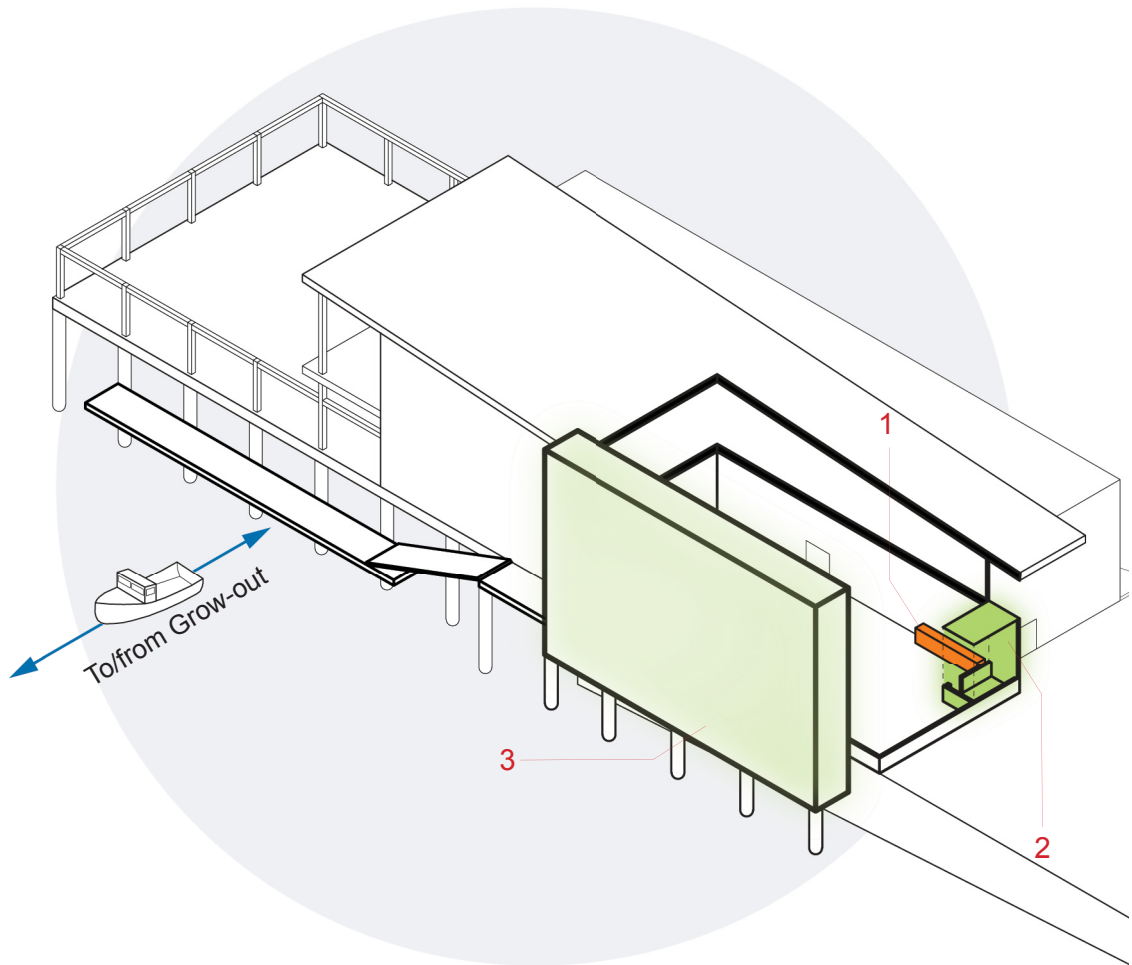


Fig. 33. Hatchery operation, winter.

1. Seawater tanks
2. Oysters: Larvae tanks

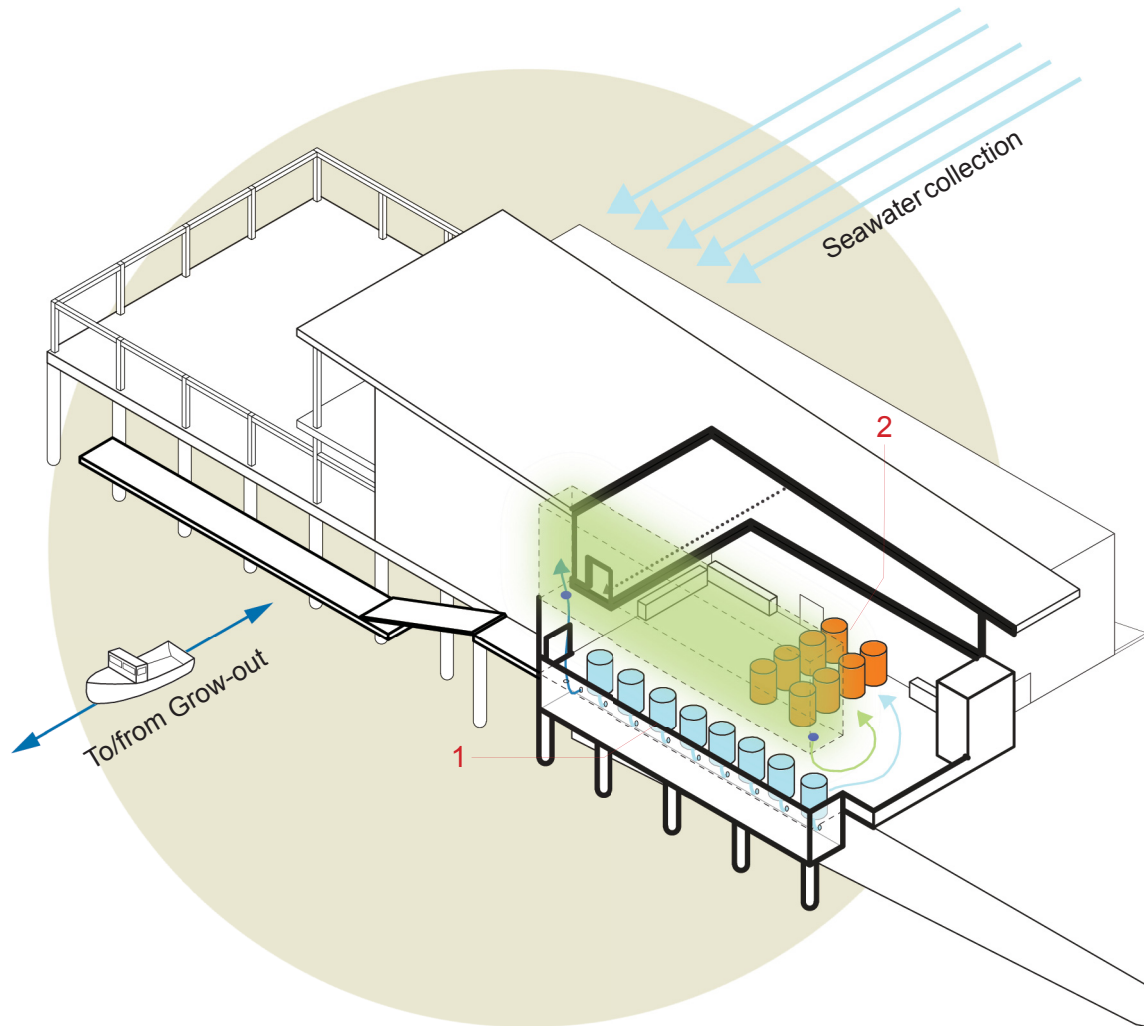


Fig. 34. Hatchery operation, spring.

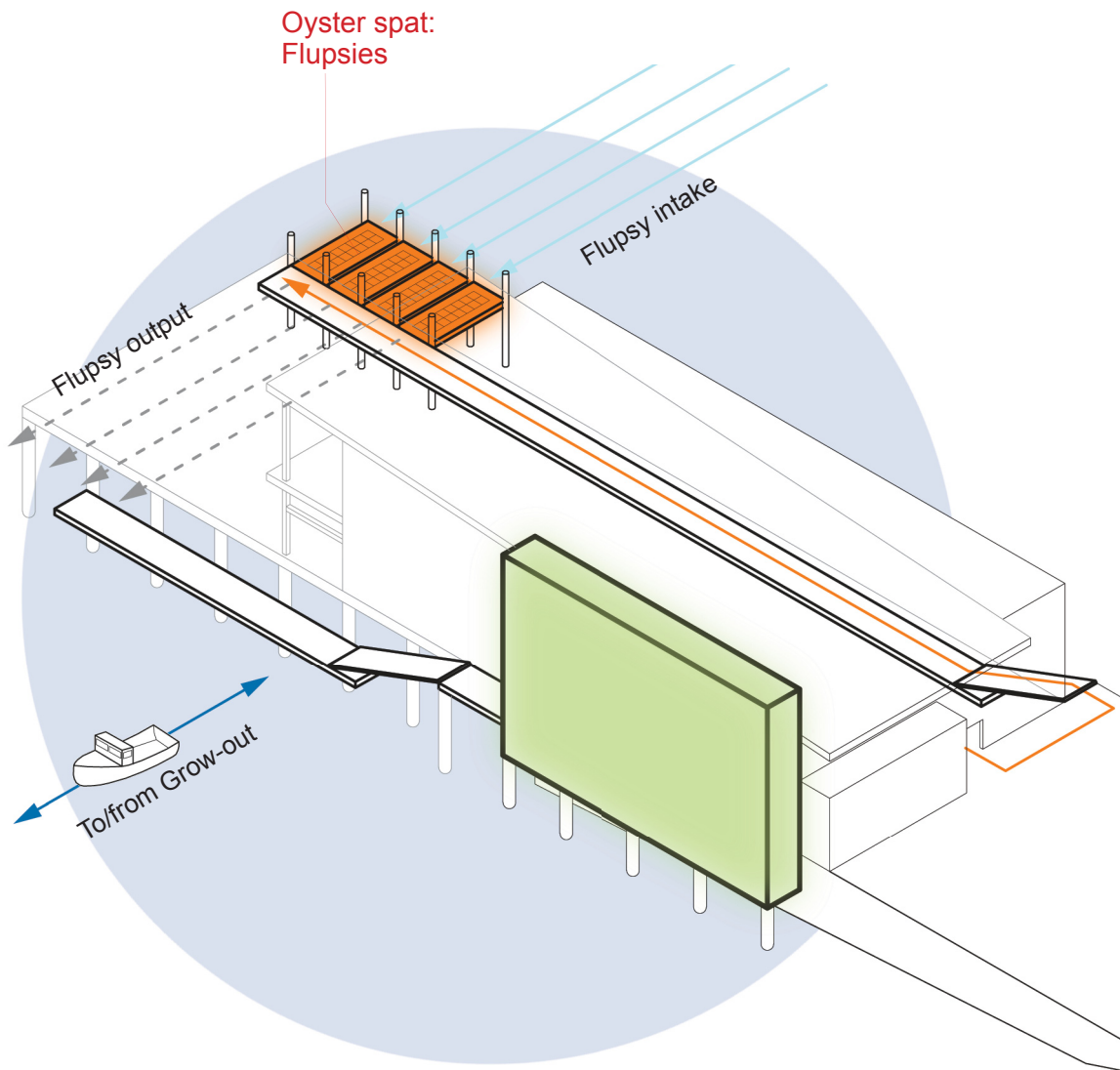


Fig. 35. Hatchery operation, summer.

- 1. Oysters: Processing
- 2. Oysters: Shipping

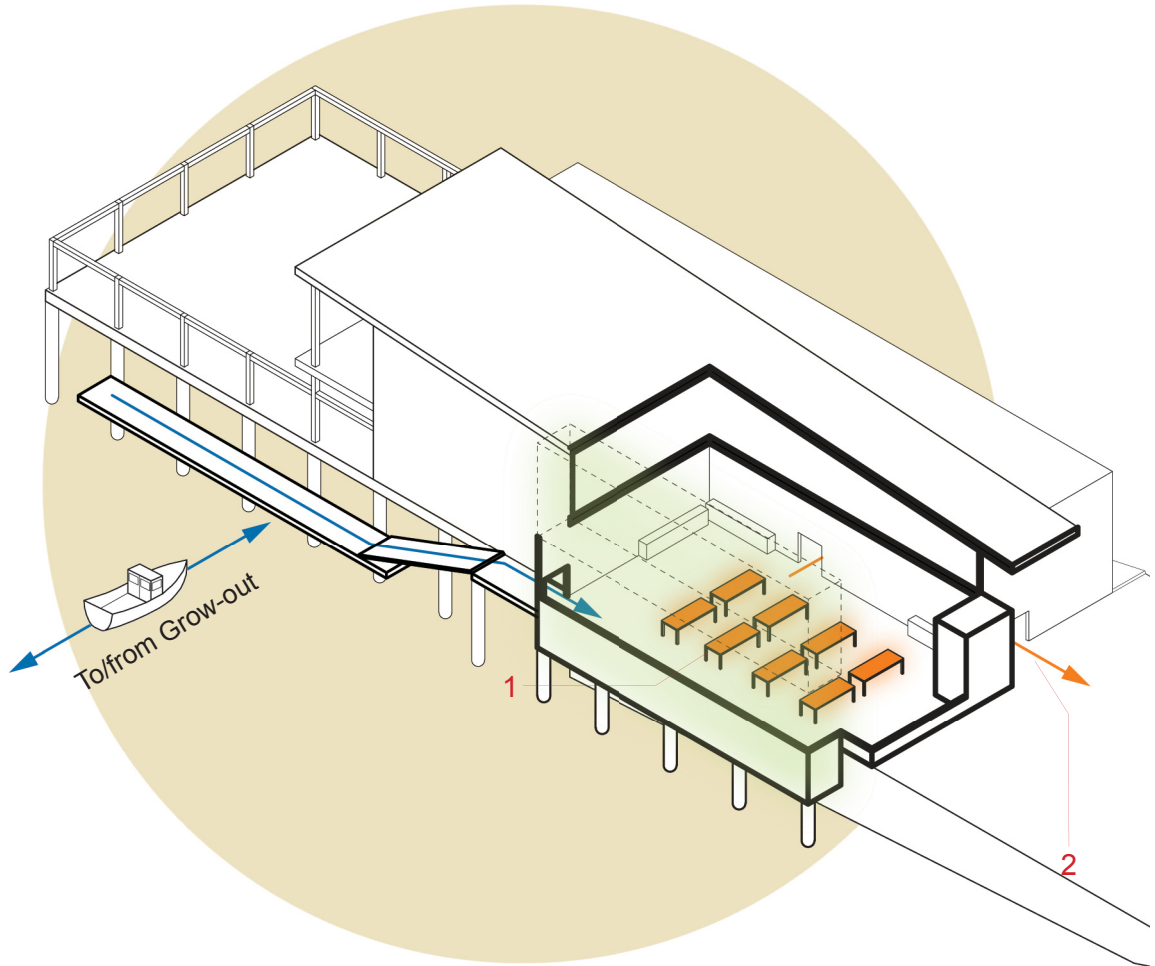


Fig. 36. Hatchery operation, fall.

Oysters and Architecture: Economy and Community

Two projects by New York City-based landscape architecture firm SCAPE, highlight the potential for oyster-based projects to foster not just economic growth, but also community development. The first project, “Oyster-ecture,” is a conceptual proposal to reimplement an oyster-centric ecosystem in Brooklyn’s Gowanus Canal. Historically, the Gowanus Canal area had a strong oyster industry and naturally occurring oyster reefs. These reefs allowed rich ecosystems to develop in tidal flats along the coast, and therefrom, human settlement thrived on the land. Reimplementing oyster reefs both as natural breakwaters and as filtration systems would create a coastline of clean water, act as wave attenuation, and foster a diverse ecosystem, all to the benefit of settlements along the Canal. Oyster growth would become an integral part of the communities’ activities, economy, and development.⁶⁹

The second SCAPE project, “Living Breakwaters”, is a similar proposal for oyster reefs as natural breakwaters in Staten Island’s Raritan Bay. The project proposes using these breakwaters as a means of wave attenuation and to create tidal flats, fostering ecosystem growth. SCAPE’s model studies have shown that oyster reef breakwaters can reduce storm surge wave heights by up to 1.2m. In addition to ecological benefits, marinas and coastal structures also benefit from wave attenuation, protecting and fostering local industry. Lastly, carefully designed breakwaters eliminate the

69 Barry Bergdoll, ed., *Rising Currents: Projects for New York’s Waterfront* (New York: The Museum of Modern Art, 2011), 90-99; and “Kate Orff: Reviving New York’s Rivers - with Oysters!” TED, accessed June 7, 2015, http://www.ted.com/talks/kate_orff_oysters_as_architecture?language=en#t-580637.

need for land-based sand dunes, which prevent interaction with the water. With these barriers removed, communities can better interact with their coastal environments.⁷⁰

These projects stress the historical precedent of oysters as catalysts for ecology and community. They also show how reviving an historically important connection in new ways can help coastal communities grow. Lastly, they show the symbiotic relationship between site, community, and economy.

Gathering: An Extension of Programme

Community-oriented programme in the hatchery extends from the needs of the workers and the oysters. A café provides a place for workers to take their breaks, but also provides a place for visitors to interact with hatchery workers and the building. The café extends into a restaurant to further invite in the public (fig. 37, 1, below).

Permanent indoor market stalls provide space for the hatchery to sell some oysters in town, but the stalls also provide space for local farmers, bakers, and fishermen to sell their products as well (fig. 37, 2).

The building also provides gathering space for the public to hold any number of activities (fig. 37, 3): evening or weekend annex classes, holiday dinners, dances, town hall meetings, craft fairs, exhibitions, bingo night, etc. In the winter, most activities are held inside, although on an unseasonably warm day, activity can extend out onto the wharf.

70 "SCAPE: Living Breakwaters," SCAPE/Landscape Architecture PLLC, accessed June 7, 2015, <http://www.scapestudio.com/projects/living-breakwaters/>.

Fig. 38 shows the extension of programme in the spring. The exterior wall adjacent the market (1) can open to allow flow between indoors and outdoors. The market can grow out onto the wharf, or other activities can flow inside and outside. The restaurant also has an exterior wall of sliding panels that open out onto a deck space.

In fig. 39, during summer, programme flows completely between indoors and outdoors. The floating wharves (1 and 2), used primarily by the hatchery for oyster access, become shared spaces as the public can launch kayaks upriver or into the harbour. A set of stairs (3) allows activities on the wharf to flow up to a deck on the upper level, where a sliding panel wall opens (4) to allow flow of activity from indoors to outdoors, as well as from the upper level to ground level.

In the fall (fig. 40), activities can carry on much as they do in the summer, although they will gradually recede back into the building as the weather cools late in the season.

As the seasons change and temperatures get warmer, the building opens progressively, allowing programme to flow in and out, only to recede back inside in the winter. Community-oriented programme initially begins as providing amenities for hatchery workers, but by integrating the public into these activities, as well as providing space for activities of communal gathering, the town and the river are brought together in the building.

