Manifestations of Contemporary Port City-scapes in Denmark

Anthropogenic Terrain and Future Trajectories

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ABSTRACT

The extensive Danish coastline is dotted with small and medium-sized harbours. Key activities in each of these harbours vary; based on combinations of, e.g., fishery, transportation of goods and people, recreational facilities, offshore activity, and industrial production on land. To various degrees, these harbours and the activities that shape and sustain them, are embedded in their localities - developed through close interrelationships with site-specific conditions of the sea and of the land, interwoven with local economies and communities – they are also material manifestations of links to elsewhere and global production and consumption flows. They are national and regional nodes in mobility networks of trade and flows, manifesting as moorings of building and infrastructure at local sites.
This paper empirically traces instances of site-specific interrelationships between harbours, towns, and landscapes. Four Danish harbours are the object of study, one an inland port by a fiord, the others located on the east and west coasts of the peninsula of Jutland. On basis of this study, the paper develops thematic deliberations on the material manifestations of contemporary port city-scapes and their mutual on-goings in two interlinked trajectories. First, in acknowledging and seeking to unfold the character of these harbours as anthropogenic terrains, the paper engages a conceptual discussion of the inscriptions of human-nature relationships in their material layout, space, and form. Second, the paper deliberates on future trajectories for the material agency of these layouts, spaces and forms in the 'port-city relationships', discussing controversies and mutualities between ports and towns.

Manifestations of Contemporary Port City-scapes in Denmark: Anthropogenic Terrain and Future Trajectories

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KEYWORDS
Port City-scapes; Anthropogenic terrain; Port City; Local culture; Globalization; Denmark

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Introduction

Contemporary port city-scapes (Hein 2019) of Denmark (Jutland) are constructed environments of demarcated facilities between land and sea of boulders, asphalt, concrete and steel, forming quays and piers to protect activities with cranes, storage buildings, where ships dock, moor, load and unload. Some have grown slowly through time, others enforced on to the landscape based on a masterplan. Yet, more or less all are developed in close interchange with site-specific conditions – geophysical, natural and societal conditions – of the sea and of the land. As such, these port city-scapes and the activities that shape and sustain them are, to various degrees, embedded in their localities, and ports and cities have grown collectively by mutual dependencies through history.

While such port city-scapes host various key activities, participating in forming and sustaining local life, they are also material manifestations of links to elsewhere. They participate in global production and consumption flows in a globalized world.

In this paper, we explore how seaports form part of site-specific interrelationships with the towns and landscapes with which they share location. We are interested in how ports do not only fulfill the function of throughput of goods and people, but are also implicated with local conditions of the sea, the land, and the town. More specifically, we examine how ports manifest materially in relation to site-specific conditions, and we discuss the local implications of the material layouts, forms and spaces of ports on landscapes and towns.

As an outset for the analysis, ports, here, are acknowledged in their character as both nodes (for links to elsewhere) and (local) places (Bertolini 1999). This outset does not, however, assume a balanced relationship between ports, towns and landscapes. On the contrary, such balance is critically addressed by academic literature that asserts that relations are not only diverse and dynamic, but also contested. Indeed, the literature on port-city relationships stresses that towns and ports are increasingly spatially and functionally separated, and have opposing interests; the port's operational efficiency as a gateway – a node for links to elsewhere – in opposition to place functions of the local town (Hoyle 1988, Ducruet 2007, Ng, Ducruet 2014, Hein, Carola 2016). This increase of opposing interests, along with the development of the industrialization, ignited active planning for *separation* – by artificially enforcing borders – as a solution for conflicts between industry and other uses (Grant 2005).

At the same time, contemporary understandings of "city" and "country" argue that the boundaries between urban and wild are blurred (Lister 2016, Tietjen 2011). Here, streams of thought in urbanism and architecture on landscapes and ecologies suggest that the relationship between landscapes such as harbours and natural landscapes have long been subject to an imbalance, by virtue of people's far-reaching and comprehensive projects to transform their world (Swyngedouw 2010, Hodson, Marvin 2010, Derickson 2018, Jon 2020).

In this paper, we set out to empirically trace instances of site-specific interrelationships between port, town, and landscape that can contribute to our understanding of what constitutes contemporary port city-scapes in Denmark. The aim is to unfold how ports manifest materially at concrete sites, with what site-specific implications for natural and cultural landscapes and for the

relationship between the port and the town. We use four Danish cases for this tracing (Table 1 and Figure 2), analyzing their material manifestations, in order to deliberate key points of the mutual on-goings of these contemporary port city-scapes.

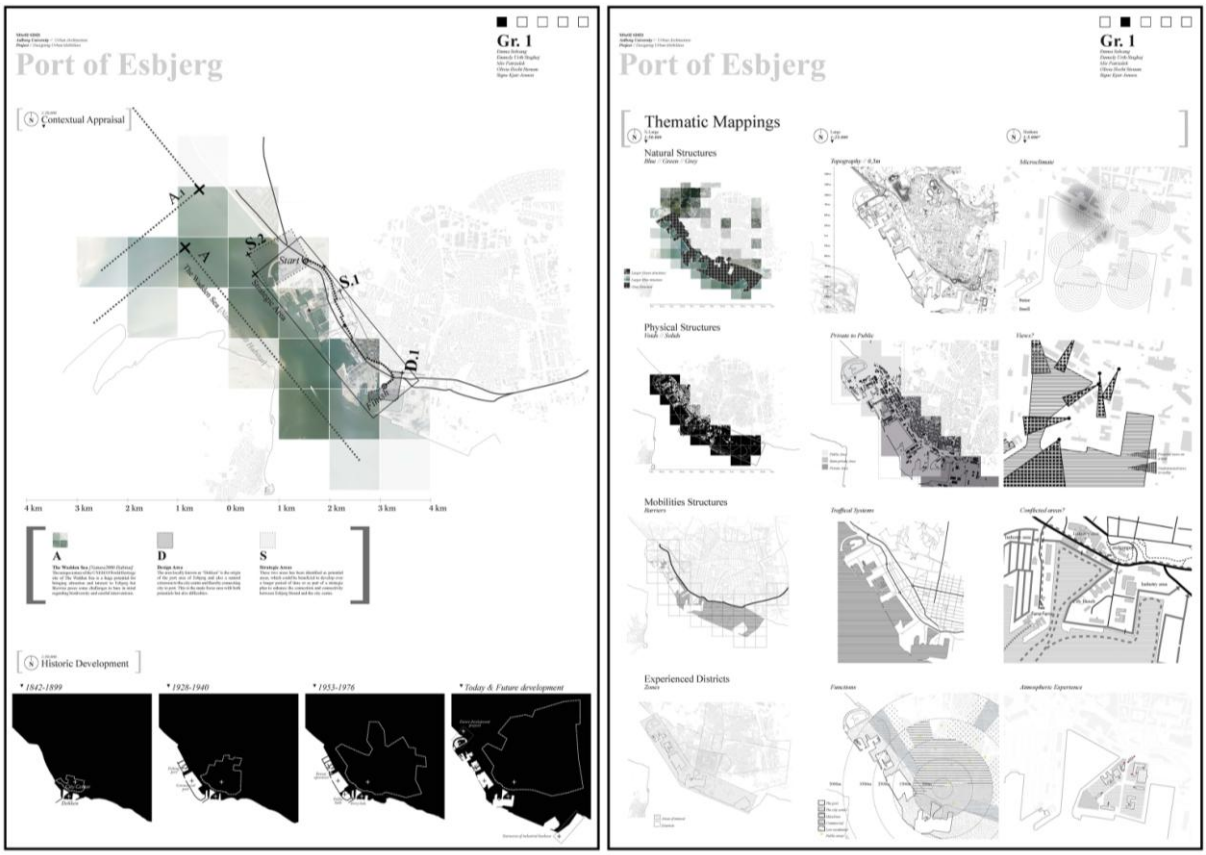
Analysis: Tracing Mutual On-Goings Between Port, Town, and Landscape

Method

The study is based on empirical insights from mappings, analysis and identification of design challenges, conducted in collaboration with postgraduate students in a research based studio, spring 2021 (see Figure 1). Further, it is based on expert interviews with port CEO's and heads of municipal departments concerned with city development in the selected cases.

