

Renewed Urban Waterfront: Spatial Conditions of a Contemporary Urban Space Typology

Beate Niemann, Fabian Pramel

Abstract—The formerly industrially or militarily used Urban Waterfront is a potential area for urban development. Extensive interventions in the urban space come along with the development of these previously inaccessible areas in the city. The development of the Urban Waterfront in the European City is not subject to any recognizable urban paradigm. In this study, the development of the Urban Waterfront as a new urban space typology is analyzed by case studies of Urban Waterfront developments in European Cities. For humans, perceptible spatial conditions are categorized and it is identified whether the themed Urban Waterfront Developments are congruent or incongruent urban design interventions and which deviations the Urban Waterfront itself induce. As congruent urban design, a design is understood, which fits in the urban fabric regarding its similar spatial conditions to the surrounding. Incongruent urban design, however, shows significantly different conditions in its shape. Finally, the spatial relationship of the themed Urban Waterfront developments and their associated environment are compared in order to identify contrasts between new and old urban space. In this way, conclusions about urban design paradigms of the new urban space typology are tried to be drawn.

Keywords—Composition, congruence, identity, paradigm, spatial condition, urban design, urban development, urban waterfront.

I. PARADIGMS OF URBAN DEVELOPMENT

THE Development of urban Waterfront is one of the central contemporary tasks. As a legacy of industrialization or a former military use, inner-city port facilities fall broke nowadays [1]. In particular, reasons for this are new models of urban development policy and the orientation of cities towards the next higher economic sectors. Therefore, these areas have a great potential for development. The development of the waterfront can be used to expand the existing range of services and in order to compensate deficits. Externally, the development of the waterfront acts like a structural marketing campaign in the international competition of the cities.

In the past, major urban design challenges were always based on planning-theoretical paradigms. The post-war urban design of modernity, for example, propagated the use separation, the plot reorganization and the city for cars. These paradigms have resulted in urban transformations and are still visible today, although contemporary urban development follows contradictory paradigms. The walkable city and overcoming the hierarchized street through the shared space and the mixed used city are just some of them. Therefore, the question of the paradigms of the waterfront development had

to be asked necessarily. In order to get an idea of possible urban design paradigms of the waterfront development, urban waterfront projects, which have already been developed or been implemented in the planning, will be analyzed by their spatial conditions. The planning areas are examined and described in terms of their spatial conditions as well as their congruence with the adjoining, already existing and accessible urban areas. Within this paper, factors of sustainability are not considered in favor of a precise view of the urban space and its spatial conditions. Mixed utilization, ecological aspects or flood protection are examined exclusively in terms of their spatial characteristics.

II. EUROPEAN URBAN WATERFRONT

The subjects of the investigation are waterfront developments in the European city. This type of city typology was selected for the study, because comparable urban structures are described in the experts discourse. Because of similar developments, European cities have analogous spatial characteristics. Spatial differences are not disadvantageous for the investigation, as the concrete urban development interventions are not compared and evaluated under all aspects, but their spatial attributes and the surrounding urban spaces are identified and their relationship is described among themselves. Therefore, general paradigms can be identified on the basis of the diversity of the case studies much more. In addition, only the waterfront developments that are located in the inner city are eligible for the case studies. In favor of a consistent result, non-urban waterfront developments are not defined as Urban Waterfront in the context of this investigation, but rather as a city-peripheral waterfront, which may have to be developed on the basis of divergent planning paradigms. They may have comparable spatial characteristics in the planned area but are not subject to an urban context in a comparable way.

In order to be able to examine corresponding spatial attributes in addition to a comparable geographic location in the urban fabric, waterfront developments, which exclusively provide the development of public spaces, are excluded from the outset.