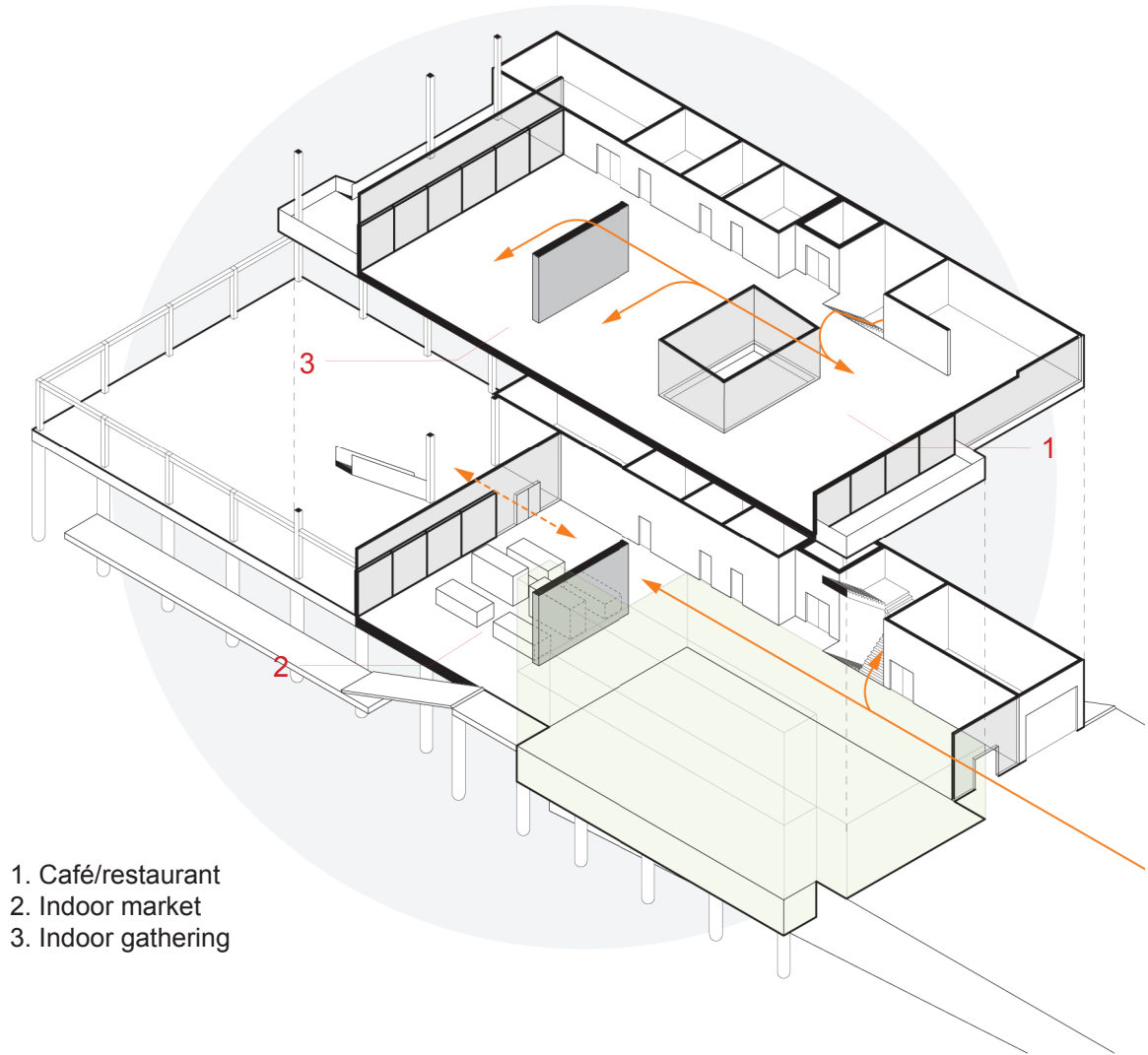


Fig. 37. Building flow, winter.

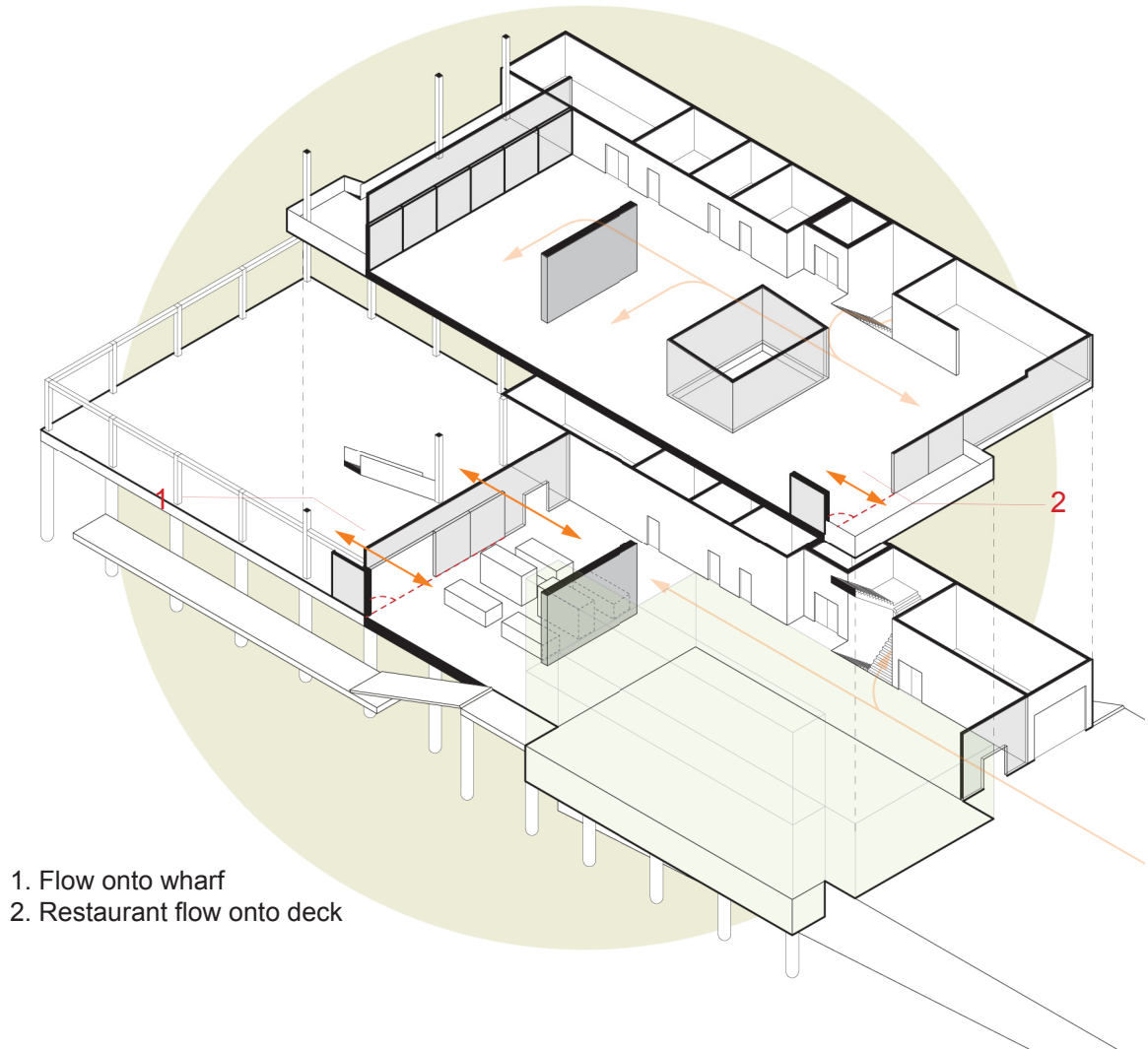


Fig. 38. Building Flow, spring.

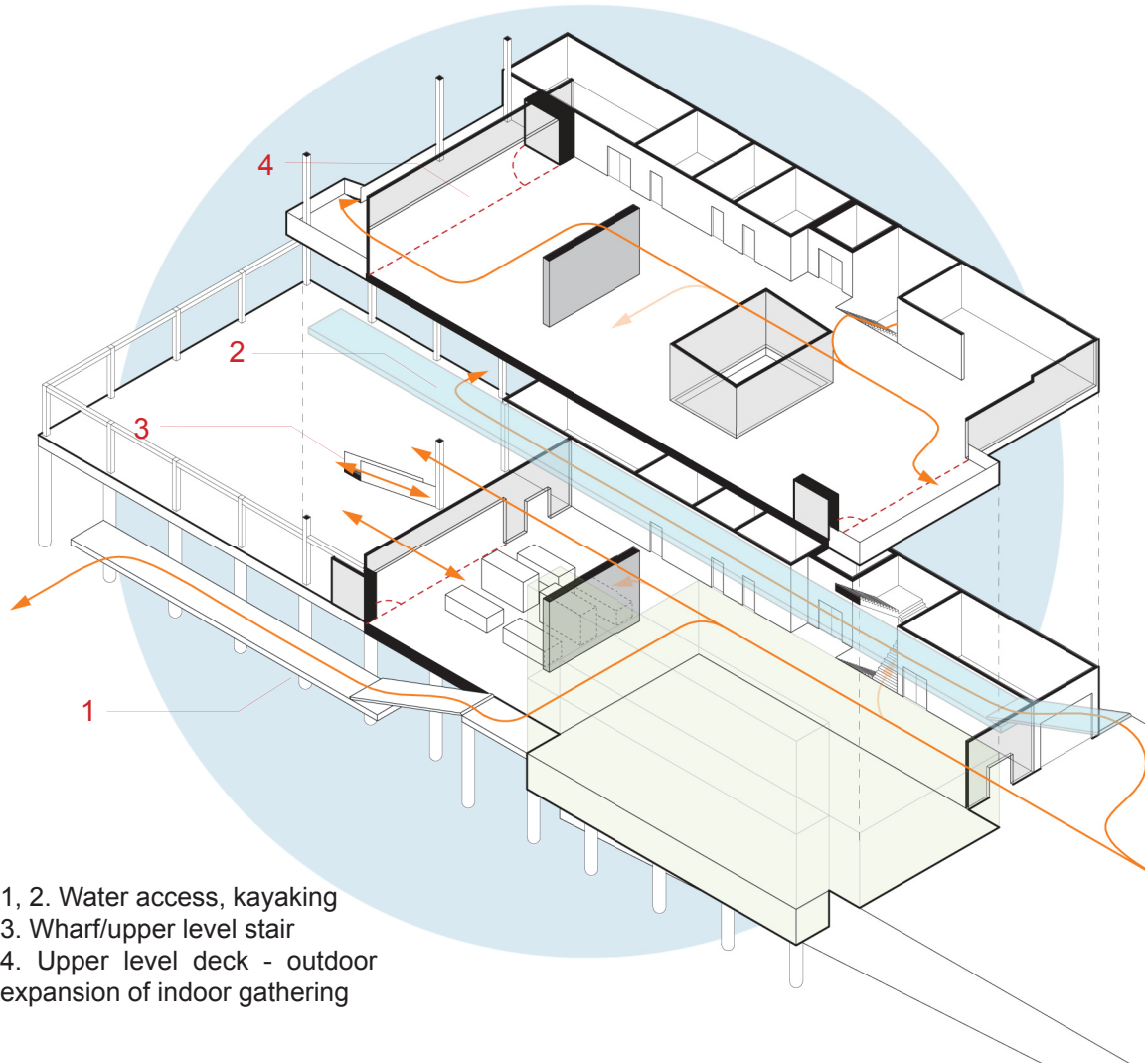


Fig. 39. Building flow, summer.

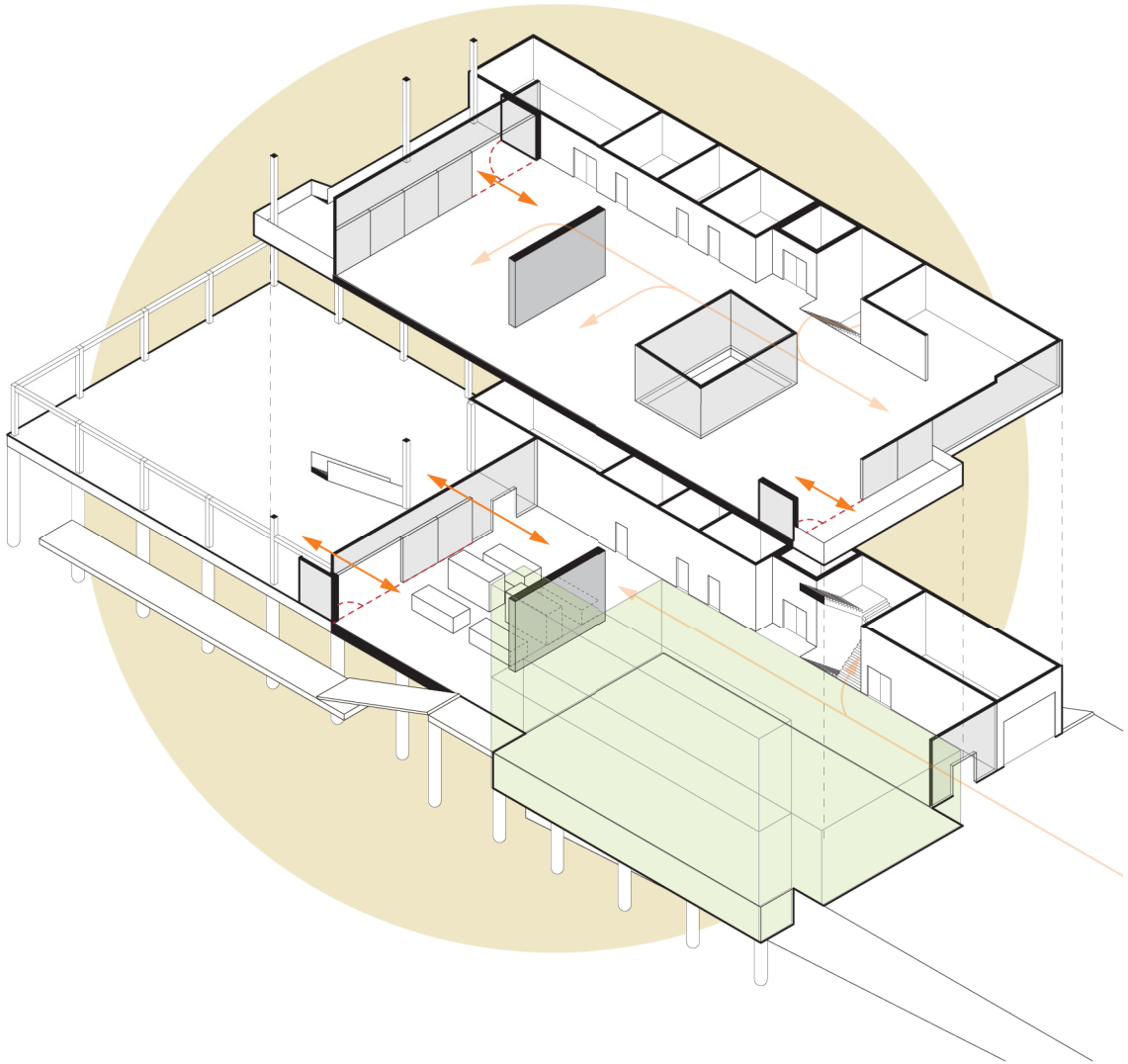


Fig. 40. Building flow, fall.

Gathering: Wind and Sun

Determining interior and exterior places of gathering in this climate and on the coast requires consideration of two important factors: the direction of the wind and the direction of the sun. Consideration of wind in particular is necessary because, being next to or on the open water, there is little to provide a windbreak. Also, with the formation of sea breezes blowing from the water to land (or vice versa), there is the issue of a constant breeze blowing toward the land. A sea/land breeze blowing roughly E/W from water to land can develop, particularly in summer, due to air pressure differentials over land and sea.⁷¹ Due to fluctuating wind direction and the lack of trees or other buildings to act as a windbreak, a movable windbreak system is provided to allow for shelter depending on time of day or year. Figs. 41-46 (below) show seasonal use of the building in relation to sun and wind patterns.

In the winter, prevailing winds come from the NW (fig. 41). Shadows prevent the wharf from being comfortably used in the morning, but if weather permits after noon, a temporary windbreak can be set up to block the wind (fig. 41, 1, orange). Most activities take place indoors in the restaurant and indoor gathering space (fig. 41, 2), and in the permanent market (fig. 41, 3).

In spring, winds continue to come from the NW, requiring a windbreak on the NW side of the wharf (fig. 42, orange). As the weather warms up, activities can begin to extend on to the wharf, which is most comfortably used after noon when it receives direct sunlight.

⁷¹ Norbert Lechner, *Heating, Cooling, Lighting: Design Methods for Architects* (Toronto: John Wiley & Sons, 2001), 70.

In summer, the wind shifts, coming from the SSW, requiring a windbreak on a different side of the wharf (fig. 43, orange). The direction of wind allows for the flow of activity from the wharf (1) to the second level (2), both completely open from inside to outside. The lack of shadows on the wharf allows it to be used for most of the day.

In fall, the wind continues from the SSW (fig. 44). Building use remains much the same as in summer until mid-fall when temperatures begin to drop. Shadows dictate that the wharf space is best used after noon.

Special conditions include the sea breeze (fig. 45) and land breeze (fig. 46), common in summer. During a sea breeze, the wharf space can still be used in conjunction with the windbreak panels, but the upper deck is closed off to prevent wind from blowing through the building (fig. 45, red). A land breeze, by contrast, is a weaker, warmer, desirable breeze. Fig. 46 shows no windbreak, so summer evening activities on the wharf can take advantage of the land breeze.

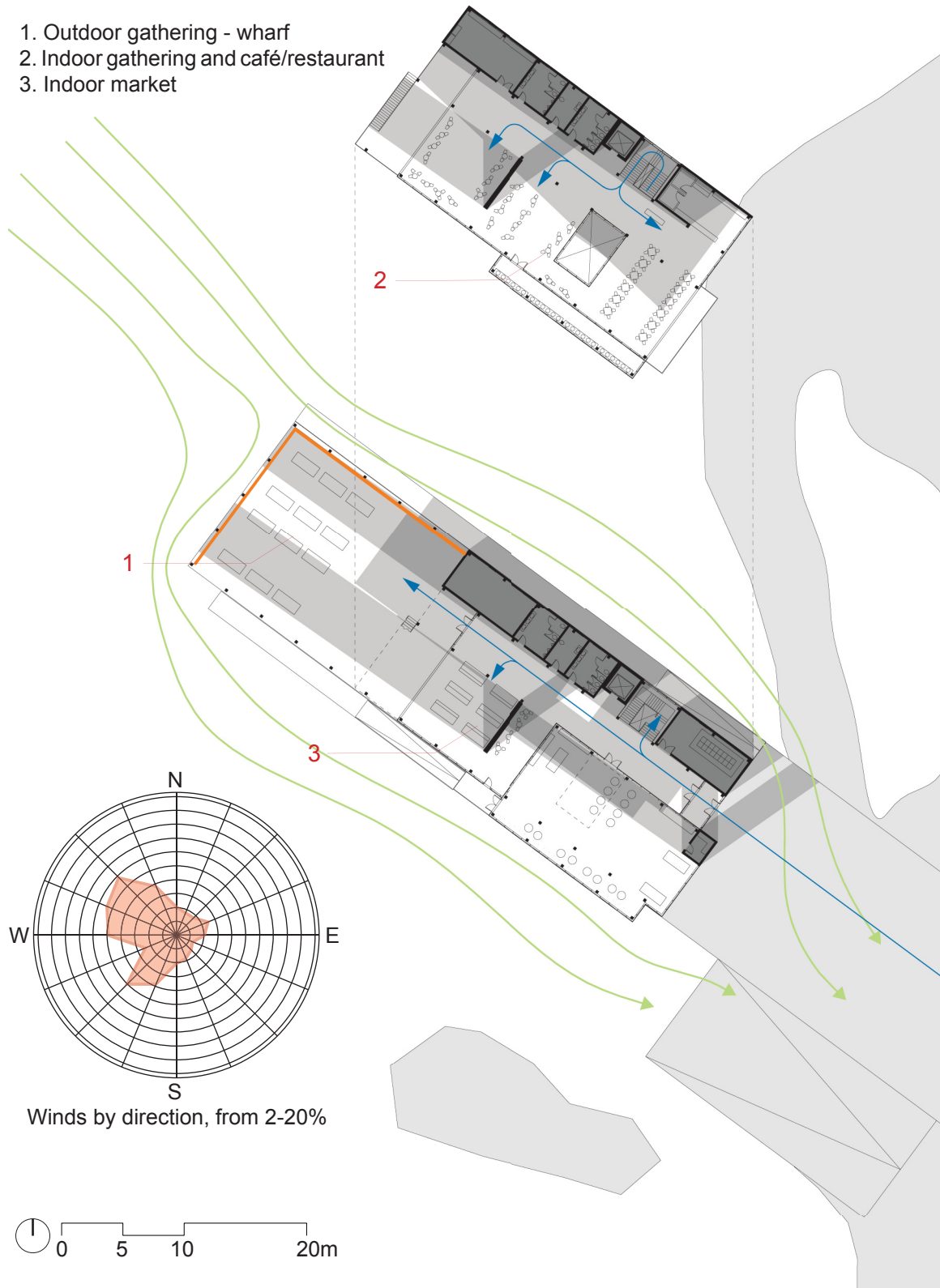


Fig. 41. Site conditions, winter (Dec 21). Shadows at 8am, noon, and 4pm; winds from NW; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb;" wind data from Windfinder GmbH & Co. KG, "Wind & Weather Statistics Western Head - Windfinder."