To unfold material manifestations of externalities and site-specific interrelationships between harbours, towns, and landscapes, this research based studio aimed firstly, to analyse the entanglements of material manifestations with processes, dynamics and the life of the harbours and secondly, to examine the spatial-material composition of the harbours as cultural landscapes.

The empirical work includes on-site field observations and photo investigations of spatial-aesthetic characteristics; reviews of historic development and future development plans; mappings of built, open, green and blue structures, volumes and spaces, infrastructures, topography, zoning, functions, human and non-human activities. The gathered material was presented, tested, elaborated and discussed with central municipal and port actors through a seminar.



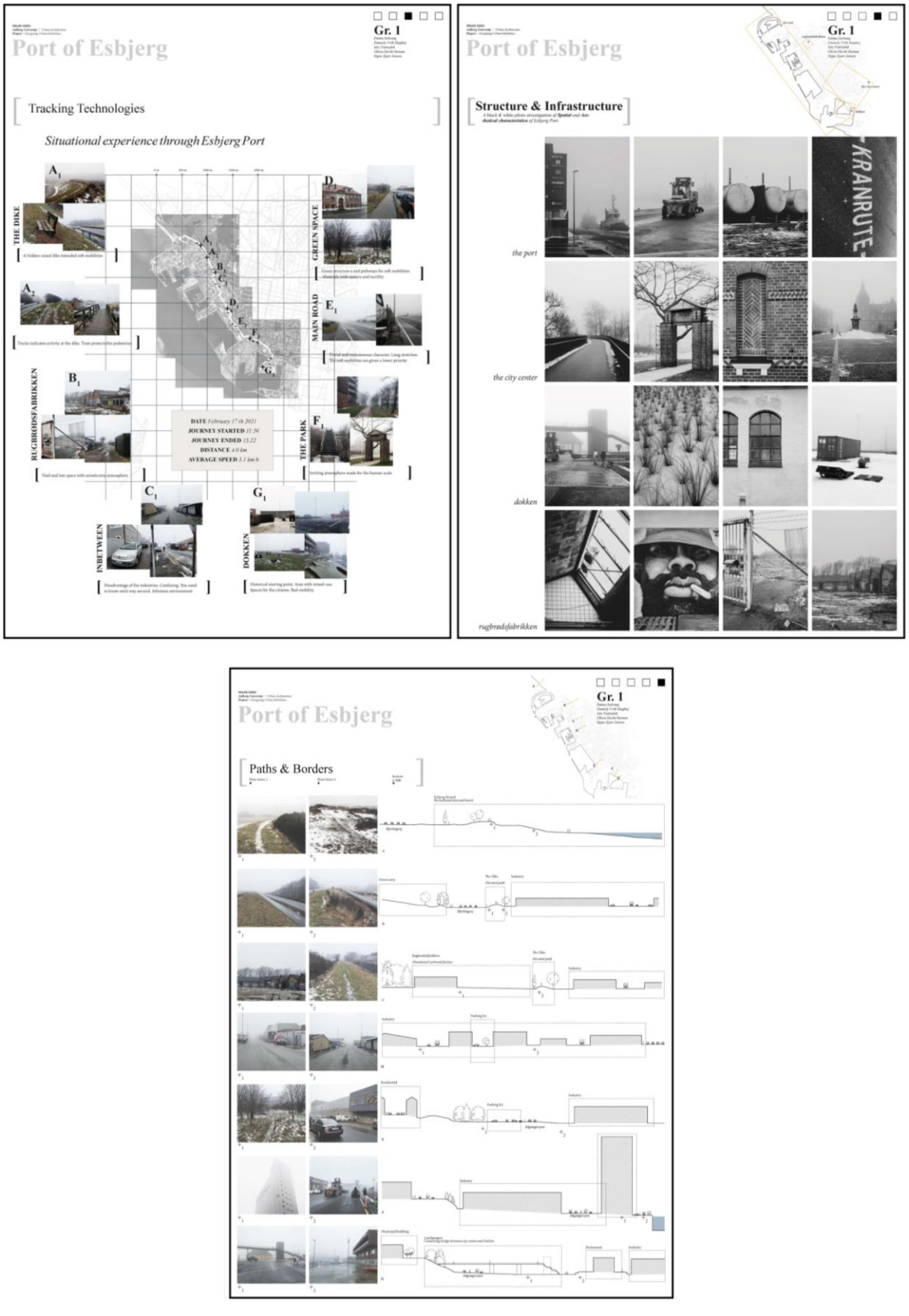


Figure 1. Mapping example C02: Esbjerg
(by Emma Solvang, Emmely Urth Staghøj, Mie Patrzalek, Olivia Hecht Stenum, Signe Kjær Jensen).

Case Introduction

This paper studies four Danish ports. One an inland port by a fiord, the others located on the east and west coasts of the peninsula of Jutland (see Figure 2). The cases have been selected due to their diverse geographical localities of the peninsula of Jutland and their historic and present importance at a regional and national level as sites for national and international trade and transportation of people and goods. Though these ports have developed with fisheries as a main activity, they have diversified and specialized within different fields of operations.