The basis for the selection of the case studies is the distinction of the waterfront typologies into the categories "Coastline", "Vis-à-vis", "Peninsula", and "Island". The order is chosen with regard to the increasing extent of the spatial relationship between the development site and water. While the coast is bordered one-sided, the island is surrounded by water on all sides. All four categories are examined by case studying. In favor of the consistency of the investigation

Prof. Dr. Beate Niemann holds a professorship for urban design and regional planning at Wismar University of Applied Sciences Technology, Business and Design, 23966 Germany (e-mail: niemann@niemann-steege.de).

result, the urban waterfront is understood as an urban space continuum. The relevance and the planning context as well as the scope of urban development interventions were fundamental for the selection of case studies. Based on the described determinants, the waterfront developments in Fredericia (Denmark), Basel (Switzerland), Copenhagen (Denmark), and Hamburg (Germany) were selected. In various ways, the case studies are located in the urban fabric and in the geographical context of the waterfront.

A. Coastline

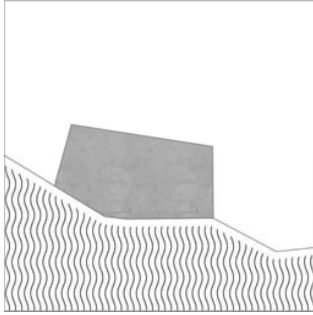


Fig. 1 Abstract of the Waterfront typology "Coastline"

First, the investigation of a Coastline development is given by the example of the planning in Fredericia. The new urban space bridges the previously existing distance between the city and the coastline. For this purpose, the area up to the coastal line is occupied. The new city limits one-sided to the water.

B. Vis-à-Vis

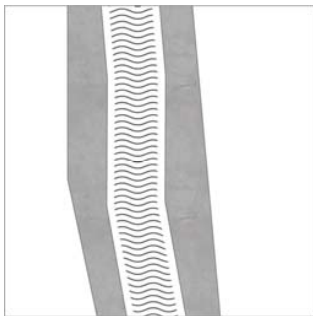


Fig. 2 Abstract of the Waterfront typology "Vis-à-Vis"

The following is a discussion of a planning that occupy two coastlines vis-à-vis and is separated by the water. The waterfront development "3Land" in Basel serves as an example.

C. Peninsula

The planning on a Peninsula is analyzed by dealing with the planned development for Nordhavnen in Copenhagen. The plan area is limited on three sides by the water.



Fig. 3 Abstract of the Waterfront typology "Peninsula"

D. Island

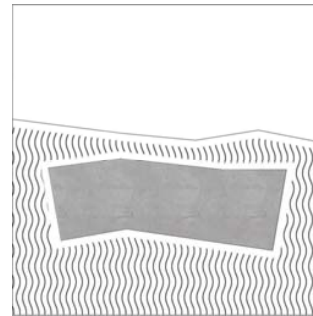


Fig. 4 Abstract of the Waterfront typologies "Island"

Finally, an island location of an area, which is limited on all sides by water, is considered at the example HafenCity in Hamburg.

III. SPATIAL CONDITIONS

In order to classify the spatial attributes, that is, the physical structure [2] of the case studies, a classification with regard to their composition and, finally, a description of their identity takes place. The composition includes the geographic framework and the location in the urban fabric as well as the history of the place, the general intention of the planning and the intended use. It expands the natural structure of the city [2] by a temporal component and the associated influencing factors of a planning process. The identity describes the spatial expression with regard to the location-specific character and is understood as part of the social structure of the city [2]. For this purpose, the urban association of the existing buildings of the former harbor use and the history of the cities' urban design are considered. The architectural and historical value of the architectural heritage is not discussed, but the spatial consequences for the planned area and its surroundings are selected by the chosen treatment of the architectural heritage.

The spatial conditions of the planned area are analyzed for their congruence in a comparative manner with the surrounding urban space in the categories of "Paths", "Dimensions" and "Spaces". In the category "Paths", the relations of the old and new routes as well as influences of exposed places of destination and other special features in the plan site and the surrounding urban fabric are described. In addition to the heights and volumes of the architectures, the

“Dimensions” are also used to elaborate the spatial correlations of the buildings, as well as their link to public spaces and the spatial street configuration. The spatial configurations and typologies of the public space are described in the category “Spaces”. For this purpose, the plan site internal, spatial conditions of these categories are described and compared with those of the environment. Through the identification of recurring patterns and anomalies, special spatial conditions of the waterfront development are explored. City extensions, which are made by adaptations of existing patterns of the urban environment in the surrounding area, are defined as congruent developments in this investigation. Spatial incongruent plans negate existing urban design patterns. A thesis that a high congruence with existing patterns of the urban fabric, means a good city extension is, is not set up. The comparative analysis identifies similarities and differences between new and old. These individual observations of the waterfront developments and their surroundings are finally compared as a whole in order to draw conclusions about the convergent or divergent urban paradigms.