Fig. 42. Site conditions, spring (Mar 21). Shadows at 8am, noon, and 4pm; winds from NW; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb;" wind data from Windfinder GmbH & Co. KG, "Wind & Weather Statistics Western Head - Windfinder."

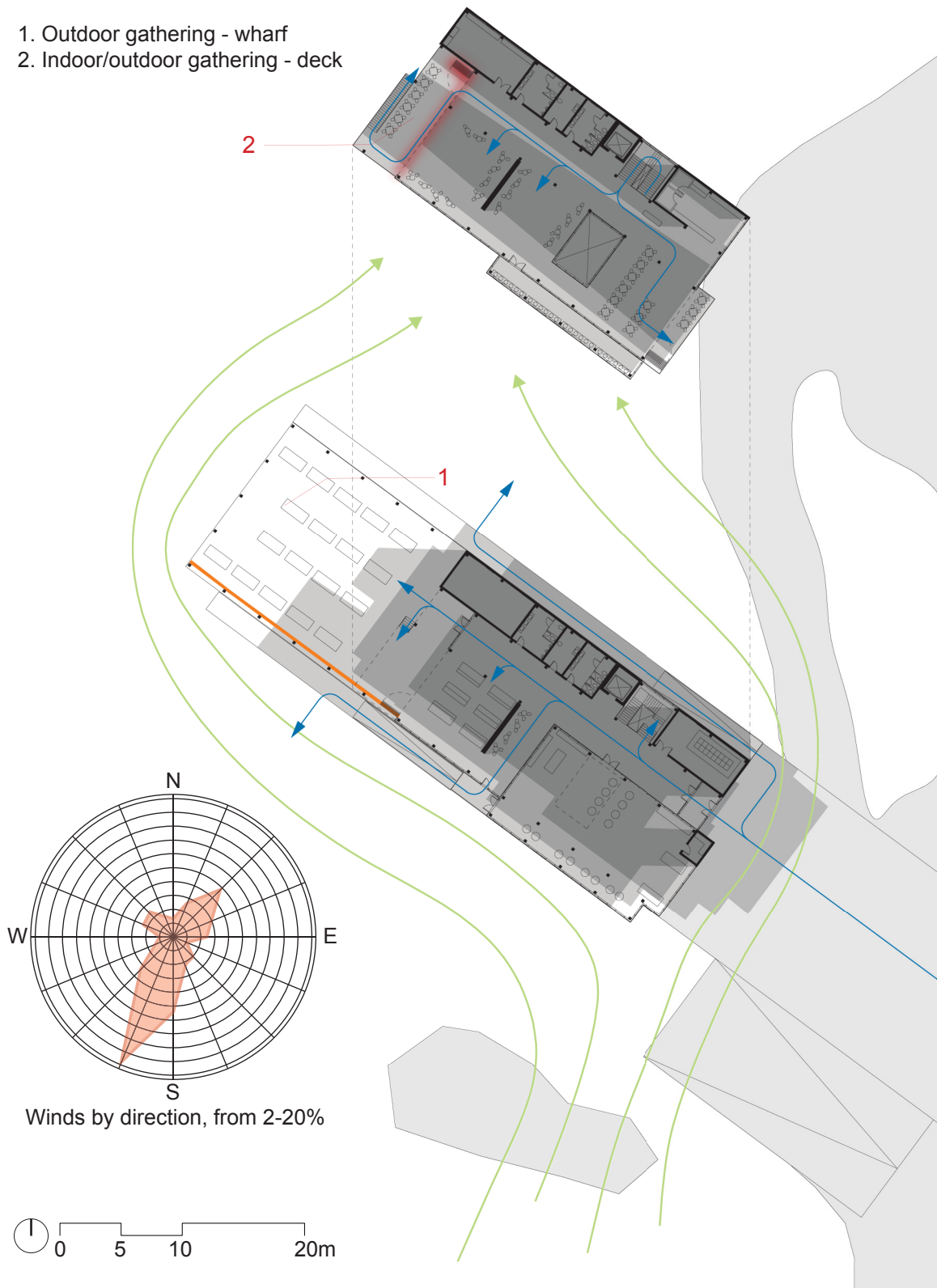


Fig. 43. Site conditions, summer (June 21). Shadows at 8am, noon, and 4pm; winds from SSW; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb;" wind data from Windfinder GmbH & Co. KG, "Wind & Weather Statistics Western Head - Windfinder."

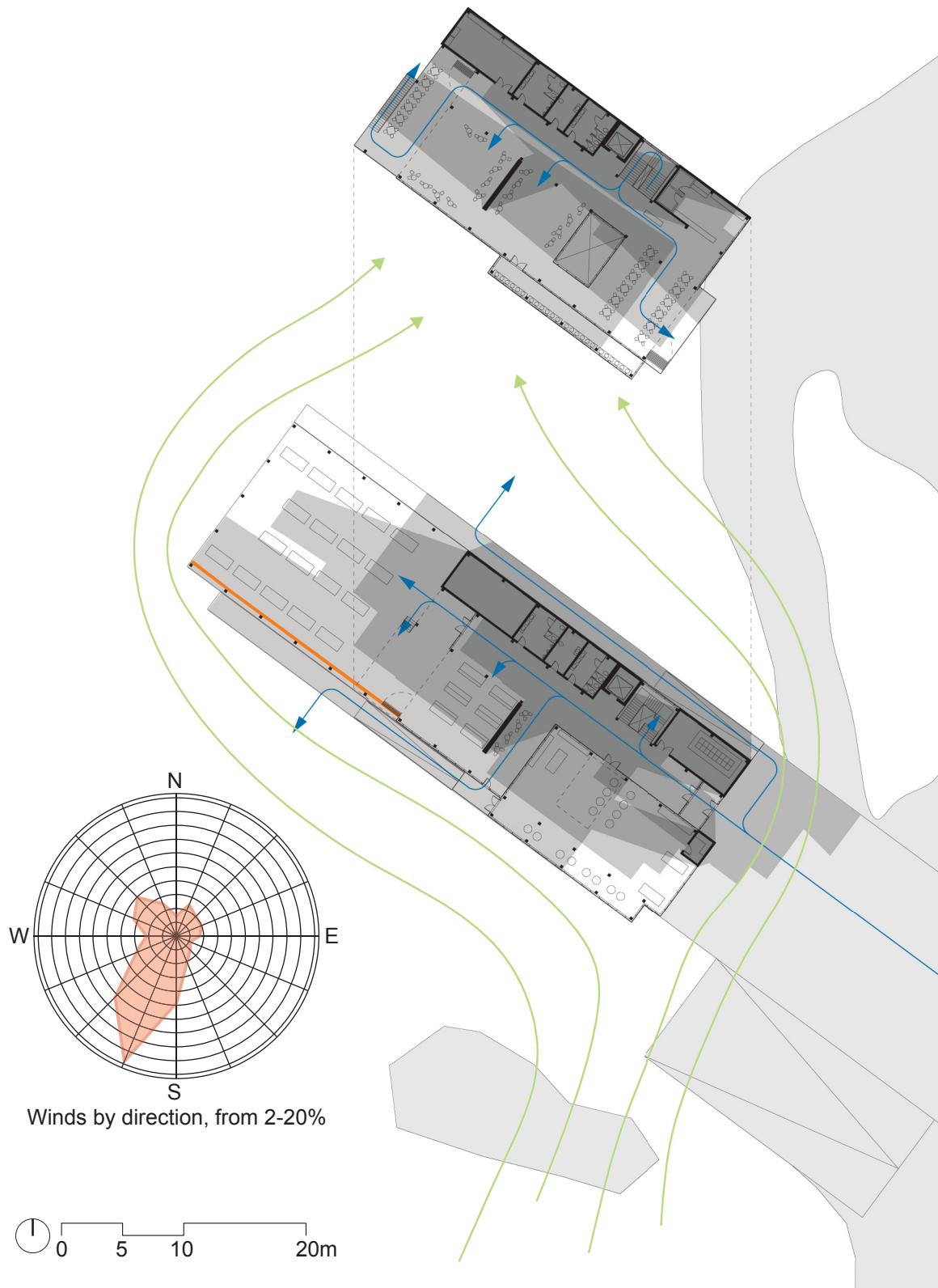


Fig. 44. Site conditions, fall (Sep 21). Shadows at 8am, noon, and 4pm; winds from SSW; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb;" wind data from Windfinder GmbH & Co. KG, "Wind & Weather Statistics Western Head - Windfinder."



Fig. 45. Sea Breeze (June 21). Shadows at 8am, noon, and 4pm; winds approximately W; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb;" wind data from Windfinder GmbH & Co. KG, "Wind & Weather Statistics Western Head - Windfinder."

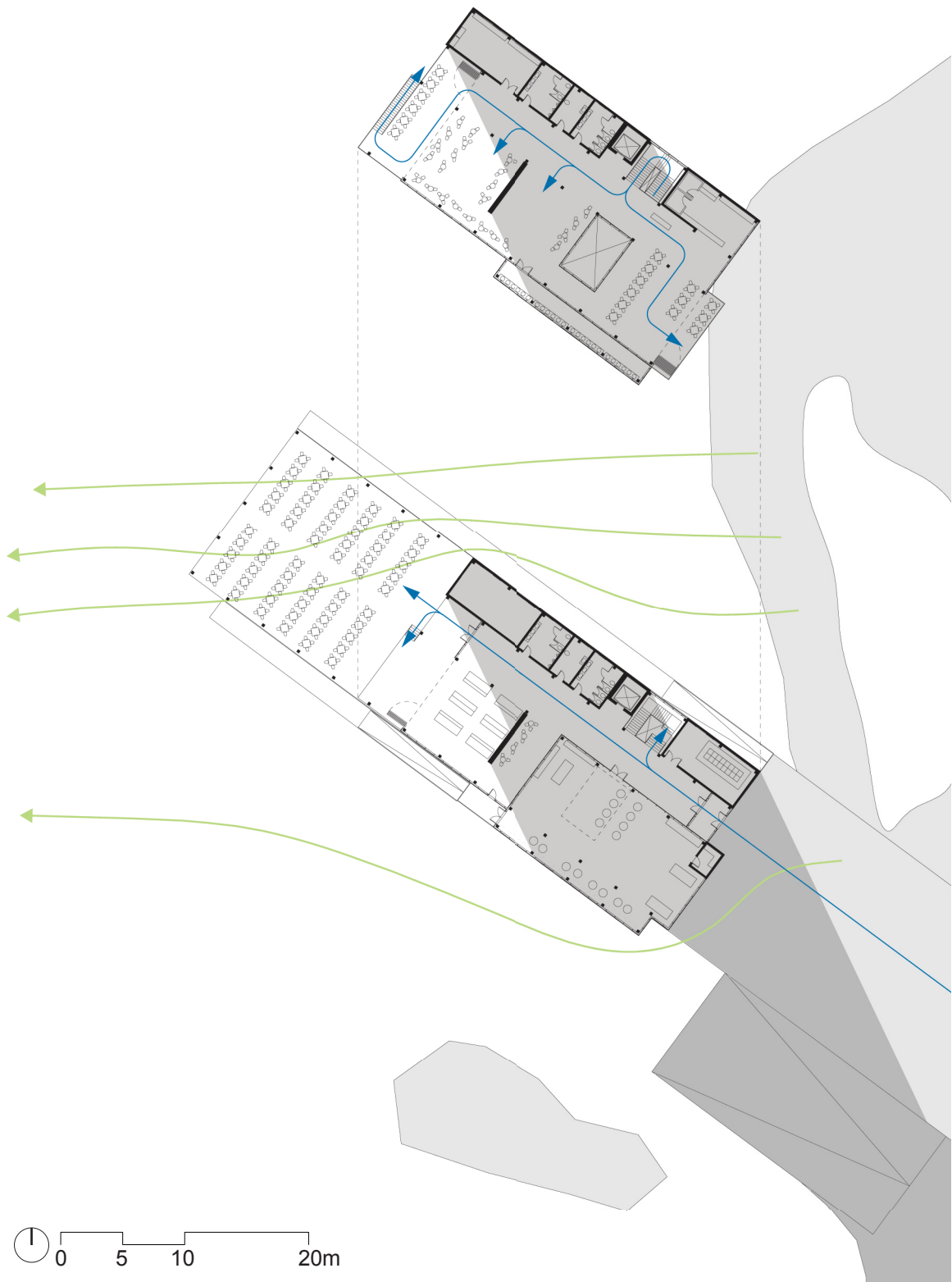


Fig. 46. Land Breeze (June 21). Shadows at 8pm; winds approximately E; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb;" wind data from Windfinder GmbH & Co. KG, "Wind & Weather Statistics Western Head - Windfinder."

Fig. 47 shows the operation of the windbreak panels. They are kept in an exterior-accessible storage room. Structure around the perimeter of the wharf supports a track for the panels, which slide along the tracks into place. The panels have retractable rollers at either end so they can pivot at the corners to block off any wall of the wharf.

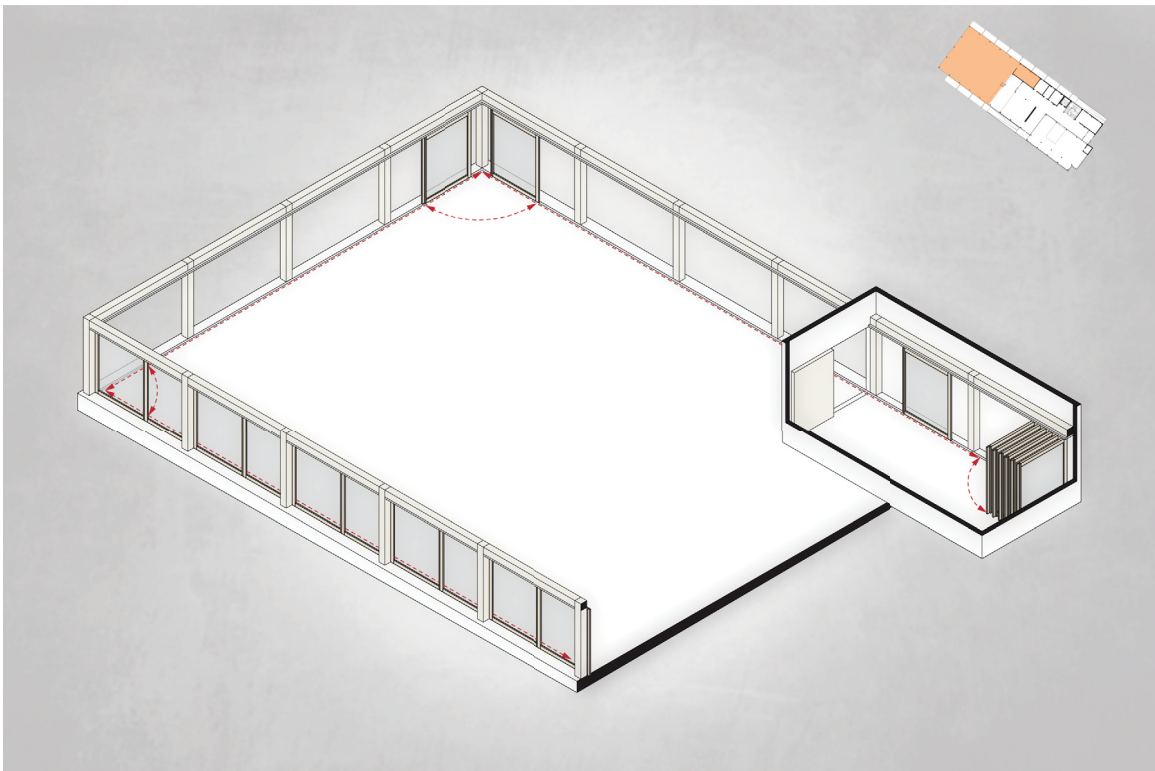


Fig. 47. Sliding panel windbreak.

Design and the Water

Building on, beside, and in the ocean has many constructional factors to consider. To better understand the local response to building in relation to the water, a vernacular investigation was conducted.

Vernacular Investigation

To understand how vernacular architecture relates to place specificity, seven wharves around the Medway Harbour and in neighbouring areas were visited. A number of commonalities came from this investigation regarding building protection, material and structure, and building arrangement and form.

Every wharf site visited has one or more seawalls, long piles of rocks built out from the coast (fig. 48, below). These are constructed to protect wharves and buildings from the forces of the ocean, as well as to create a climate of calm waters around the wharf so boats can be safely moored. In the top three photos in fig. 48, seawalls are extensions of land jutting out into the water, while in the lower three photos, they are incorporated into the coastline, close to buildings.



Fig. 48. Seawalls.

Regarding materials, wood is dominant for above-ground structure and cladding because of its resilience in sea air (fig. 49, below). The first three photos in fig. 49 show the only buildings at any of the wharves visited that are not clad in wood: a concrete masonry unit structure, and two buildings with corrugated metal siding.

Structure below water is more varied. In fig. 50, the left column shows examples of wharf structures built over and into the water. These include “crib” structures (fig. 50, 1), which are wooden frames filled with rocks to weigh down the wharf; timber frame wharves (fig. 50, 2, 3); and infilled wharves with either wooden retaining walls (fig. 50, 4) or concrete retaining walls (fig. 50, 5, 6).

The right column shows examples of buildings built over the water. Fig. 50, 7 shows a building built on a crib wharf. Fig. 50, 8 shows a building with a concrete foundation poured over a seawall. The remaining photos show various wooden post foundations resting on rocky substrate.



Fig. 49. Materiality.