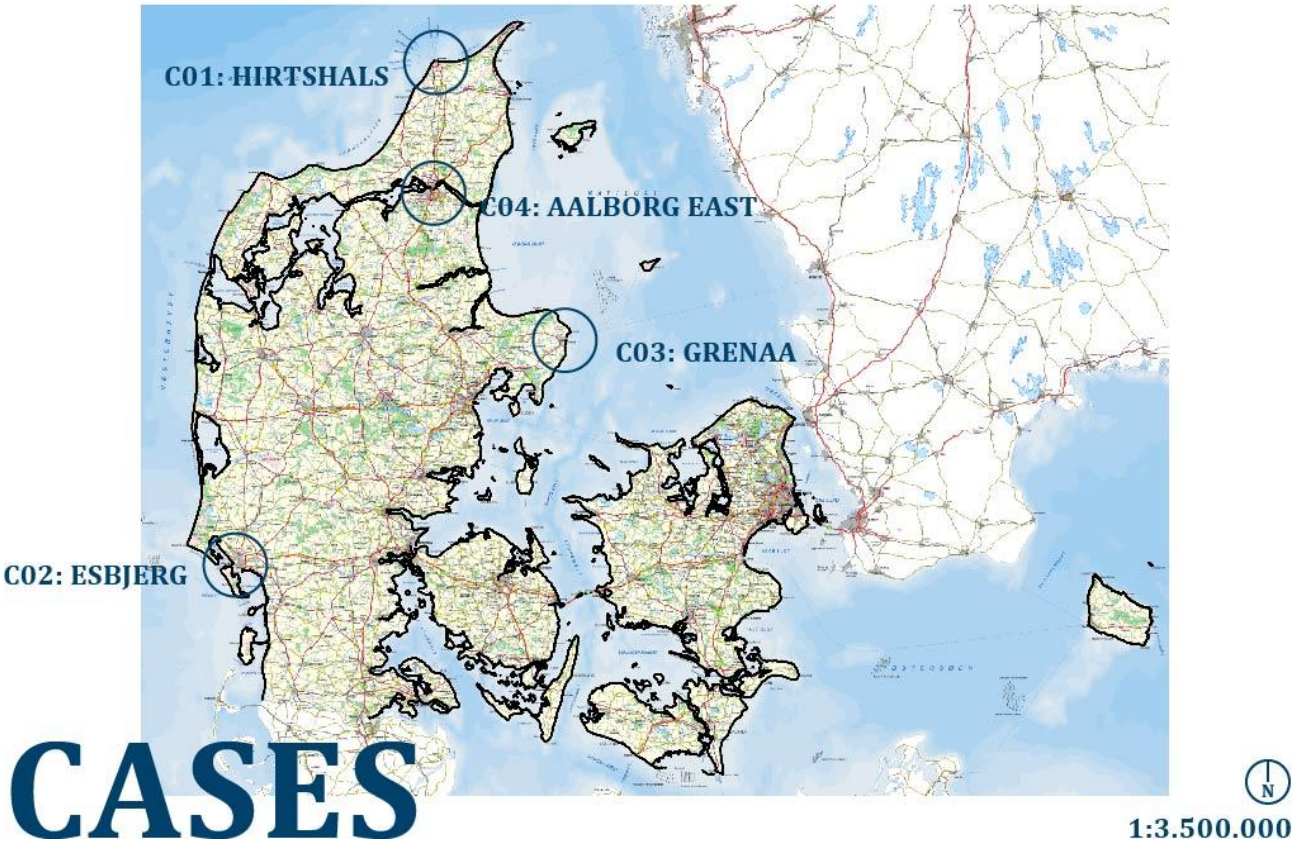


Figure 2. The four cases in a national context (case map by Søren Risdal Borg).

Hirtshals (Case 01) is the youngest port under study: a planned port and town from the early 20th Century. Here, the port and town grew collectively. In the 1970s, it was the largest commercial fishing port in Denmark. Since the 1980s, the industrial focus of the port has changed to transportation. Today, the port is growing in terms of ships, goods and passengers (Lange 2016). In Hirtshals, port and city are divided by the highway, which brings commuters straight to and from the ferry terminal. In addition, the landscape also demarcates the transition between port and town, as the town is located on raised ground, whereas the port is placed at the foot of the mound (see Figure 3).

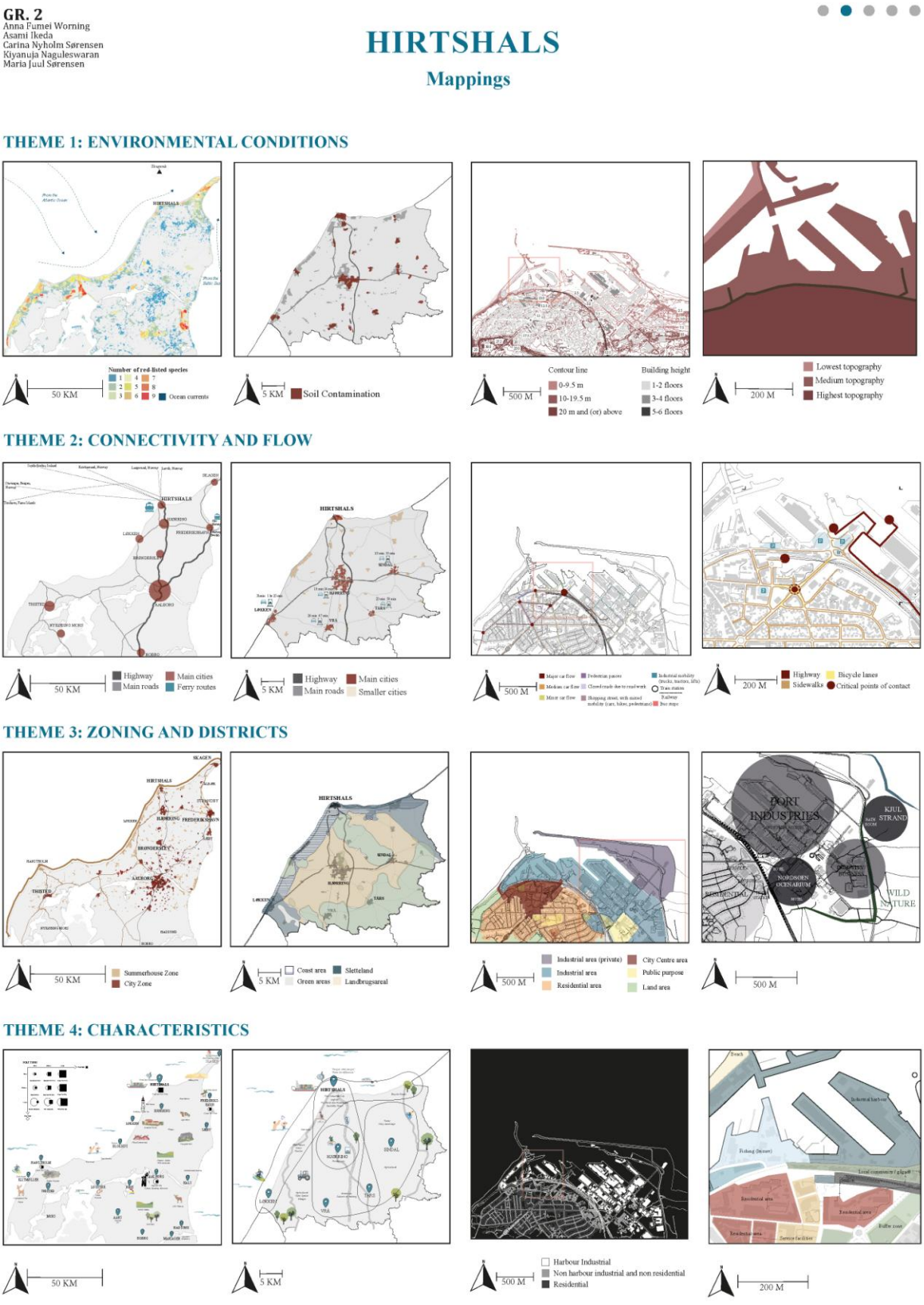


Figure 3. Mappings of Hirtshals C01
(by Anna Fumei Worning, Asami Ikeda, Carina Nyholm Sørensen, Kiyanuja Naguleswaran, Maria Juul Sørensen).