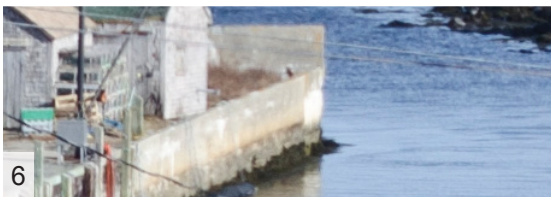


Fig. 50. Subaqueous ground connection.

Finally, building arrangement and form at the wharves range from autonomous sheds and shacks arranged in a seemingly unorganized cluster (fig. 51, below, left column) to long and narrow single buildings (fig. 51, right column). Clustered buildings represent a fragmentation of activity and ownership, while the single, long buildings represent a unity of workers in a shared building.

In relation to site conditions, clustered buildings create numerous exterior areas where wind can deflect off walls and infiltrate between buildings, creating undesirably windy outdoor spaces. The long and low buildings, however, shed wind in a more straightforward manner, creating outdoor areas where wind direction can be anticipated.



Fig. 51. Building arrangement and form.

Fig. 52 (below) represents how the design learns from the above. The building design utilizes wooden structure above ground (fig. 52, 1) and wooden cladding for opaque exterior walls for their proven durability in sea air (fig. 52, 2). The basement level structure transitions from concrete retaining walls to concrete columns (fig. 52, 3). The retaining walls create habitable space only where needed for mechanical services underneath the building, and are similar in concept to fig. 50 images 5 and 6 as an extension of land. The concrete columns provide minimal interruption of water currents through the site, similar to the timber frame wharves and building foundations in fig. 50.

Fig. 52, 4 points to a long harbour-facing extension of the basement. This space is where seawater is collected (see fig. 34, above), but it also incorporates the principles of the seawall into its function. The extension prevents ocean currents from travelling directly underneath the building, thus protecting its exposed underside from water damage. Instead, ocean currents are redirected around the end of the extension, or along the extension to collect water. This also creates calm waters on the building side of the extension, where boats can be safely moored.

Finally, the building form (fig. 53) follows the “long and low” form for its predictability regarding wind, and because of the communal nature of the form in contrast to the cluster organization, bringing activities together rather than separating them. Fig. 53 compares the building design to the nearby defunct fish plant in Port Medway. Despite being taller than the fish plant, the building design still adheres to the principles of being a long, narrow building with almost no areas where wind can deflect unpredictably.

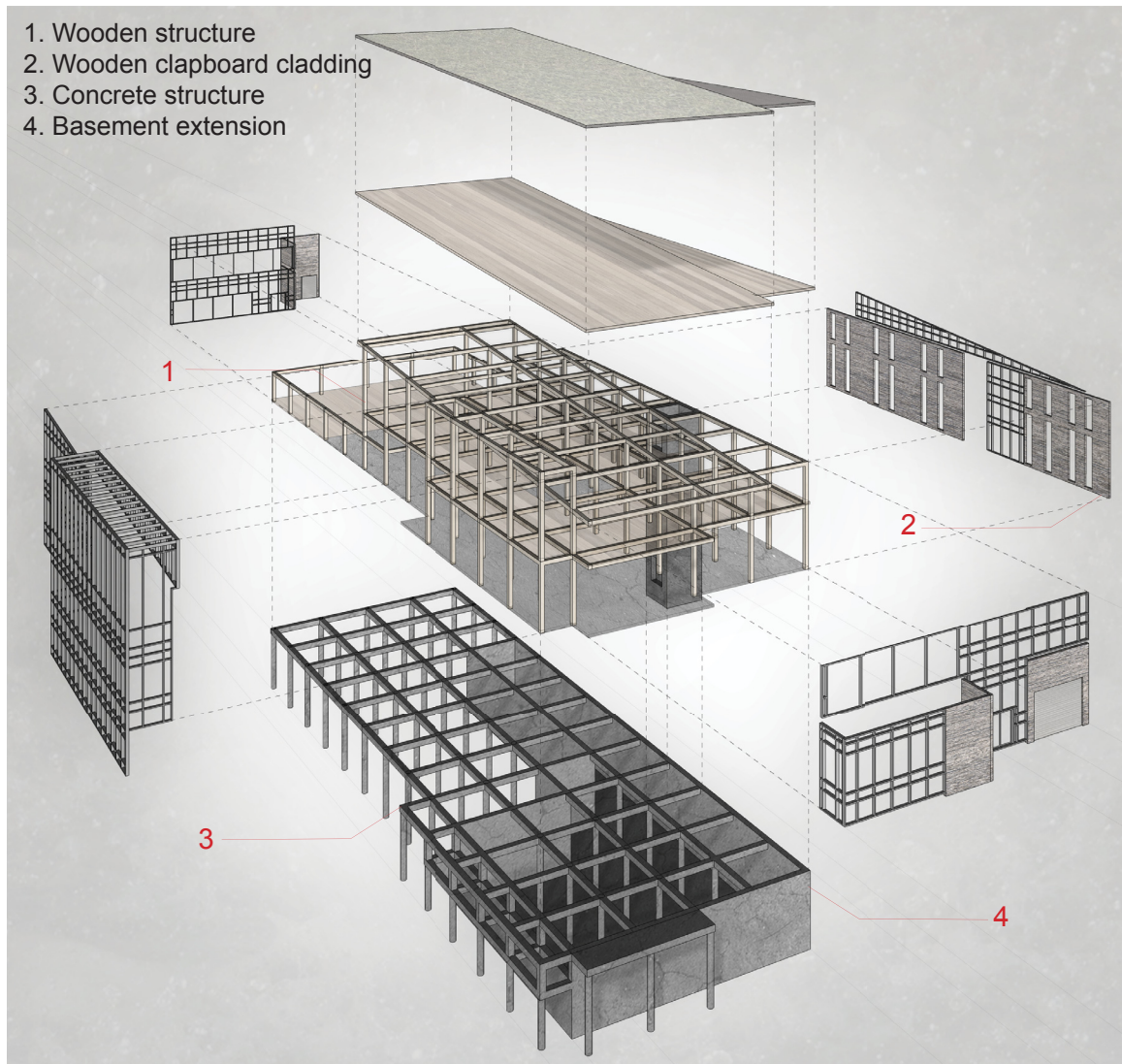


Fig. 52. Structure and material.

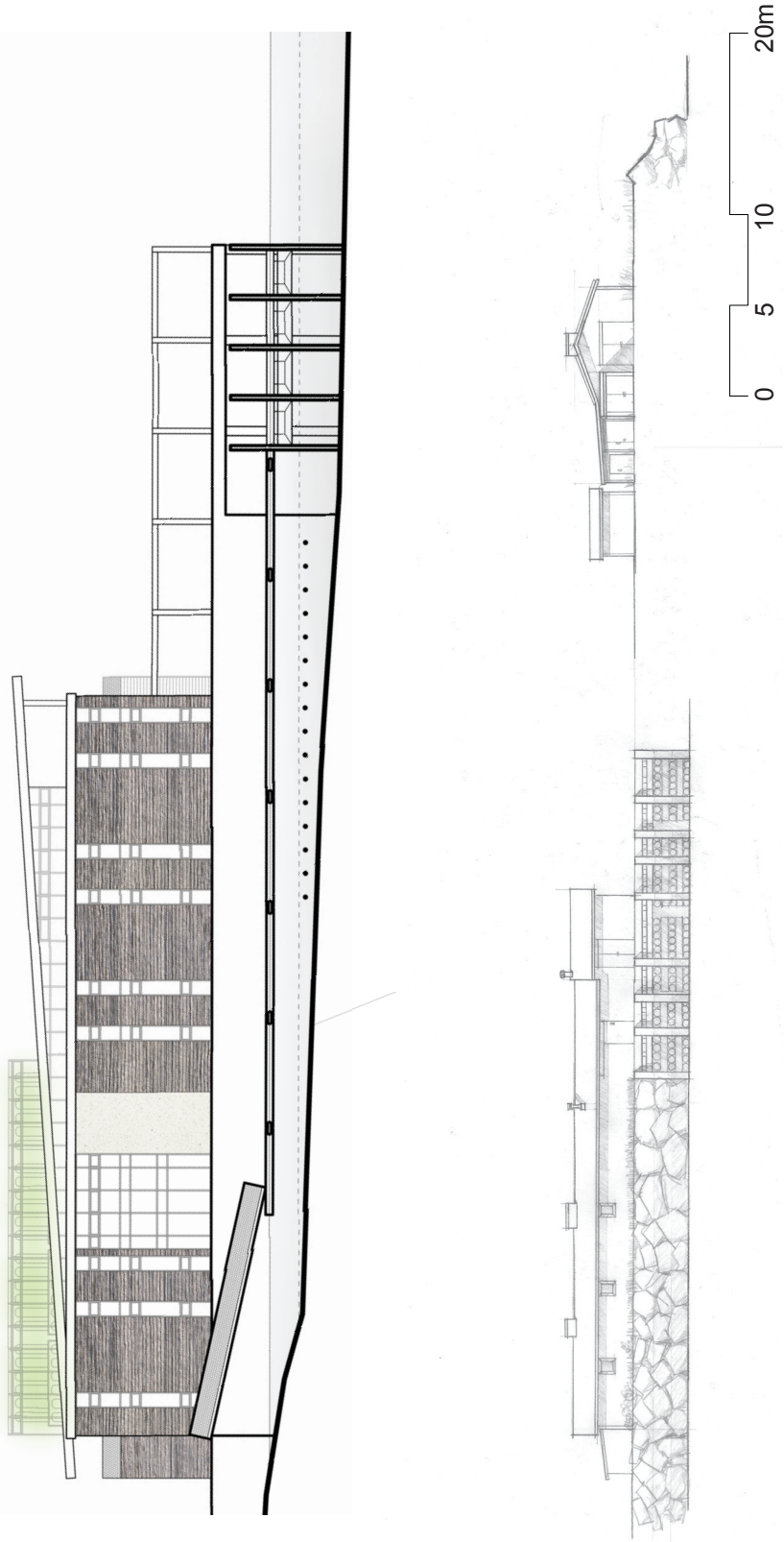


Fig. 53. Design form compared to an existing building.

Sea Levels

Another important consideration regarding building on the coastline is the issue of varying sea levels (fig. 54, below). The site's water level has a variance from low tide to high tide of 1.6m. A storm surge can increase the water height up to an additional 0.9m.⁷² The light blue lines in fig. 54 show low tide (-0.8m), high tide (+0.8m), and a storm surge at high tide (+1.7m). Since storm surges are foreseeable, preparatory measures can be taken. The site is also protected from the ocean, being well within the harbour on the opposite side of land from the ocean, so a storm surge is less likely to affect the site as drastically as it would areas more directly facing the ocean (see chapter 2, fig. 3). In a worst-case scenario during which a storm surge at high tide brings waves big enough to reach the underside of the building's wharf, the wharf floor consists of detached wooden panels, 2.5mx5m, resting on the wharf structure (fig. 55). This allows the panels to bear the brunt of the storm without causing damage to the wharf. After the storm, the panels can be slid back into place or repaired/rebuilt if damaged/lost.

⁷² CBCL Ltd., *The State of Nova Scotia's Coast Technical Report*, (Halifax: Province of Nova Scotia, 2009), 164.

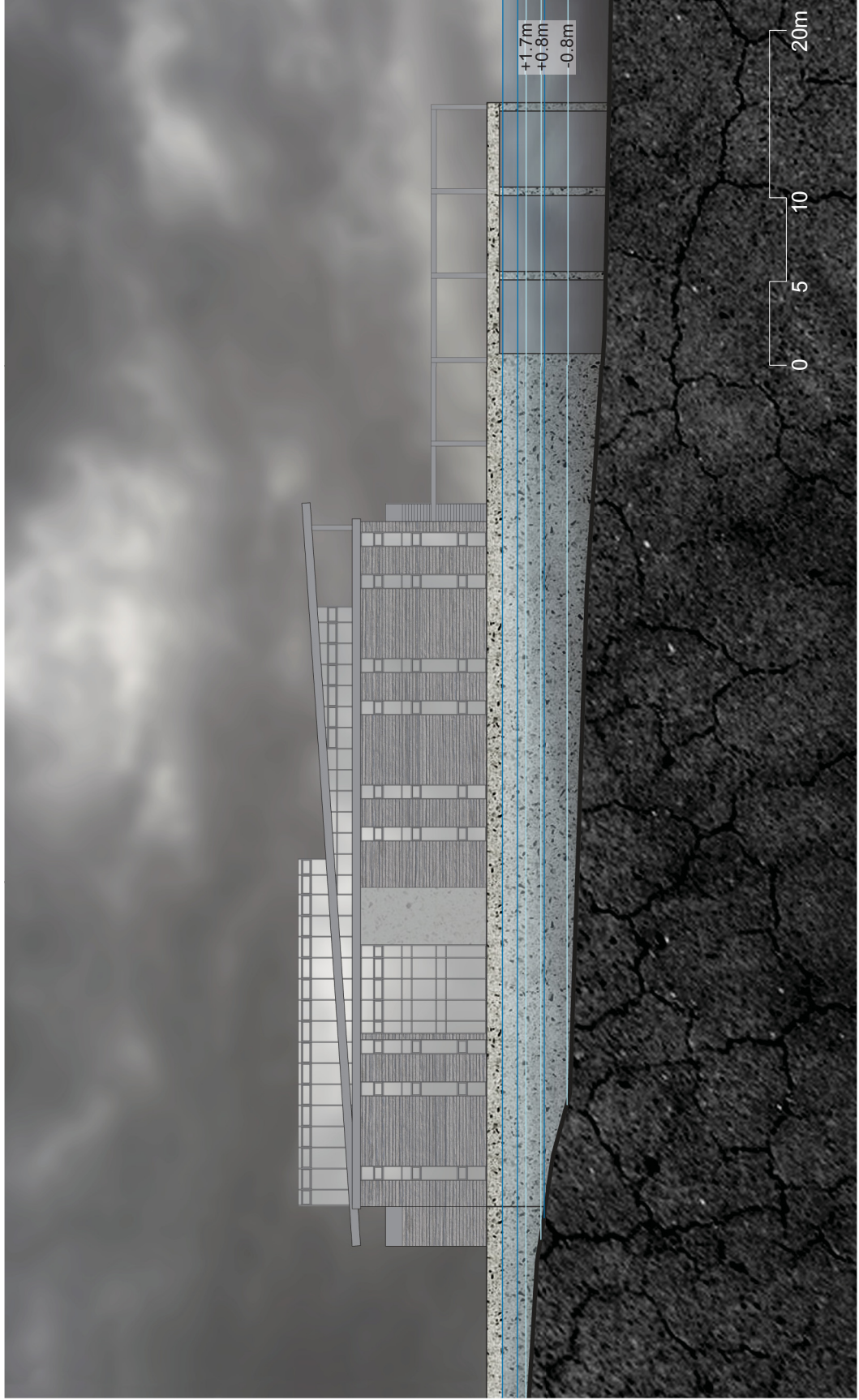


Fig. 54. Water levels at the site, 2015 (light blue) and 2100 (dark blue).

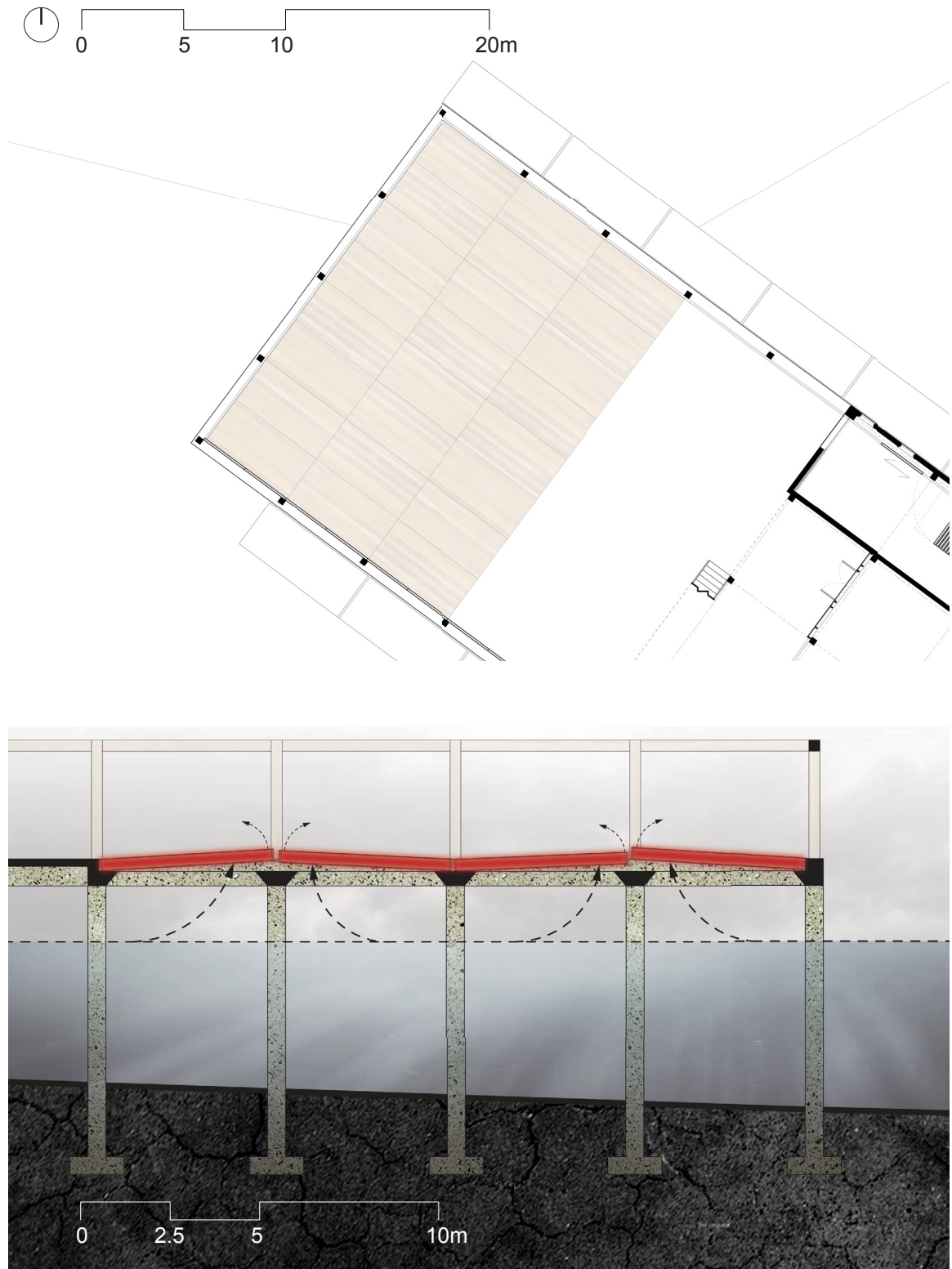


Fig. 55. Detached wharf floor panels plan/section; base map data in plan from Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

A second issue with water height is that of rising sea levels (figs. 54, above, and 56, below). A recent study estimates that by 2100, sea levels around Nova Scotia will be 0.7-1.4m higher due not only to the rising sea trend, but also because Nova Scotia is sinking at approximately the same rate.⁷³ Assuming a 1.4m increase in sea level, the building has therefore been placed at a height that allows it to remain above sea level by 2100. Fig. 54 shows corresponding low tide, high tide, and storm surge at high tide levels for the year 2100 (dark blue lines), below the building.

Fig. 56 (below) is a plan view of Port Medway in 2100. While the immediate coast will be underwater, the design proposal will still be above water. The light blue perimeter line indicates the extent of flood damage a storm surge can cause at high tide. The design is placed high enough so that even at high tide, a storm surge will not flood it.