Esbjerg (Case 02) is a planned port and city with a characteristic urban grid structure. After the loss of Southern Jutland in 1864, the need for a contemporary harbor in Western Jutland became vital and in 1868, it was politically decided to construct a port and town. For many years, it was the largest fishing port in Denmark, but during the second half of the 20th Century, the focus of the port changed towards offshore energy (oil, gas and wind). Today it is known as the "Danish Energy Capital" and the largest Danish port in terms of area (Dansk Center for Byhistorie n.a.). Here, the port stretches along the edge between land and sea. Inland, along the port, larger roads demarcate the transition between port and town (see Figure 4).

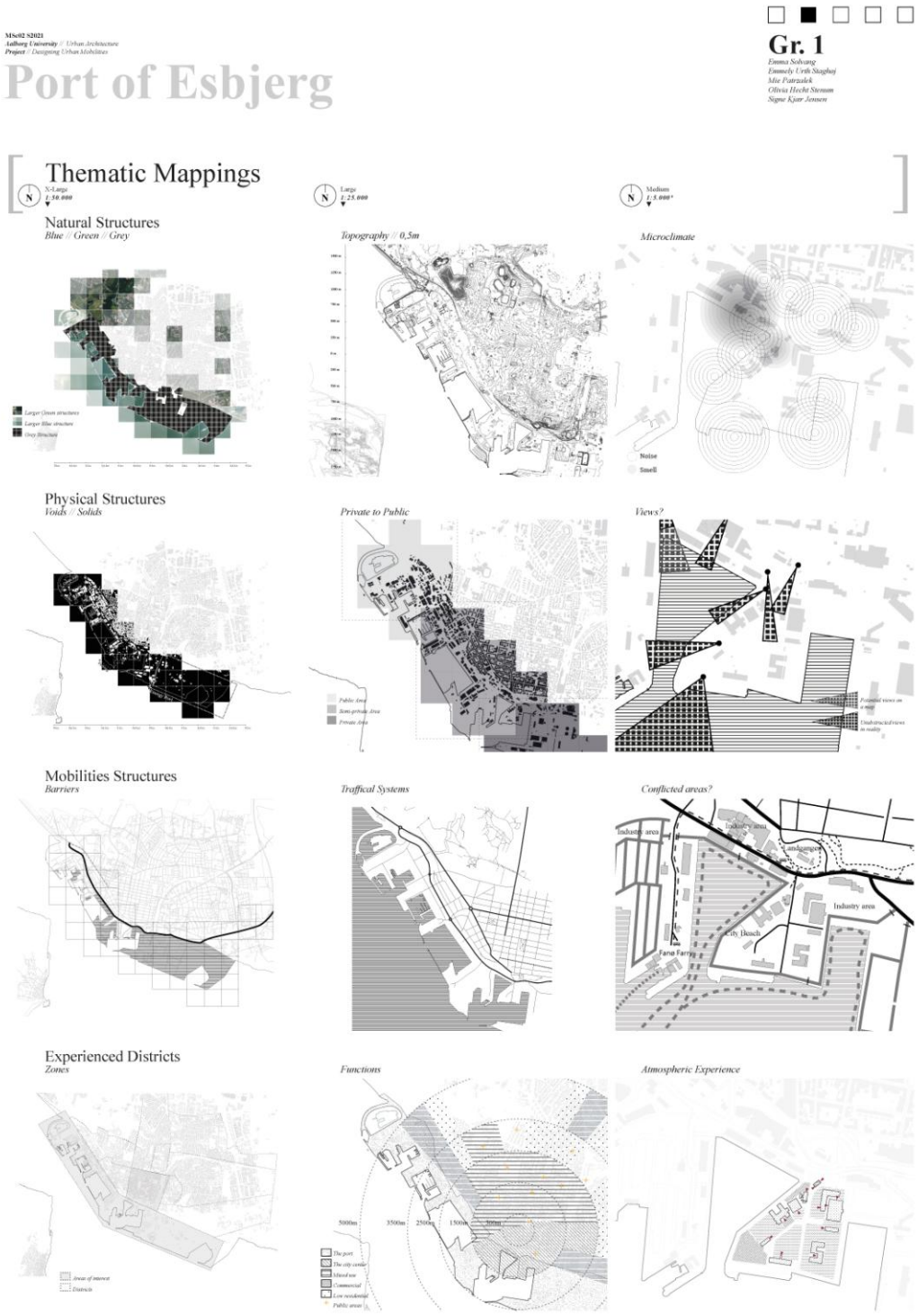


Figure 4. Mappings of Esbjerg C02
(by Emma Solvang, Emmely Urth Staghøj, Mie Patrzalek, Olivia Hecht Stenum, Signe Kjær Jensen).

Grenaa (Case 03) is a smaller historic market town. Both the port and industry have been important assets for the town. In terms of industry, textile were dominant, in terms of the port, the fishery industries were leading. However, it was also an important ferry port with regular national ferries since 1834 and to Sweden since 1960. With the industry in decline in the late 20th century, tourism grew due to the beaches and surrounding landscape, with seaside hotels and summer cottages, marina and aquarium. Today tourism has grown to be an important industry (Den Digitale Byport: Danmarks købstæder 2011). Grenaa is a city with a long history imprinted in its structural composition, with a small historical center placed upstream, surrounded by suburb. Between land and sea, the port is located as well as beaches and larger areas contemplating summer cottages (see Figure 5).