⁷³ Ibid., 160-163.

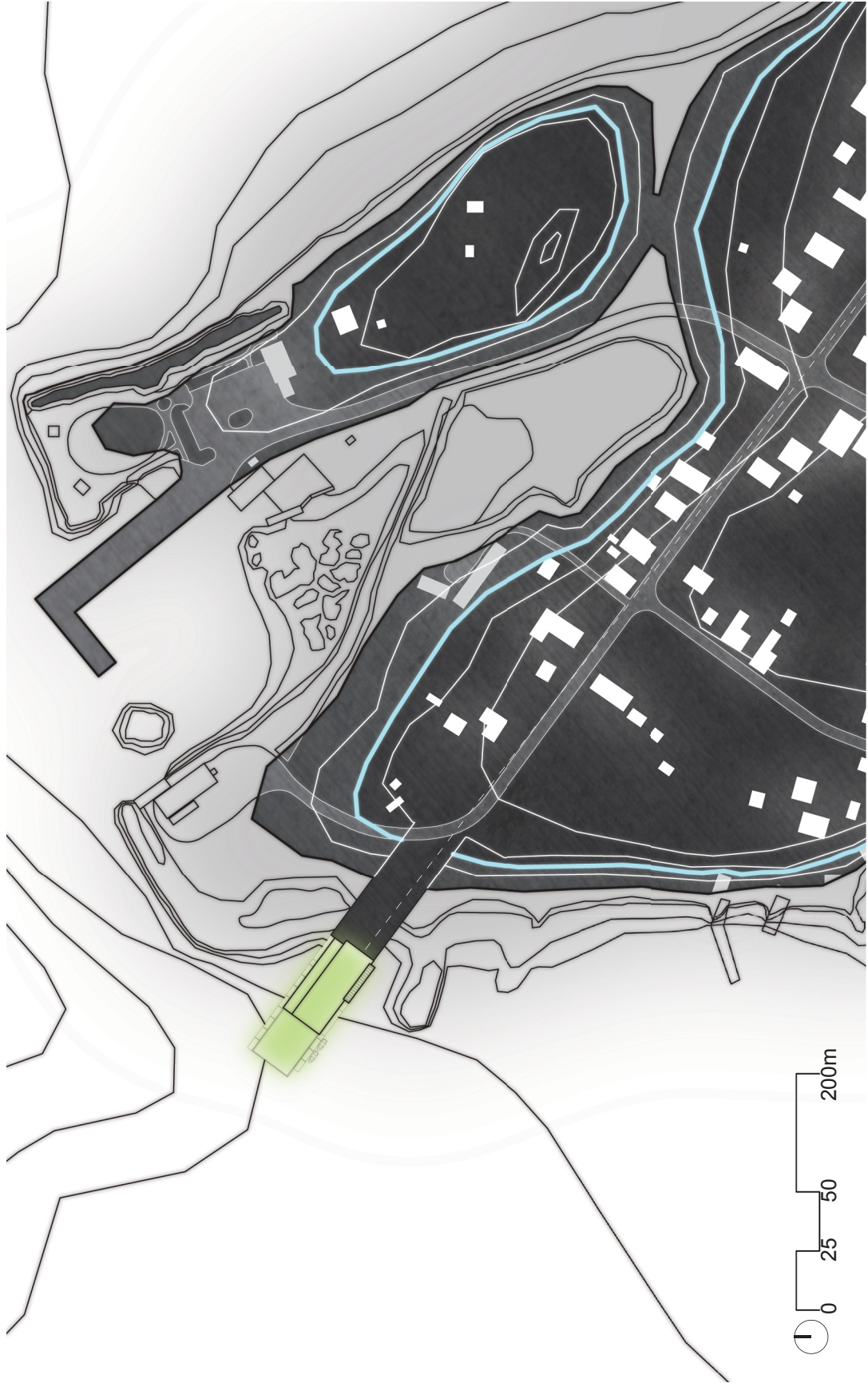


Fig. 56. High tide in 2100; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

Design Overview

This section provides a final overview of the design proposal's plans, elevations, and sections. Fig. 57 combines plans from the basement, ground level, and upper level in one image to show how the three relate to each other.

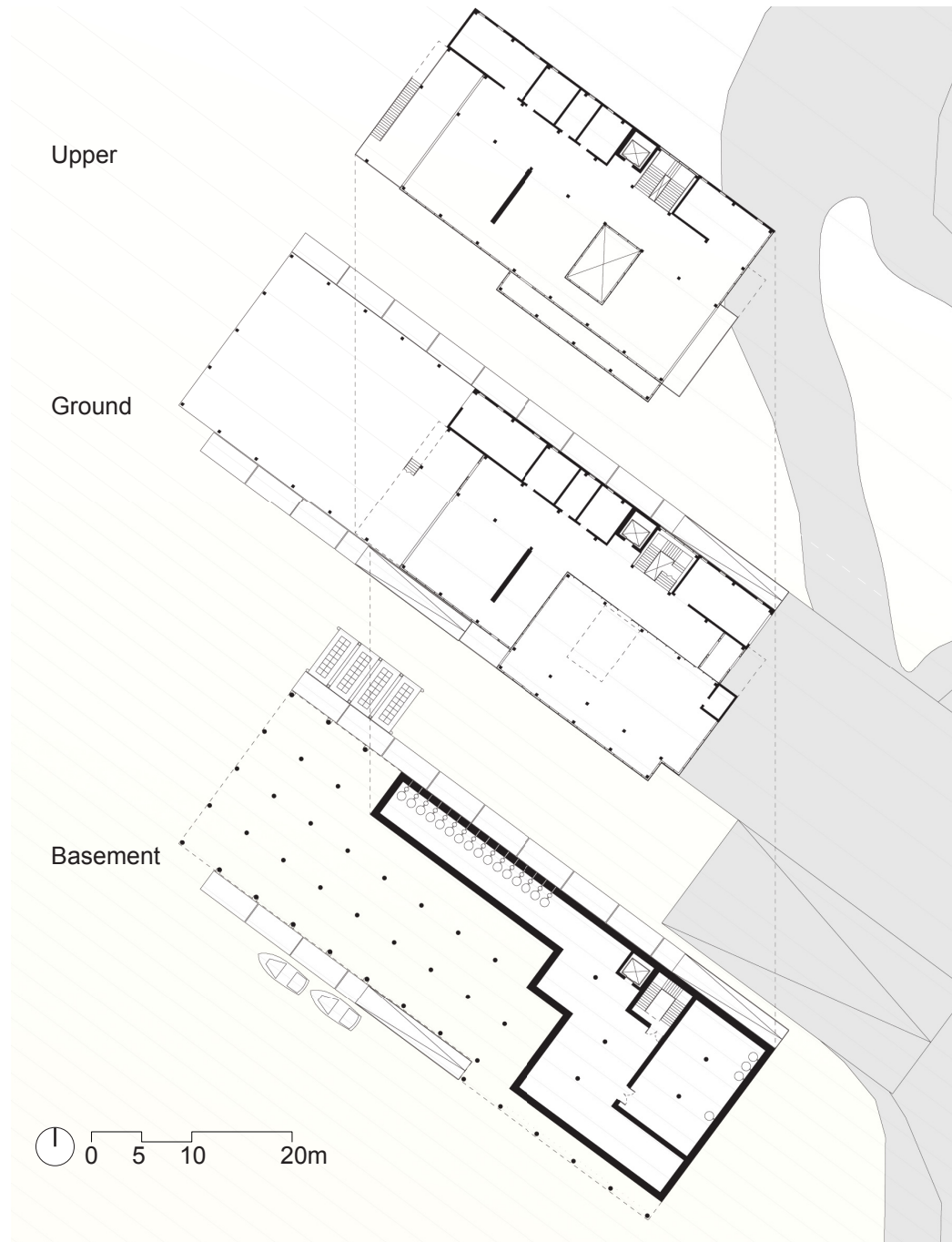


Fig. 57. Combined plans; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb."

Fig. 58 (below) is the basement plan and shows relationships with the water. Flupsies are moored in the ocean current (fig. 58, 1) so they can receive and expel seawater. The basement wall (fig. 58, 2) extends out to receive seawater for hatchery use. Fig. 58, 3 shows town water connections, where fresh water is provided for the hatchery, restaurant, and washrooms (blue arrows), and grey water is sent to the sewage drainage field (grey arrows). Finally, fig. 58, 4 shows disposal of used seawater from the larval tanks or algae tanks. The water is drained from the underside of the algae wall (dotted black line) and carried out with the tide (green arrows). This water is not grey water, but rather either seawater that is devoid of phytoplankton, or excess algae water.

Fig. 59 is the ground level plan and includes the algae master stock room (1), hatchery production space shown set up with larval tanks (2), algae wall space shown set up with seawater tanks (3), flupsy storage (4), market space (5), windbreak panel and market stall storage (6), and the wharf gathering space set up with market stalls (7).

Fig. 60 is the upper level plan and includes outdoor restaurant space (1), indoor restaurant space (2), upper level algae wall (3), restaurant kitchen (4), a glazed opening to view down into the hatchery (5), indoor gathering space (6), gathering storage and cooking facilities (7), and outdoor deck connected to the wharf by stairs (8).

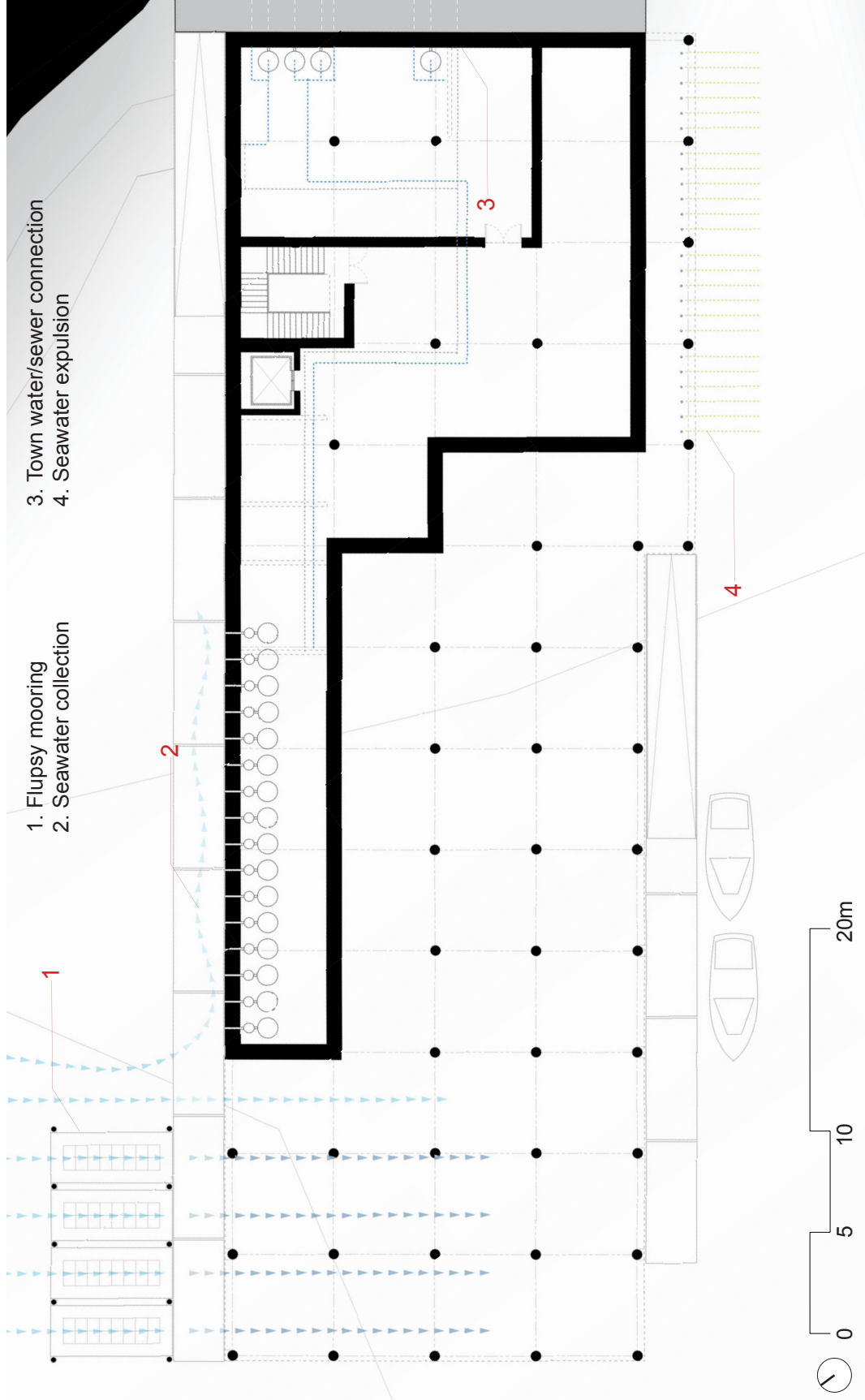
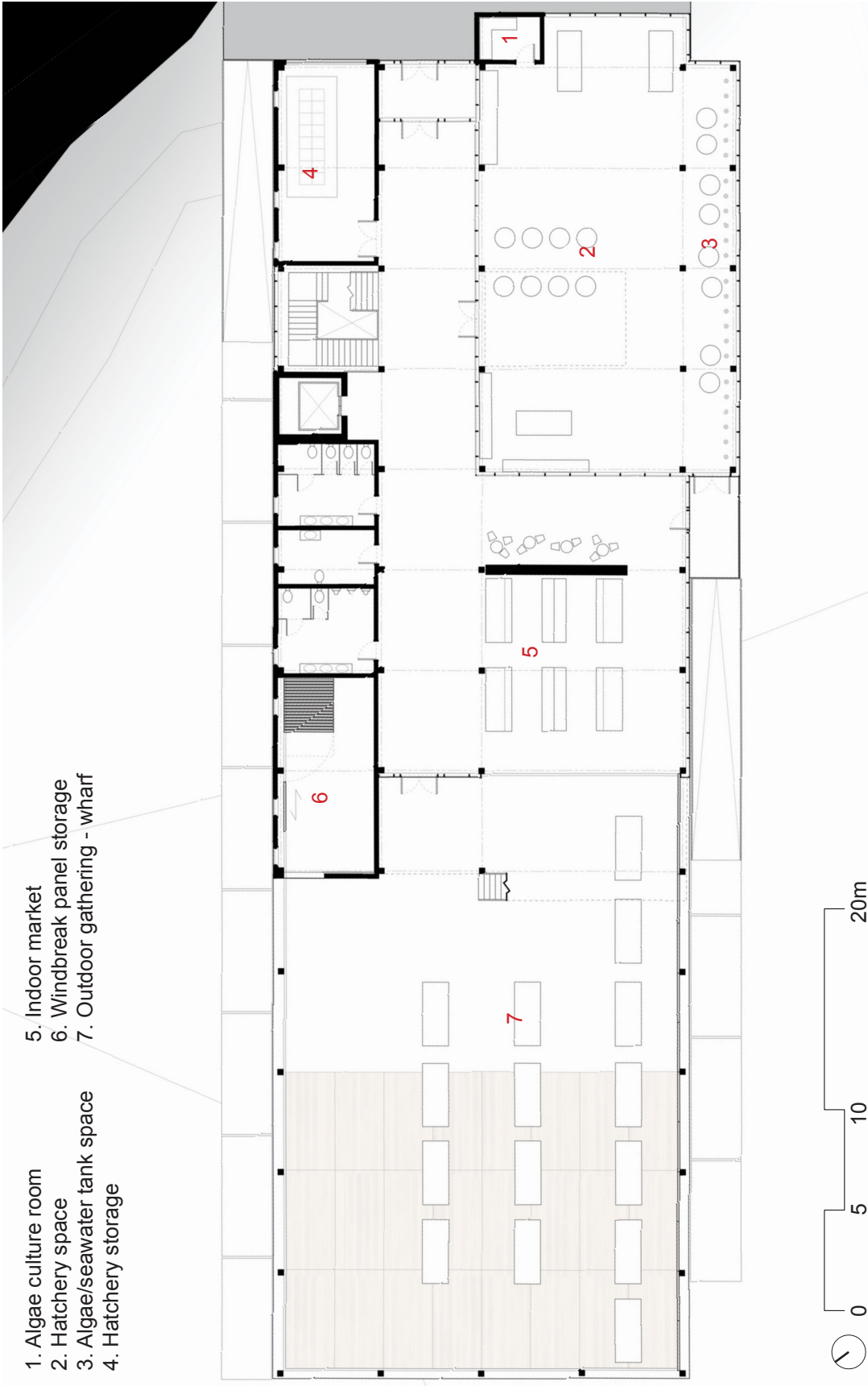


Fig. 58. Basement plan; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."



- 1. Algae culture room
- 2. Hatchery space
- 3. Algae/seawater tank space
- 4. Hatchery storage
- 5. Indoor market
- 6. Windbreak panel storage
- 7. Outdoor gathering - wharf

Fig. 59. Ground level plan; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."



- 1. Café/restaurant deck
- 2. Café/restaurant indoor seating
- 3. Algae wall
- 4. Restaurant kitchen

- 5. View to hatchery below
- 6. Indoor gathering space
- 7. Indoor gathering storage/kitchen
- 8. Upper level deck

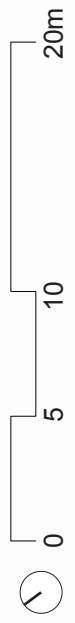


Fig. 60. Upper level plan; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

Fig. 61 shows the roof plan and elevations. The roof includes green roof space on both the flat and sloped roofs, and exterior walls are comprised of glazed curtain walls on most sides. The north side of the building is mainly clapboard cladding, as this is the building's opaque "service" side containing washrooms, storage, stairs and the elevator.