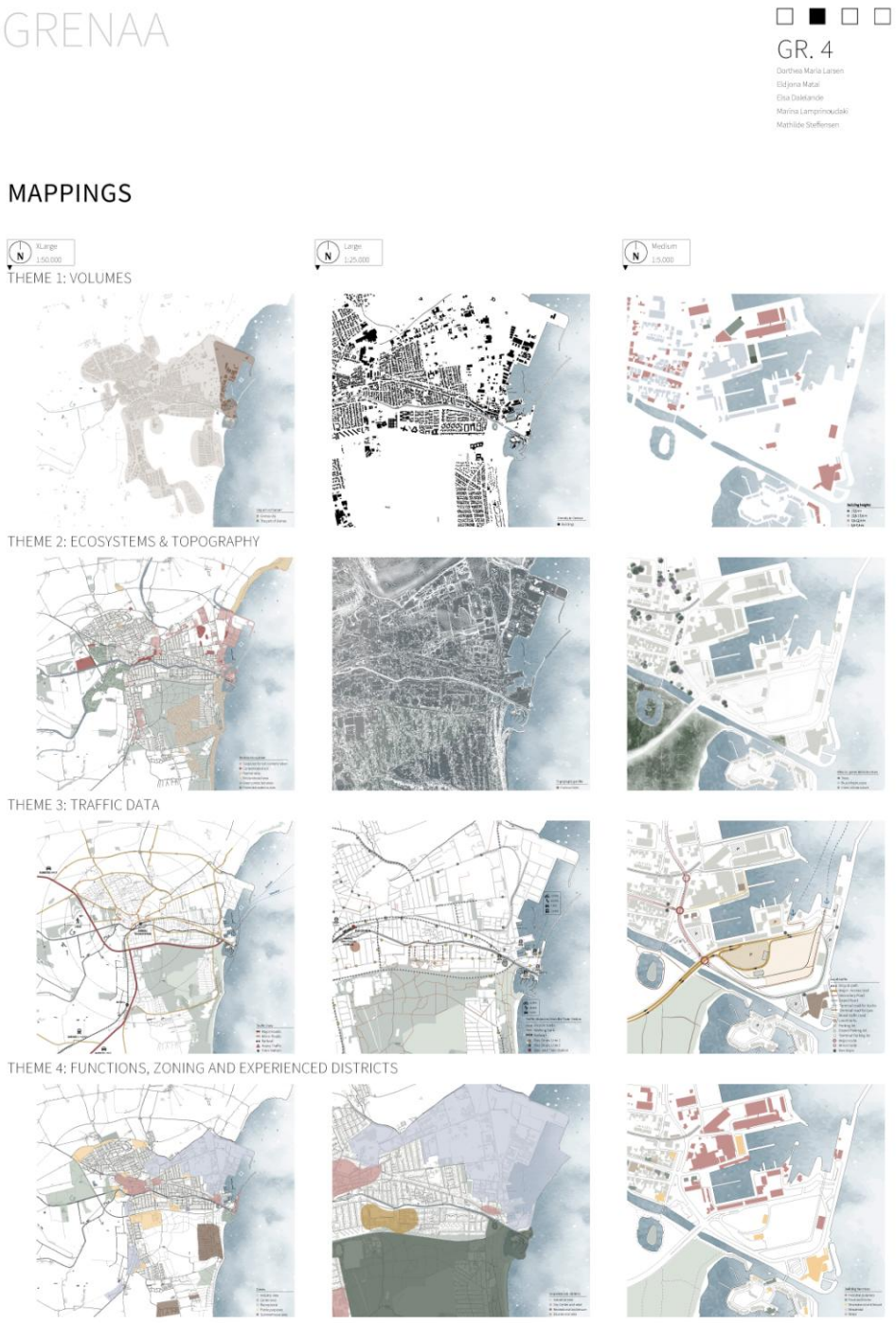


Figure 5. Mappings of Grenaa C03
(by Dorthea Maria Larsen, Eldjona Matai, Elsa Dalelande, Marina Lamprinoudaki, Mathilde Steffensen).

Aalborg (Case 04) grew as a market town, later an industrial city known as 'the city with the smoking chimneys' (Andersen 2013) situated along the fiord. During the 1970s it was developed through a vision of the 'knowledge city' with a new regional university, and in the 1990s the industrial port moved out east from the city centre and is today situated in an industrial and infrastructural hub, a gathering of companies with production of goods from windmills to chocolate (Springeren, Port of Aalborg n.a.).

The port of Aalborg, a medium sized port (Mortensen et al. 2020), is the largest of the four ports. While much of Aalborg is placed on small hills, the port is situated on raised seabed, a horizontal landscape stretching far, also enforced by the long, wide and linear roads. Here, the morphology and the characteristics of the infrastructure distinguish port and city (see Figure 6).

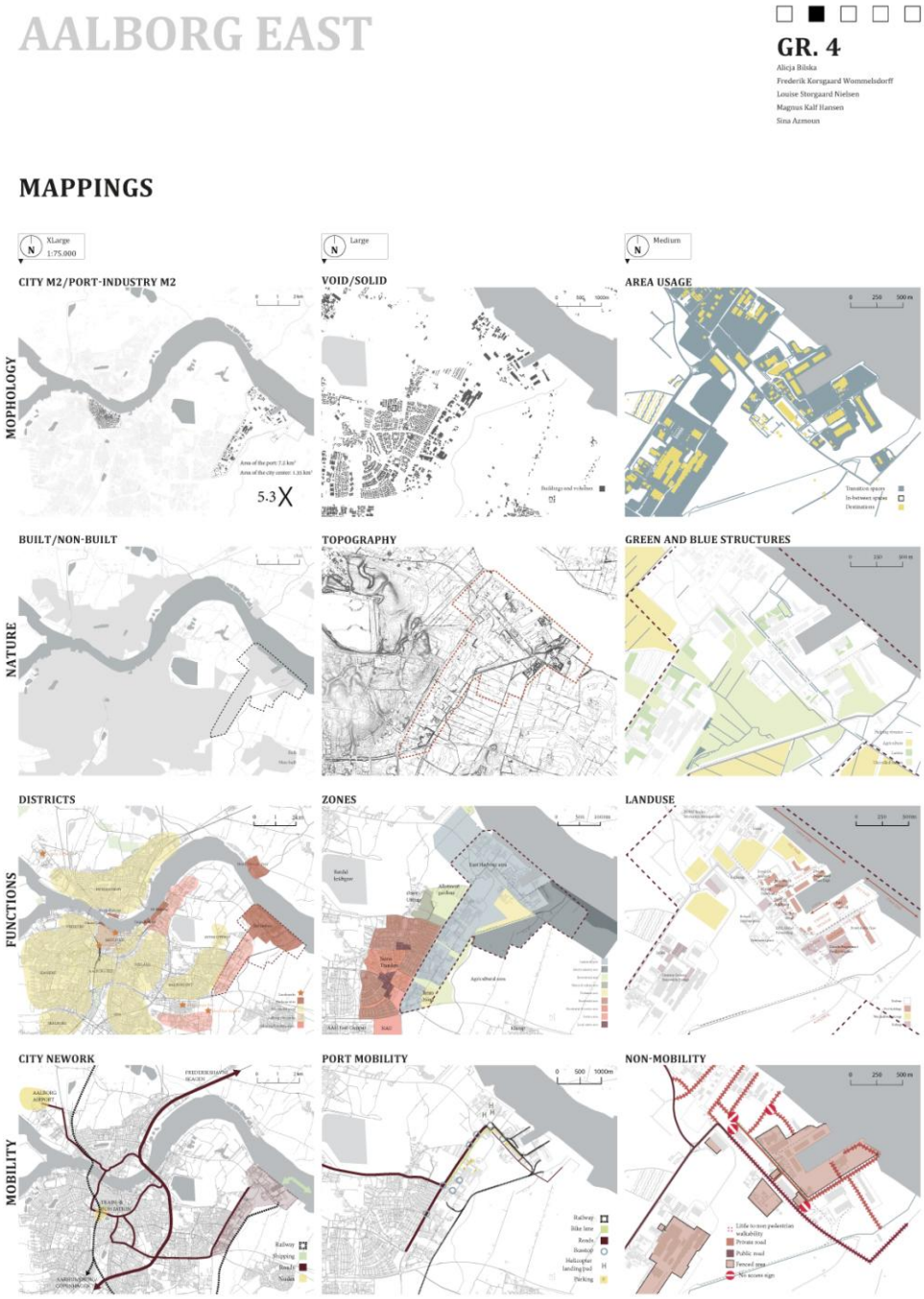


Figure 6. Mappings of Aalborg C04
(by Alicja Bilska, Frederik Korsgaard Wommelsdorff, Louise Storgaard Nielsen, Magnus Kalf Hansen, Sina Azmoun).

All four cases are sites for notable amounts of local and regional jobs, as seen in Table 1.

Table 1: Case facts.