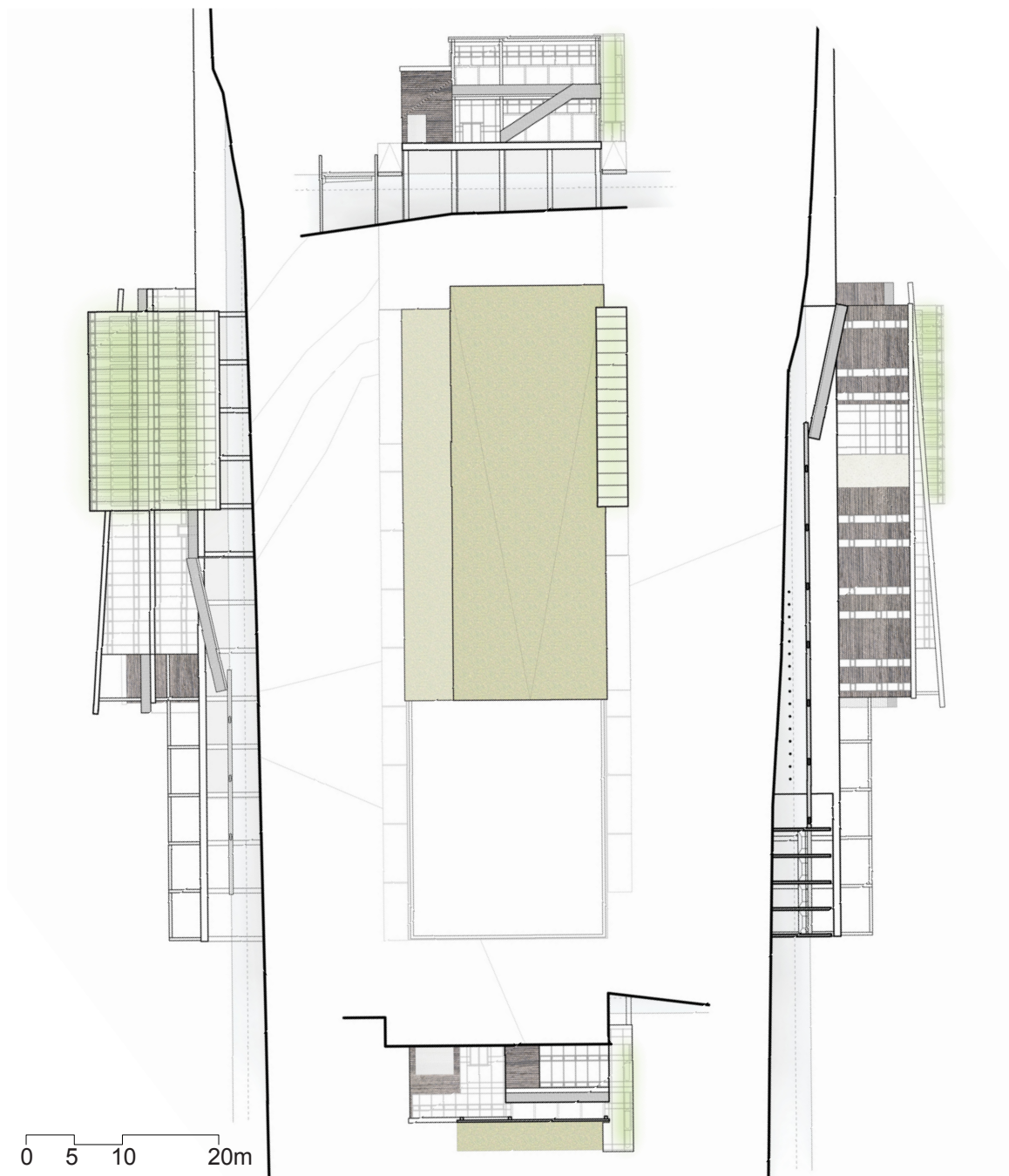


Fig. 61. Roof plan and elevations.

Figs. 62-64 (below) show progressive sections through the building and activities taking place both inside and out. Fig. 65 is a longitudinal section of the building at night, showing the glowing algae wall in the background during a large town celebration event.

Finally, fig. 66 shows a 1:200 model with perspective views from the south (top) and from the north (bottom).

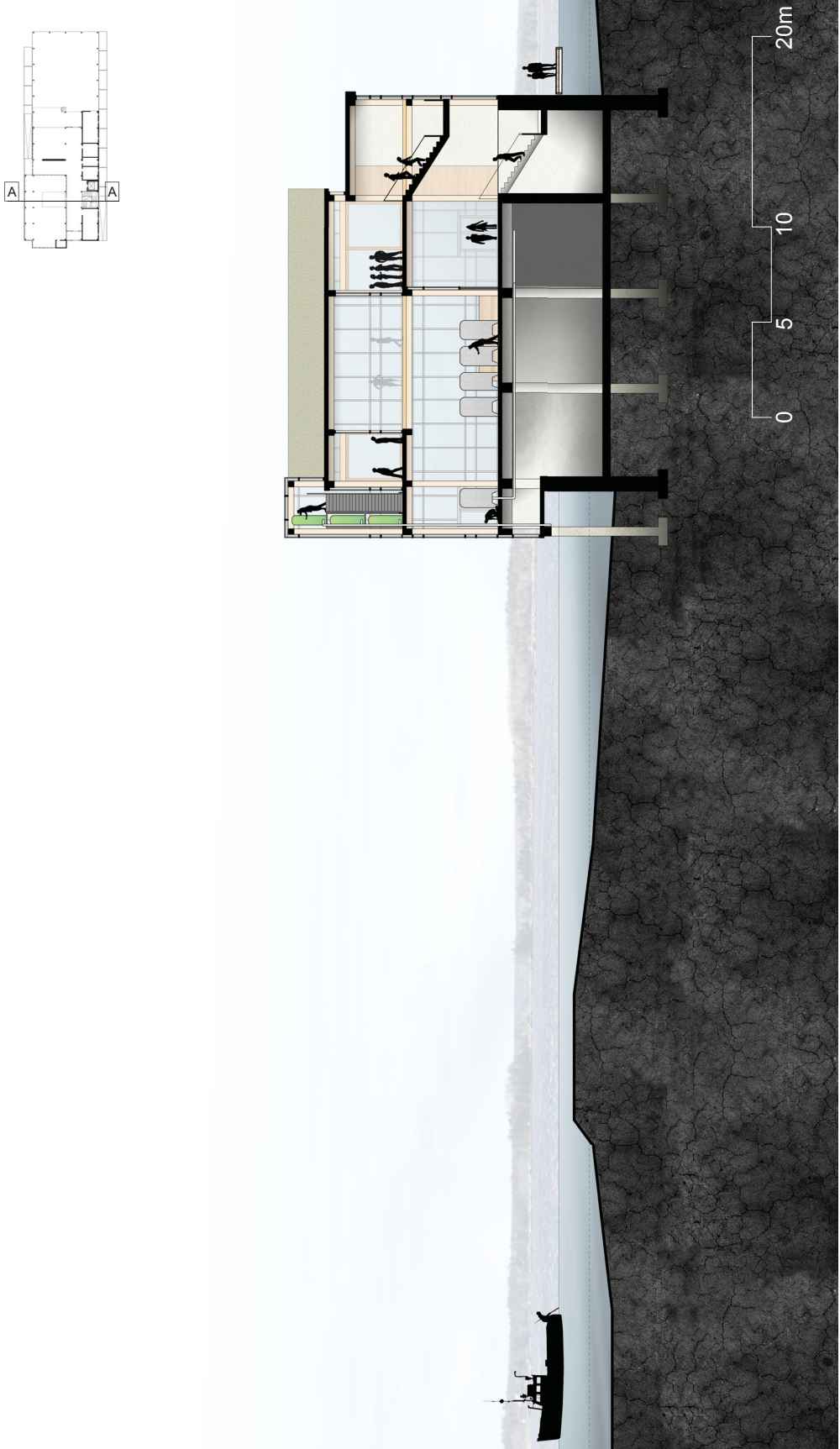


Fig. 62. Section A.

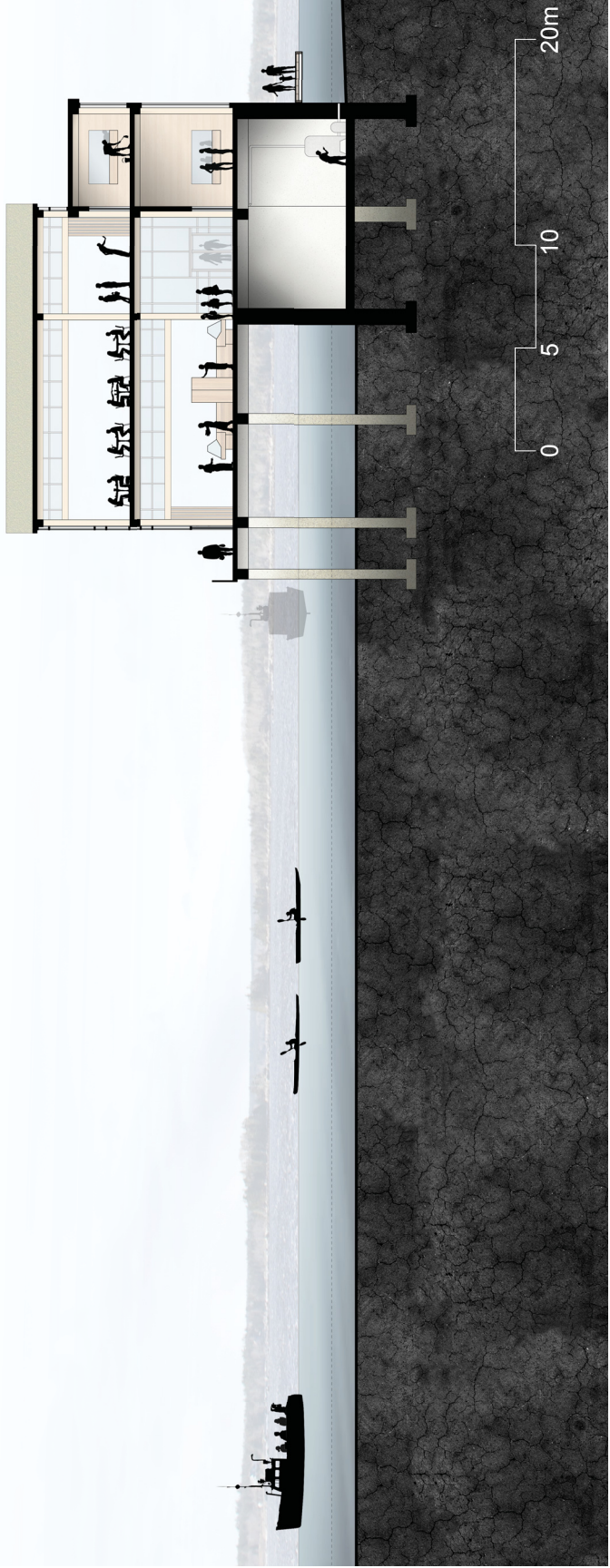
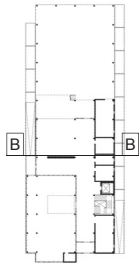


Fig. 63. Section B.

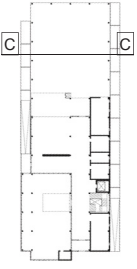


Fig. 64. Section C.

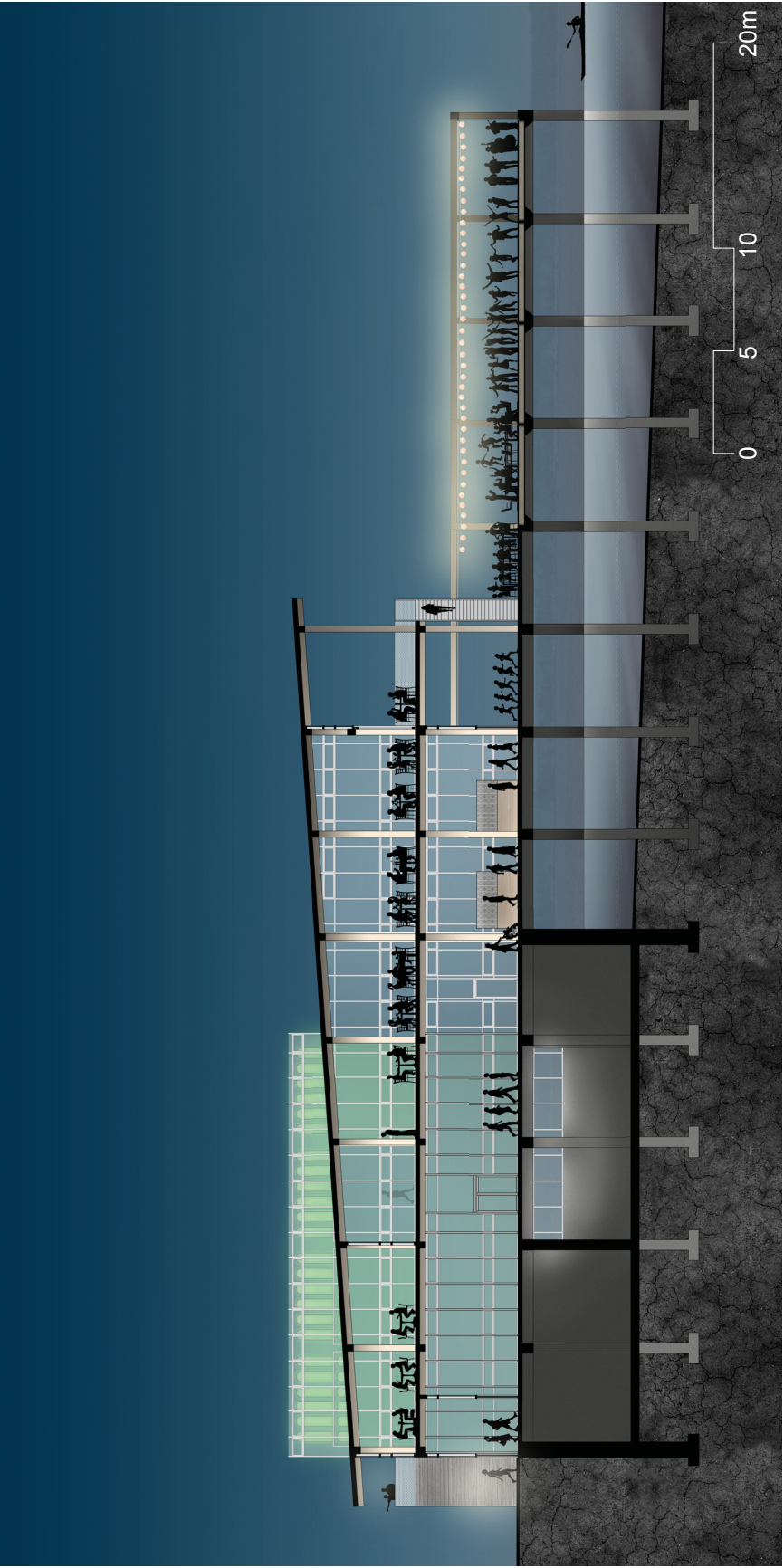
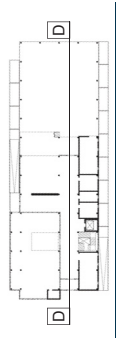


Fig. 65. Section D.

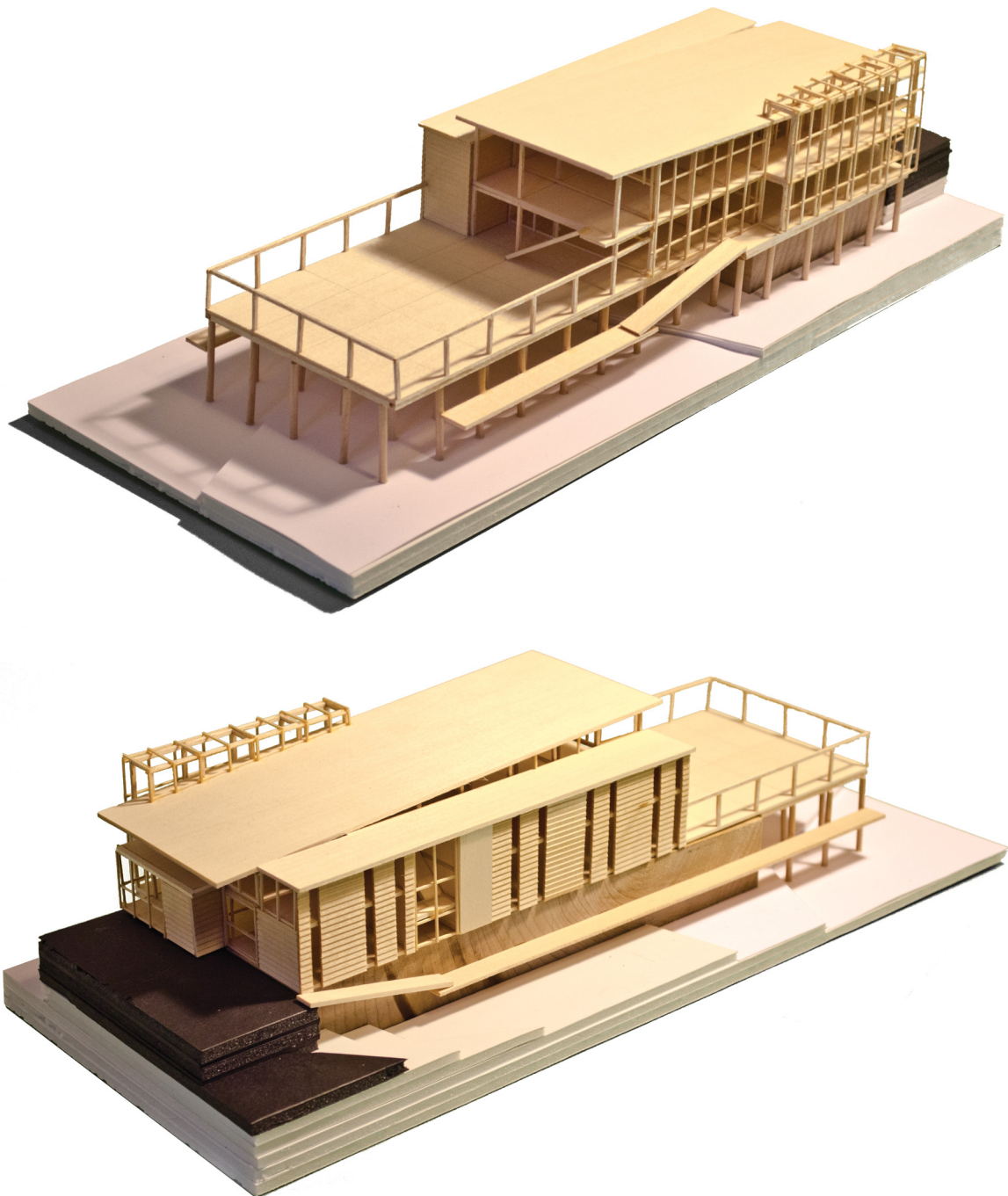


Fig. 66. 1:200 model.

CHAPTER 4: CONCLUSION

From the 1930's onwards, the tourism industry took a slow hold in Port Medway, eventually growing to be the town's largest economic force. Despite the industry's decline across the region over the past three decades, tourism has had a lasting effect on Port Medway. Tourism brought in seasonal residents, new permanent residents, and countless visitors during the summers. It provided at least some economic injection into the community, which it desperately needs. However, it also brought a nostalgic-focused ideology, and with it, restoration efforts focused on selectively preserving or recreating relics to construct an image of a bustling seaport long since quietened.

The lighthouse at Foster's Point is an example of this. It is intended to represent the town's former ocean-based industry. What the lighthouse represents today is the tourism industry's backward gaze on a time that only briefly existed. Once charged with guiding lost ships through the fog, the lighthouse now is expected to guide the town's economic and community survival.

This thesis stands in stark contrast to what the tourism industry has to offer; it proposes a new economic avenue. The oyster hatchery and community space represent an economy intricately tied to the specificity of place where water and land, industry and community, come together. The hatchery reinvigorates the lost river-ocean connection by relying on the confluence of both for the oysters to thrive. Rather than emulating a perceived historical vernacular, the design learns from built responses to site and climate.

In many ways, the hatchery is the lighthouse typology

reimagined, since the two share many similarities. In a literal sense, the hatchery's algae wall lights up the night, the algae tanks glowing fluorescent, standing as a vertical projection very similar to a lighthouse along the coast. Programmatically, both act as beacons from the water and for the town. There are, however, crucial differences. While the function of both of these beacons includes calling in boats and tourists, the hatchery is different in that it firstly calls in the community. The lighthouse, despite being an object for public consumption, is inaccessible, while the hatchery is open. Perhaps the most important difference between the lighthouse and the hatchery lies in what they signify. The lighthouse signifies what is lost: lost ships, lost enterprise, lost community. The hatchery signifies what is found: new economic promise, rejuvenated community, and a meaningful connection between these and the specificity of place in this rural coastal community (fig. 67).