	Hirtshals Case01	**Esbjerg Case02**	**Grenaa Case03**	**Aalborg Case04**
	Key city/town figures			
Founded	Planned town from 1919	Planned town from 1870	Estimated 13th century or older	Estimated late 10th century
Population (January 2020)	5.733	72.037	14.251	140.897 (Aalborg-Nørresundby)
Population peak	(Year 1996): 7.009	(Year 1998): 73.422	(Year 2017): 14.856	(Year 2020): 140.897 (Aalborg-Nørresundby)
Municipal status	2nd biggest town within Hjørring Municipality (independent municipality until municipal merger in 2007)	Administrative centre for the municipality of Esbjerg and even the biggest city of the province of South West Denmark	Administrative centre of Norddjurs Municipality (independent municipality until munici¬pal merger in 2007)	Administrative centre for the municipality of Aalborg and even the biggest city of the province of North Jutland
Administrative city area (urban zone area, incl. port and industry)	7 km2	27 km2 (not incl. urban areas of Dædding, Gjesing, Kjersing, Andrup etc.)	12 km2	Approx. 45 km2
	Key Port-figures			
Inauguration	No official opening. First taxes claimed in 1929	Built according to the Act of 24 April 1868. First opened for sailing in 1874	Unsure. First actual port was built in 1813	Received royal privilege in 1476. Inauguration of eastern harbour (site of case study): 1972
Ships calling at port (annual 2019)	2.361	18.006	(annual 2020): 1.266	(annual 2016): 1.684 Companies such as; Siemens Gamesa, Bladt Industries and more, are not represented in these numbers
Total throughput of goods (annual 2019)	1.946.000 ton	4.313.000 ton	(annual 2020): 1.410.000 ton	(annual 2016): 5.325.555 ton
Number of cars (2019)	760.000	(2020): 46.519	Unknown	Unknown
Passengers (annual 2019)	2.541.000 (international)	1.824.000 (domestic)	(annual 2019): 146.000 international and 31.000 domestic	0

Value of fish unloaded (2019)	479,2m DKK	(2020) 17.730.171 DKK	(2020): 23.650.000 DKK	0
Land area	1.100.000 m2	4.500.000 m2	1.425.000 m2	5.100.000 m2
Quay length	4,7 km	> 14 km	2,5 km	3,7 km

Tracing01. Imprints of Continua (Technological Development)

From their origins, these ports have been subject to circumstantial change through time. The development may be understood as being produced in continuum; as vessels grew in size and e.g. containerization made demands for larger inland areas, the physical layout of the ports had to adapt, and this continuously affected the towns and hinterlands through, e.g., land reclamation, large infrastructures and shifting relations between port and city. This is a development described in the work from 1963 on major seaports of the UK, by James Bird. Bird provided the "Anyport-model", describing the archetypical development of ports through six eras; from the very first primitive port to the newest, modern and specialized port structures of the 1960s. This is a technology driven development of ports; larger vessels calling for longer quayage, larger cargo demands larger fields for storage, etc. James Bird observed in the 1960s, how such development is visibly manifested in material form; "*One of the most fascinating aspects of port study is that the various eras of port development can be seen co-existing in present port lay-outs*" (Bird 1963), p. 34).

For ports situated in rivers, Bird demonstrated the logic of ports growing downstream as larger vessels and port structures requires wider and deeper waters. This is partly recognized in the case of Grenaa (see Figure 5), where the port initially was situated approximately 2 kilometers upstream, in close relation to the town and inland trade route. However, due to sand drift at the estuary, in 1812 a new and modern port was built by the open sea, leaving a gap between the old city Centre by the river and the port activities by the sea. This new location also enabled access of larger vessels, and hence the continued growth and development of the harbor to the extent we see today.

Such imprints of continua can also be seen in Esbjerg, where material manifestations of (energy) transitions are still present in the physical layout of the port. As seen on Figure 7, the port has changed significantly in terms of size, shape, building stock and building typologies, in a continuous movement from north-west to south-east. Rather than transforming existing structures, at the port of Esbjerg, or scrapping them altogether when new port facilities are erected, the 'older' structures are kept and downgraded in importance, with less intensive operations. As Bird (1962, p. 33-34) stresses, "*One era supersedes another, but the installations remain. […] Because of the great capital cost of port installations, it is often cheaper progressively to downgrade a dock or quay in traffic importance rather than scrap it altogether*". Thus, in Esbjerg, while offshore wind energy is dominant in terms of port operations, defining the contemporary physical development of the port facilities, the legacy of the oil and fishing eras are still very present in the physical layout of older port spaces – now downgraded in importance and operation intensity. Similar development is visible in the three other cases. While many port facilities in Aalborg have surpassed to city development, the ports of Grenaa and Hirtshals, share similarities in their current layouts, displaying expansions and geographical growth of the ports through time.

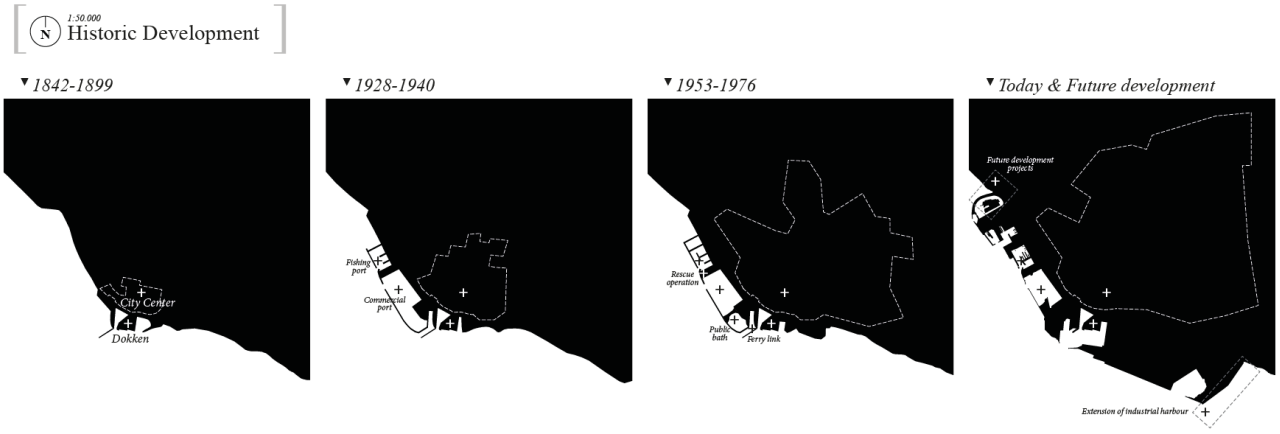


Figure 7. Case 02, Esbjerg historic development
(by Emma Solvang, Emmely Urth Staghøj, Mie Patrzalek, Olivia Hecht Stenum, Signe Kjær Jensen).

Tracing02. Deep Seas and Straight Lines

As illustrated above, these harbours, originally shaped by historical and natural ecological conditions, have evolved from existing conditions as landscapes shaped by practicalities. The morphology is defined by functionalistic principles such as; requirements demarcated by technology, e.g., size of ships, cranes, trucks, gods.

In the development of Hirtshals, the exact site selection, at the west coast of northern Jutland, was chosen because of the natural geological conditions. Here, the engineer argued for placing the port on the tip along the coast as this would be the strongest point against natural landscape changing circumstances such as erosion. As a downside, such a location demands skilled sailors, as sailing in and out of the controlled environment behind the breakwaters of the harbor brings difficulties.

However, the development, which follows these origins, illustrates material responses to circumstantial change such as technological, political and market forces. With the case of Hirtshals, the circumstantial change meant approaching the location, fixed by historical precedence, to match the technological and societal landscape. Sand erosion demands continuous maintenance of the manufactured landscape to sustain port activities. Bigger vessels demanding further dredging, not just in the case of Hirtshals, but in all four cases, a continuous control over water depth is exercised, thus fighting the natural conditions of the landscapes which these port control.

Other examples are the control induced over streams. In the case of Grenaa and Aalborg, the streams have been allocated from their naturally meandering course, to a controlled straight line (see Figure 8). Such action alters the natural ecosystem, and bring consequences for the habitation (Storstrøms Amt 2006) which these stream originally sustained and also necessitates maintenance in order to keep these streams 'in place', working against the forces of water.

This time dependent control and the protocols enforced over territories, in some cases, means transformation of both port, city and landscape (Schubert 2011). In the case of Aalborg, port activities expanded through time, extending the quay to suit increased industrial production and larger vessels. In more recent history port functions has allocated up the fiord, abandoning the altered waterfront, later to be transformed into other urban functions. Thus, the port has been defining the landscape and the city through its operations and material configurations.

Figure 8. Case 04, Aalborg, stream in controlled straight line (picture by Søren Risdal Borg).

Tracing03. (Im)permeable Barriers

As already touched upon in the introduction and tracing02, port cities have historically changed from what could be called a symbiotic relationship between port and town towards more separate and independent entities. It has been identified how there has been "an increased spatial and functional segregation between port, urban and regional activities" (Ng & Ducruet 2014, p. 785).

With his port-city interface-model, Hoyle (1988) describes the evolution of the port-city interface through five stages. He shows diagrammatically how the initial close spatial and functional association between city and port has become more and more separated. However, he also points to a later tendency of waterfront redevelopment – where in some cases, city-functions are claiming back waterfront areas.

One recurring motif of all four Danish cases is the spatial developments/growth and expansions of the ports from smaller local sites in close relation to the city core, to the absorption of further peripheral areas (see Figure 7 for the example of Esbjerg). Further, in terms of use, they have all developed from somewhat locally rooted functions/production of, e.g., fisheries towards more specialized and heavy industrial purposes with a much more global orientation. This has materialized in large restricted areas with no or little access for the public. Together, the material manifestation of this development is seen as the ports, historically and in the planning documents for the future, are spreading along the waterfronts, acting as increasingly impermeable barriers between city and sea. Along with this spatial development, the socio-spatial dimensions of the port-city relationships have been further detached, as relatively less local residents work at the ports and more employees commute from the hinterlands.

Figure 9. Case 04, Aalborg, restricted access (picture by Søren Risdal Borg).

Tracing04. (Dis-)connection

The port authorities are also being increasingly aware of the cities' roles as well as other external conditions for attracting qualified workforces. Representatives of the ports articulate this. Especially for the smaller cities, and for those situated in peripheral national contexts, the jobs of the ports in isolation are not enough. An attractive environment for living and leisure, comprising access to water and other recreational landscapes; quality dwellings near the sea; cultural facilities; shops and restaurants are among such values for new local workers, which the port authorities are recognizing. This is, e.g., seen in plans for a new urban district called Esbjerg Strand in the southern part of the port of Esbjerg and in development plans for the old port of Hirtshals. In Grenaa, plans are made for a redevelopment of the southern part of the port for more tourist friendly purposes. In Aalborg, where the port for decades has been isolated from the city, an increased focus by the port authority has been on surroundings that are more attractive for the employees within the industrial landscape; thus we can observe steps towards attempting to form a more inviting port city-scape, steps that may lead to more attention towards integrating the natural landscape.

Further, tensions exist between the port city-scapes and the landscapes they edge and participate in. The material manifestations of these port city-scapes artificially draw clear and concise borders between the landscape functions. In the case of Grenaa, the port, the city, and the landscape of beaches and ocean are clearly demarcated by shifts in material configuration (see Figure 10). To the east, concrete and boulders border the line between port and ocean, to the north an asphalt road separate the coastal beach and the industrial landscape, west of the port roads and trees borders the city, lastly, to the south, the artificial straightened stream of Grenaa separate port and the coastal landscape. These "zones" of different landscapes are perceived as conflicting. The port of Grenaa cuts through the coastal landscape, separating it in two detached habitats. The coastal habitats along with the city encircle the port, preventing further expansion in those directions,

forcing the port to expand towards the ocean, in order to adjust to changing conditions for port operations. Thus, a tension can be identified between cities, ports and landscapes. Pushing borders and combating over the square meters.

Figure 10. Case 03, Port of Grenaa engulfed by town and landscape (map by Søren Risdal Borg).

Discussion

The empirical tracings above illustrate instances of site-specific interrelationships of these port city-scapes, between port, town, and landscape. While these port city-scapes differ in their geography, history and context, they share commonalities in their material manifestations as well as the mutual on-goings of these contemporary port city-scapes. On this basis, the paper develops thematic deliberations in two interlinked trajectories. First, in acknowledging and seeking to unfold the character of these harbours as anthropogenic terrains, in the light of recent configurations to the material layouts. Second, in reflecting the analysed port city-scapes with theories on 'port-city relationships', discussing controversies and mutualities between ports and towns, to unfold indications for future trajectories of the material agency of these layouts, spaces and forms.

With the concept of 'Anthropogenic terrains' we seek to address these landscapes as constructed environments. In acknowledging and seeking to unfold the character of these harbours as anthropogenic terrains, we draw on related theories (see e.g. Derickson 2018, Hodson, Marvin 2010, Jon 2020, Swyngedouw 2010) within urban and architectural studies to deliberate how the material manifestations of the Danish port city-scapes under study, are significant as 'organization spaces' and what that organization is doing (Easterling 1999). These spaces of organization implicate tensions between humans and nature, in ways that contrast with contemporary ecological thinking (Lister 2016, Spirn 2012). These concepts aid in foregrounding attention to material agency of these port city-scapes: how they enact control and perceived stability.

To further understand these complications, we include theories on 'port-city relationships' (see e.g. Bird 1963, Hoyle 1988, Hein, Carola 2011, Ng, Ducruet 2014) to discuss the controversial conditions of the material agency of these layouts, spaces and forms and the connectivity and disconnectivity between ports and towns. Next, these contemporary conditions are under scrutiny in their future trajectories, as we find perspectives for softening certain borders to be present and a recognition for enforcing potential reciprocities between the port, the town and the landscape.

Anthropogenic Terrains

Far from the material layout we see today, these settlements, in their genesis, were a result of human needs for movement and food. In relation hereto, the sites for harbour settlements are, in the four cases – despite having different time-dependent societal and technological conditions – determined by natural conditions. Here, geology and nature provided access to fish and to corridors and waterways through sites of safe transition from land to sea.

Today, what is common to all four cases is the anthropogenic terrain; the human-made material layout using concrete, steel and asphalt. While local conditions of environment, history and society vary, all four harbour landscapes are inherently constructed environments, reconfigured to fit the land-use practices of port facilities, complexes of business and industry, structures for production, goods and raw materials. Land reclamation extends the harbour out to sea and docks excavates inland to shelter ships, ultimately manifesting the anthropogenic shorelines at the crossing of land and sea.