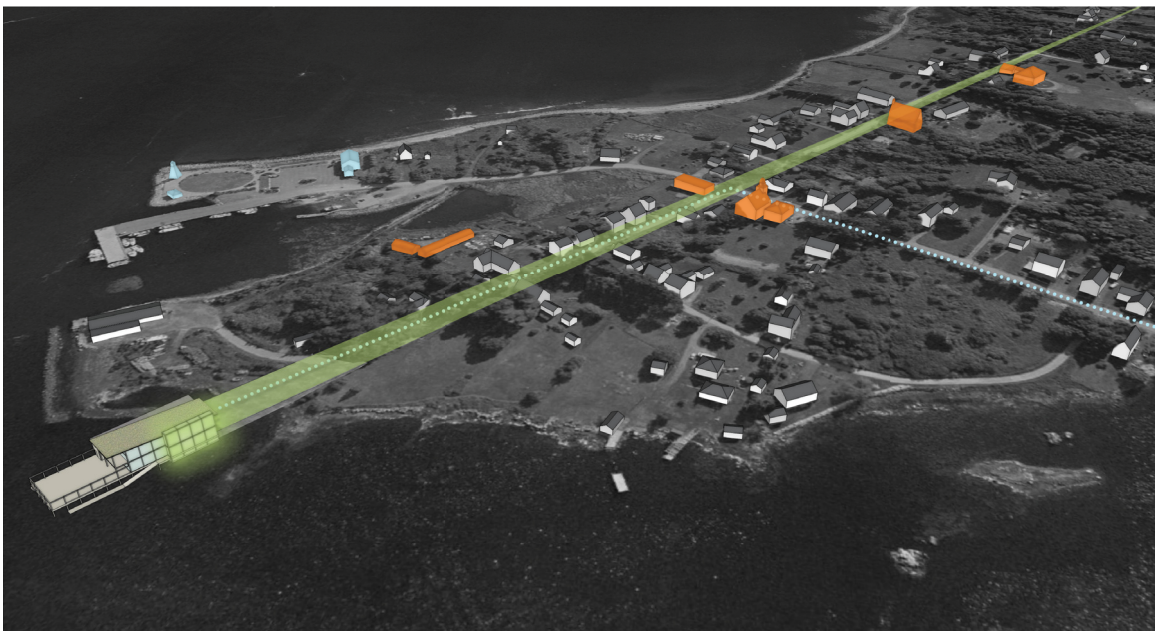


Fig. 67. The hatchery as a beacon, connecting water to town; satellite imagery from Google Maps, "Map of Port Medway."

APPENDIX: DESIGN DEVELOPMENT

This section highlights important development points throughout the design process. Design progressed by testing plans, elevations and sections against the site conditions of wind, sun, and water. Tests were accomplished through drawing, while formal explorations and arrangement of programme were accomplished through both drawing and working models.

Fig. 68 (below) shows four early 1:500 study models made in succession clockwise from top left. These models explored the idea of combining “cluster” and “long and low” building organizations outlined in chapter 3, fig. 51. The cluster idea was eventually abandoned due to the shortcomings discussed in chapter 3, “Vernacular Investigation.”

A set of design parameters were then set out to maintain clarity and consistency of programmatic requirements (fig. 69). These were set out with the knowledge that, as design progressed, circulation spaces would be combined, arrangements of rooms would change, and some activities would be combined.



Fig. 68. Early 1:500 working models.

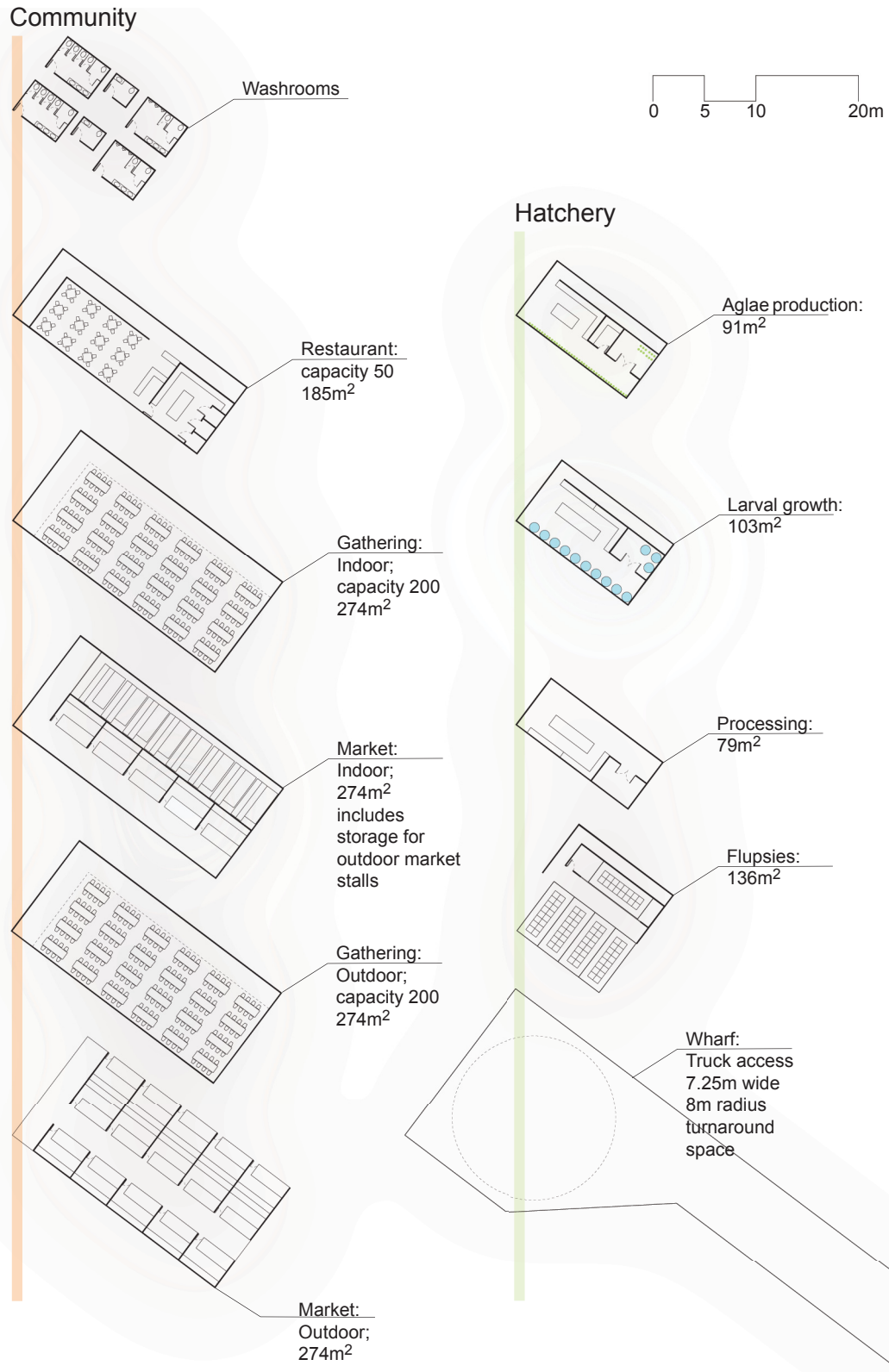


Fig. 69. Design parameter diagrams.

The first design iteration made after the parameters were set out is shown in fig. 70 (below) and represents an attempt to organize the programmatic blocks in relation to the site's winds and solar exposure. Fig. 71 is an example of shadows being cast over the algae space (1) and wind causing problems in the outdoor gathering space (2). Fig. 72 shows a problematic wind scenario in which wind gets caught in between exterior walls in the gathering area.

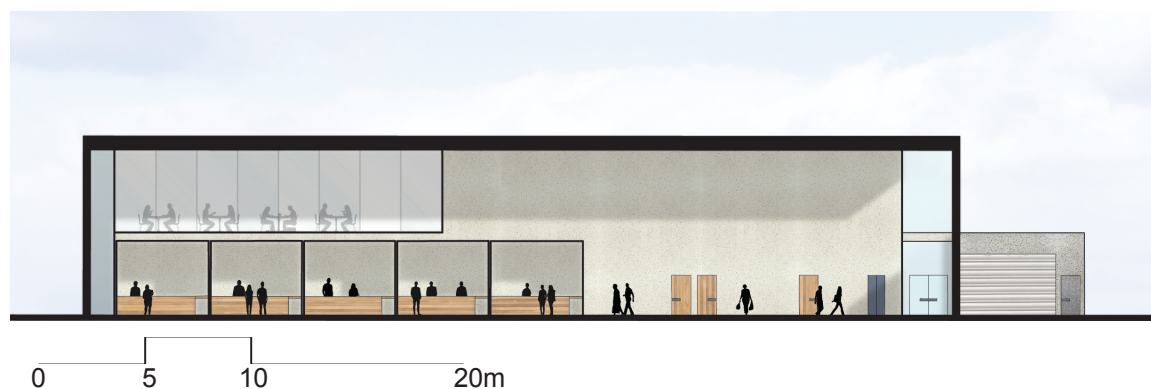
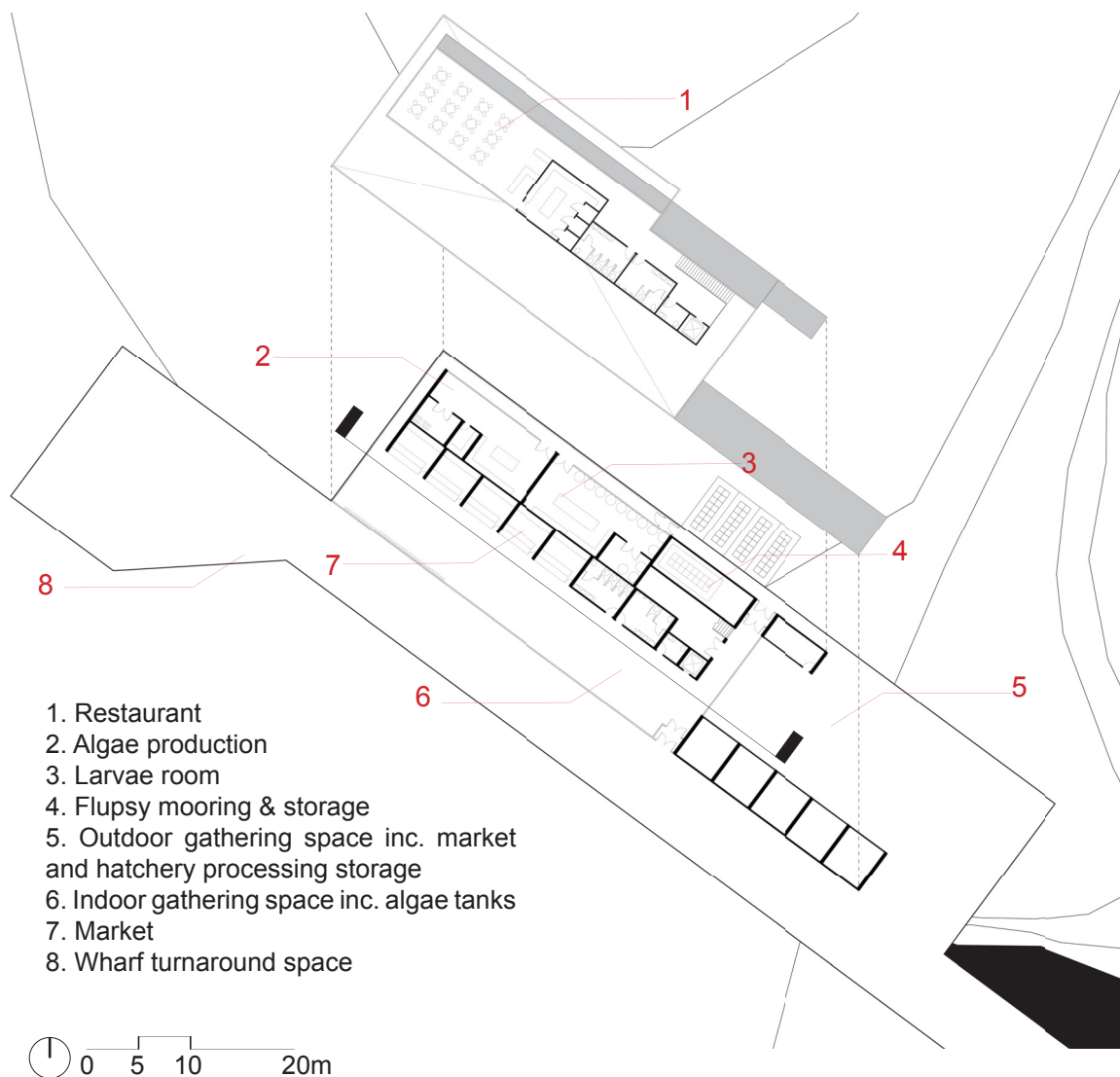


Fig. 70. Iteration 1 plan and section; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

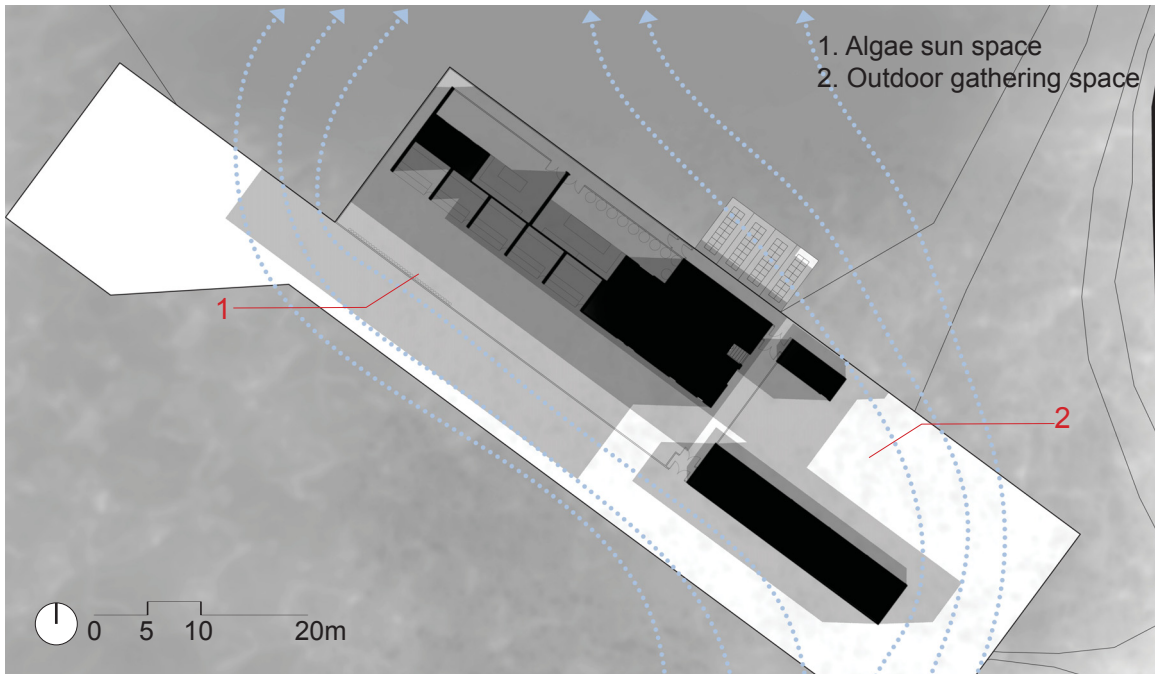


Fig. 71. Bad winds and shade; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

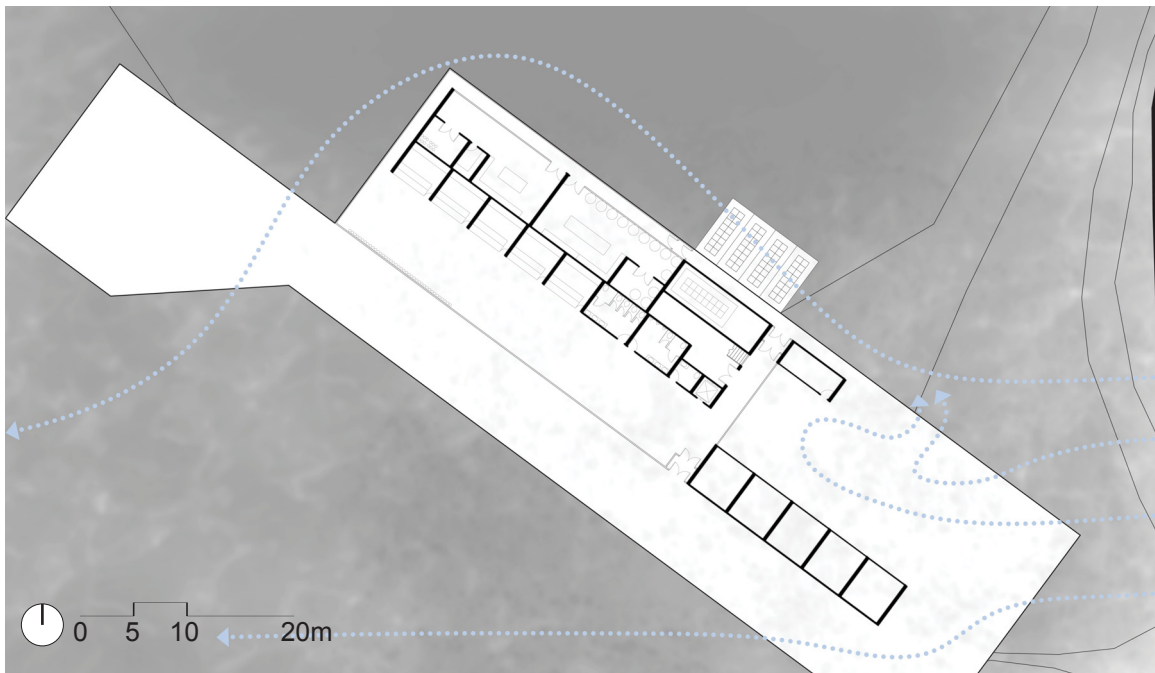


Fig. 72. Problematic wind; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

The second iteration (fig. 73, below) introduced an outdoor market storage building as a permanent windbreak (1) with sliding panels on either side as temporary windbreaks (2). Flupsies were moved indoors (3) and the algae tanks moved to the SE corner of the building for maximum solar exposure (4). Fig. 74 explores the idea of the building versus the outdoor space as the culmination of the site axis, while fig. 75 explores the idea of flipping the ground floor plan so that in section, hatchery workers are able to see the grow-out while working.

The third iteration (fig. 76) thus flipped both the longitudinal elevation and the section to place the building at the end of the axis and to face the hatchery toward the grow-out. Competing sections in fig. 76 explore the idea of extruding the hatchery rooms vertically to integrate them into public programme and provide views into the hatchery.