As such, the anthropogenic terrain of these port city-scapes, are spaces of organization (Easterling 1999). The organization of their material layout pursue stability and control for the flourishing of industrial – and port operations. Administration, government and companies nourish the reconfiguration of the surface with intensive land-use practices. Enterprises, manifested in the physical environment, dictate the layout of infrastructure, composition and distribution of sites. Such curated landscapes – defining where to place this and that, where to store goods etc. – in their arrangement of objects and volumes, is *doing something* (Easterling 2014). The organization of concrete, steel and asphalt makes certain things possible and other things impossible, as shown above; it enforces straight lines and impermeable barriers. It is acting in its organization, as it – in the analyzed cases – enables separation between landscape, port and town, constructing distinct territorial confinements suitable for certain activities, curating a separation of human and nature. As such, the material manifestations of components and their composition relations between components, is doing something, simply by occupying space.

Such a separation into distinct territorial confinements is evident in the case of Grenaa, as illustrated in tracing04. While bigger vessels demand more dredging within the confinements of the port, the analysis also reveal an alertness, induced by political regulations, to natural conditions and protection of natural habitats. This is evident as expansions of port operations are directed away from landscapes of perceived higher worth. As such, in different ways, both the sites for port operations and the adjacent sites are subject for control and regulation, yet, as distinct landscapes entities.

This trajectory of territorial and functional organization and control stands as opposite to the (to some extent) unpredictable ecosystems behaving in a self-organizing manner (Lister 2016, Spirn 2012). Contesting actions between nature and human are increasingly evident with technological advancement and the ability to construct habitable environments for human activities, as it seems less a question of whether actions are agreeable with geology and nature, rather how to overcome obstacles (geology and nature) with technology.

Anne Whinston Spirn (Spirn 2012) argues for shaping environments that acknowledge the connections to air, water, earth, not for the sake of other species, but for human survival. Thus, seeking a more integrative approach to cities and their regions, accounting for the ecological concerns – the relationships between living organisms and their environment. As Lister argues; "...humans are not outsiders to any ecosystem – rather, we are participants in its unfolding, and agents of its design" (Lister 2016;126), meaning, that such spaces cannot be treated as isolated islands, as it seems to be inherently suggested by the material manifestations of the port city-scapes. Rather, they are intertwined with the landscapes they inhabit.

Yet, the material manifestations indicate a deterministic model that seeks predictability, stability and control. Considerable effort has gone, and continuous to go, into "pushing back" at landscapes – as illustrated in tracing02 – that tend to resist the control and stabilization introduced to support port activities. Such models of efficiency is materialized in these port city-scapes, e.g. in the erection of concrete borders between land and sea cementing the environment habitable only for port activities (dominant in all four cases). To this, contemporary ecological thinking suggests perceiving the environment, not as an 'inanimate background', rather as an active agent, influencing the design of cities (Jon 2020), seeking coexistence, rather than separation.

Future Trajectories, Controversies and Mutualities

With globalization bringing technological advancement in shipping and increase in international trade, the nature of ports has dramatically changed (Ng, Ducruet 2014), as evident in the four cases. In terms of use, all four cases have developed from somewhat locally rooted functions/production of e.g. fisheries towards more specialized and heavy industrial purposes with a much more global orientation. Also here, moving from locally dependent cultural identities, towards adopting globalized standards. They have become modern seaports which, as Hoyle (1988, p.3) argues: "...acts as a gateway rather than as a central place [...] weakening the traditionally strong functional ties between ports and cities". This 'terminalization' of port operations, as Ng & Ducruet (2014) argue, reshaped the roles of ports in "...transport networks and global supply chains, which implied an increased spatial and functional segregation between port, urban and regional activities" (Ng & Ducruet 2014, p. 785). Despite the increased separation of ports and towns, the tensions over territory recognized in the four cases and conflicting goals such as environmental issues, ports and towns still share mutual interests such as economic development (Hein, 2019).

Adding to this, an increased separation of industrial activities from other urban uses, has, through the 20th century, been considered desirable and economically advantageous by prevailing planning ideologies (Grant 2005). Thus, an organizational separation, similar to the separation of the human and natural landscapes. This has materialized in large restricted areas with no or little access for the public. This development of the ports is present both historically and in their current planning, as they are spreading along the shoreline, acting as increasingly impermeable barriers between city and sea. Along with this spatial development, the socio-spatial dimensions of the port-city relationships have been further detached, as claimed by port representatives in the interviews, relatively less local residents work at the ports and more employees commute from the hinterlands. Therefore, while we identify this disconnectivity between port and local society, we also recognize, in some aspects, a stronger connectivity with the global flows of goods and people.

In these port city-scapes, constructed material form produce clear segregation, enforcing security, stability and sheltered conditions for industrial activities. Yet, we see indications in these four cases, of an increased awareness of the ports 'license to operate' (as one port CEO termed it at an

interview), adding to the controversies between free operations determined by economy and business and the potential advantages of softening the mental borders and participating in local society. Thus, while design of these port city-scapes has been driven by practicalities and global standards, ideas for supplementary design strategies are saluted for connecting to other urban activities, seeking greater integration to diminish controversies and highlight mutualities at selected sites. For the ports, this helps to create attractive working spaces for companies and employees, as previously mentioned (especially evident in the case of Aalborg). As illustrated above, some of these ports identify differential port sites, loosening the control induced over selective sites while maintaining the majority of spaces as highly restricted.

From the pursuit of separation, the port stakeholders show recognition of the interrelationship with towns and landscapes; these port city-scapes and the activities that shape and sustain them are indeed embedded in their localities. They operate with the awareness that, while they are material manifestations of links to elsewhere, participating in global production and consumption flows, sustaining urban life in a globalized world, these ports also participate in forming and sustaining life locally. Thus, what seems evident is a trajectory for these ports to operate differentially with subdivided sites in terms of their connectivity and disconnectivity.

Conclusion

In this paper, we traced instances of site-specific interrelationships, at four contemporary port city-scapes in Denmark, between harbours, towns, and landscapes. Here, we use the notion of 'port city-scape' in order to address, how the port, the town, and the landscape of each of the four cases share location, co-exist in close proximity, even sometimes in overlay. These implications may be understood as being produced in continuum; an example being that when ships grow in size, the physical layout of the port must adapt, and this also affects the town and landscape, another example being the shift in commercial enterprises, such as with the case of Esbjerg, from fishing to oil ventures, to offshore wind turbines. Responding to such circumstantial change, the organization of the material manifestations has brought changes to the permeability and connectivity between port, town and landscape. Evident is that the organizational character of these port city-scapes, their material layout, space and form, actively partake in the formation of controversies and mutualities between ports, towns and landscapes.

In the cases, this continuum is not a simple one-directional cause-and-effect chain, but rather a complex set of mutual on-going implications; port activities affect towns and hinterlands, landscape conditions affect ports and vice versa, in a continuum of negotiations, push backs and controversies.

While, recent configurations to the material manifestation enforce segregation and barriers, these port city-scapes are shaped with reciprocity between the port, the town and the landscape. It is exactly the potential reciprocity in their interrelationships: how they mutually affect each other in sustaining and developing activity, and the implications of this, which appear to be central in the future trajectories of sustaining these port city-scapes – an increased awareness of existing and potential reciprocities between port, town and landscape, strengthening and putting forth their mutual on-goings.

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