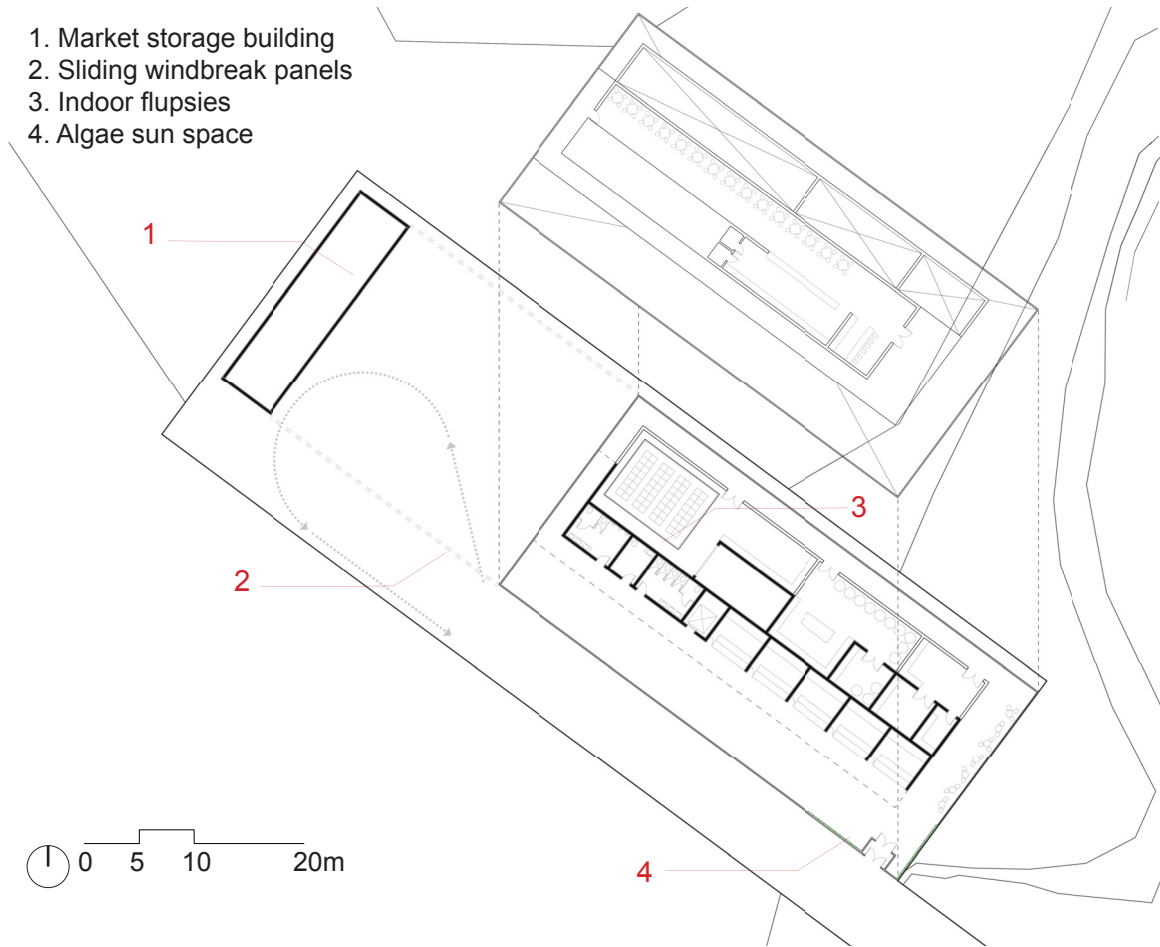


Fig. 73. Iteration 2 plan; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."



Fig. 74. Competing elevations.



Fig. 75. Competing sections.

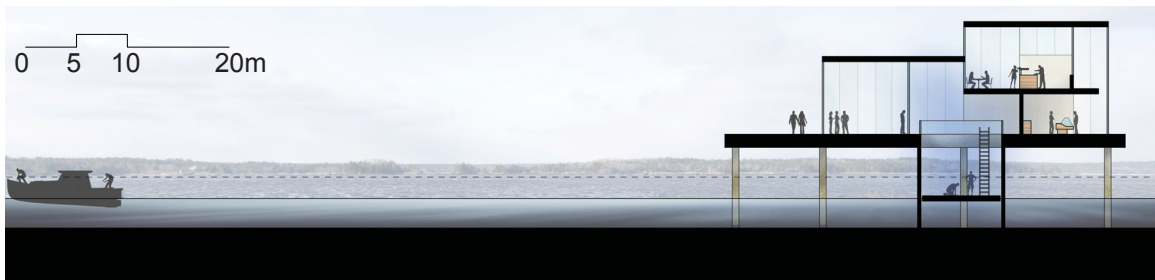
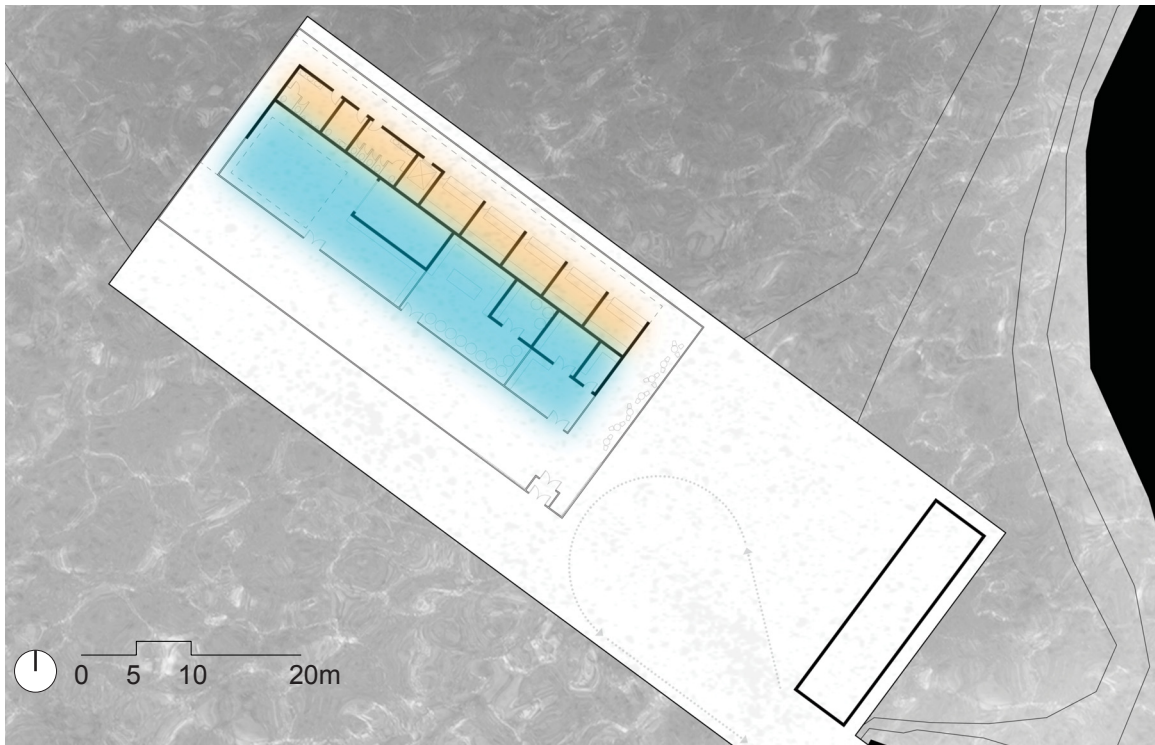


Fig. 76. Iteration 3 plan and competing sections; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

The fourth iteration began to develop the sliding windbreak panels further (fig. 77) and pushed the idea of dropping the hatchery below the wharf level but extruding the rooms vertically (figs. 78-79, below). In fig. 79, relationships between the hatchery and the water were also explored. These ideas were carried further through a working model at 1:500, which extruded the algae tanks along the second level southern wall (fig. 80, in red). Much of the design was then sorted out in a 1:200 working model (fig. 81).

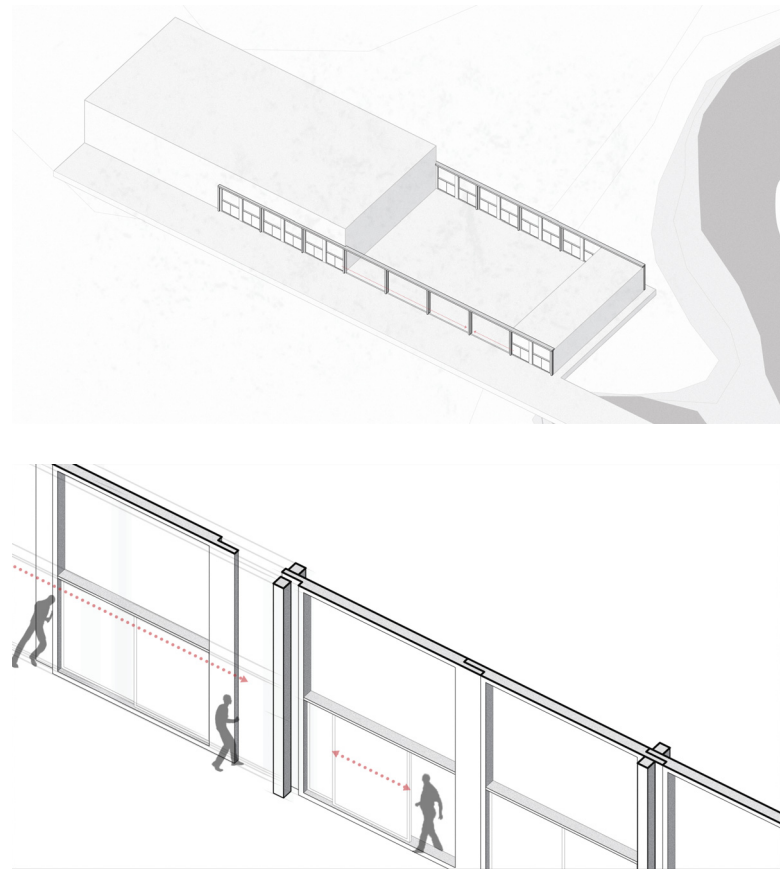


Fig. 77. Sliding panels in development; base map data from Dalhousie University GIS Centre database, "NSTDB10000_Queens2012.gdb" and Bedford Institute of Oceanography, "Archived - Classification of Maritime Inlets."

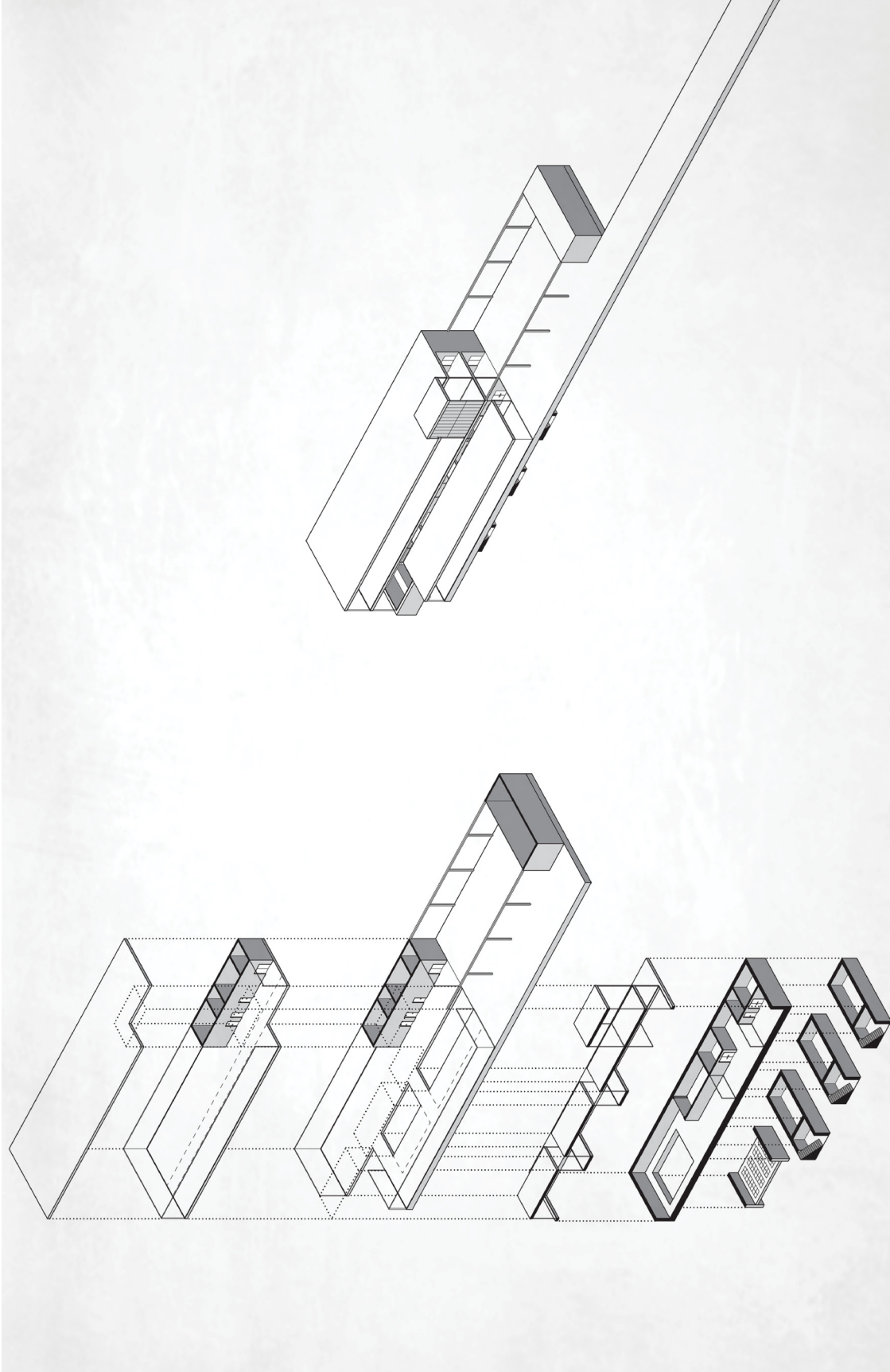


Fig. 78. Extrusion of hatchery rooms up through the building.



Fig. 79. Sectional explorations of water relationship.

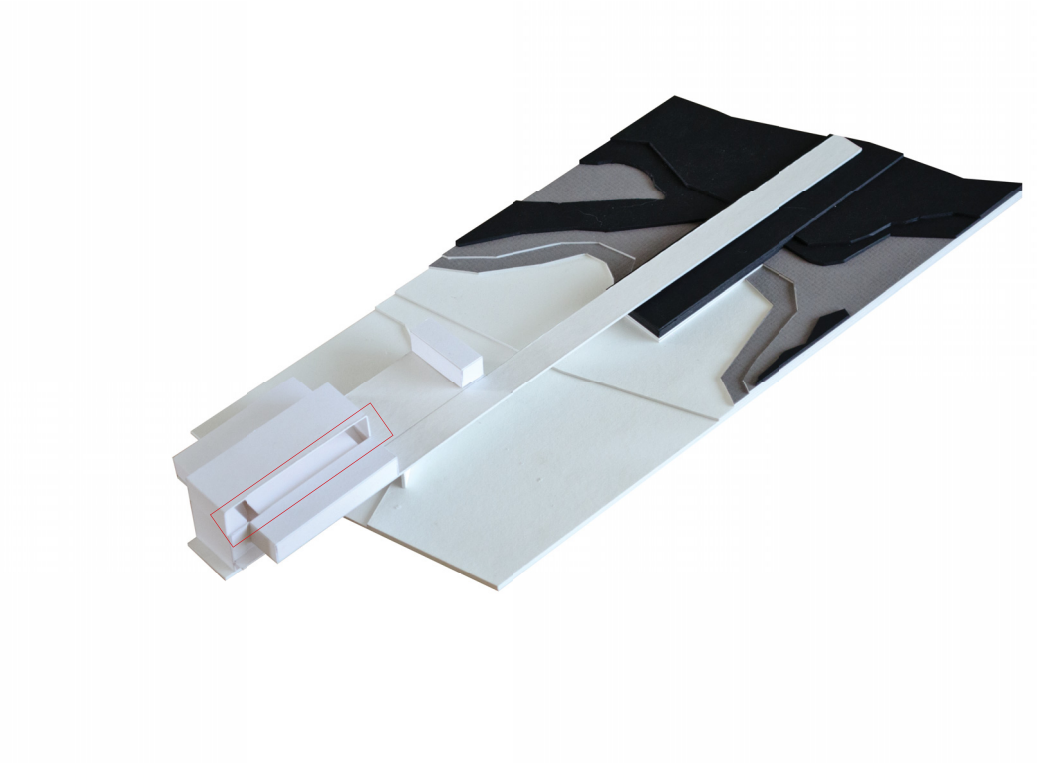


Fig. 80. 1:500 working model of iteration 4.

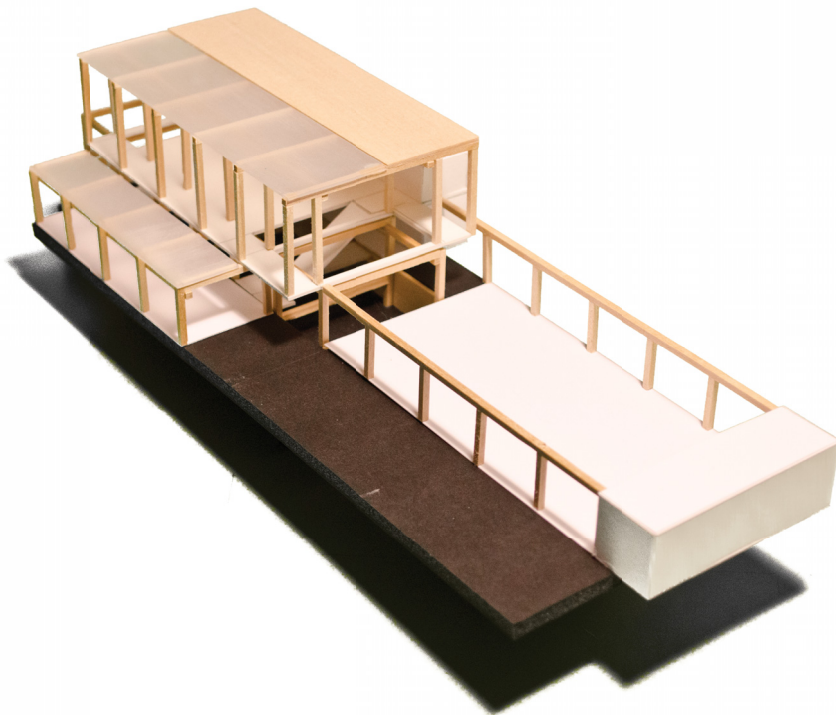


Fig. 81. 1:200 working model.

After iteration 4 it was decided to again reverse the plan so that the building is encountered first (fig. 82, below). The outdoor wharf space was made an extension of the building, rather than having a platform extend beyond the building connecting to the wharf. This was done to make the design more cohesive and encourage interaction inside the building rather than providing a means to bypass it. After the top model in fig. 82 was made, it was decided not to lower the hatchery rooms below the wharf level because it resulted in a fragmentation of activities. The hatchery was brought back to ground level and the basement reserved for water collection and services. In all three models the idea of the algae space as a large wall projecting beyond the roof is present; this was done to reduce shadows cast on the algae tanks. The middle model shows experimentation with moving the outdoor storage room to provide a permanent windbreak. In the end, the outdoor storage room was incorporated into the building and no permanent windbreak was provided so as not to impede views where wind protection was not necessary.

By completion of the bottom model in fig. 82, the design was almost finalized. Arrangement of programme remained the same from this model into the final design, and only small changes were made, such as removing the storage building at the end of the wharf, rethinking the roof, rearranging some circulation inside the building, and turning the floating raft loop into two separate rafts.



Fig. 82. Working 1:500 models before final design.

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