IV. THE COASTLINE: FREDERICIA, FREDERICIA C

A. Composition

Fredericia is located in a bay of the sea and has coastlines in the east and south of the city. The plan site of the waterfront development is located on the southern, previously industrially used coast and separates the historical urban area from the water. This adjoining historical city area is located within the former fortifications of the city in the north-west, to which only the moat and the accompanying green space recall nowadays. In the south east, an unqualified public space borders the urban area on the site of the former citadel from the coast. The coast in the east is a living shoreline and at the southern, former industrial used coast, seawalls [4] are located. Because of the one-sided limitation by the water, the case study represents the waterfront category of the coastline.

The master planning for the site has been continuously evolved since 2011. In addition to the spatial connection between the city and the coastline, the focus of the planning is on a visual connection between the urban backspace with the new district and the water. The deconstruction of interfering existing buildings is now nearly completed [3]. For a clear urban planning, the area is divided into five urban areas. The street, which runs between new and old, is the first focus area and limits the plan area to the north. The largest area in the east of the planned area and located southerly of the first zone, runs along the existing urban development grid towards the coastline. However, it is bordered by a further zone, which itself occupies the coastline in the south. All three zones will be separated by artificial harbor bays and realized in the first development phase [3]. Through canals, the two harbors are fed with water. Plans for canals exist since 1677 [3]. Together with their structural limits, these canals form the western end of the two southern zones, which will be adjoined by the new center of the district. This is also located southerly of the plan

site defining street and will be realized in the second development phase [3]. The most western area is the residential area in the already existing harbor bay, which is located opposite the center. The existing port bay will also be connected to the canals and implemented in the third development phase [3].

B. Congruence

1. Paths

Orthogonal streets follow the already existing urban grid southerly the plan site-limiting street. Due to the harbor bays and the connection of the old harbor bay with the canals, however, the connectivity of the grid is consciously narrowed and the dramaturgy of entering the site is specifically sharpened with bridges. The inclusion of the urban grid is a highly congruent planning that is able to tolerate the scarcity of accessibility as an anomaly in the pattern. In addition, the intended green axis from the existing port bay, to the former citadel does not diminish the dominance of the urban grid. By thus, the grid-based eastern zones are given their own characteristics. The two western zones also base on the urban grid, but deform its geometrical regularity in favor of their visual relationship with each other and the port bay. While the new center only negates the orthogonal orientation, the grid in the most western zone nearly dissolves in the southerly direction in favor of solitary architectures. At this point and in the eastern area, the plan site ends with a promenade at the coastline.

2. Dimensions

The surrounding urban area is dominated by blocks, which are slot together by small parcels. Individual block structures show anomalous gaps. However, the pattern is based on the polarization of block interior and exterior space. The waterfront development provides similar patterns. Despite some exceptions, the parcels are generally larger than in the existing grid. While inner courtyards can be walked around in the surrounding urban fabric, this configuration is raised to an urban design principle in the interest of varied visual connections. The border between public and private sectors is shaped more vaguely than in the existing urban fabric. The sides of the architectures are not categorized in interior or exterior space, but are assigned to different types of use with comparable public. The crystallization point of this depolarization of interior and exterior are the solitary architectures, which are planned in the already existing harbor bay. An iconic high point should be located at the harbor tip of the new district center. For the architectures on the harbor bays and canals, cantilevers of the upper storeys are foremost planned.

3. Spaces

In the concise diametrical relation of streets and architecture, urban spaces replace partial or even complete block structures in the adjoining urban fabric. While the already existing harbor bay is being extended by a city square based on this principle, this pattern is not adapted by the two

new harbor bays. They are planned without an urban space and are given a subordinate role in the new district. At the same time, the relevance of the routes along the canal is strengthened. Urban spaces are not caused in the new district by deliberate reduction of the building structure in the grid, but on blanks, which occur due to the geographical conditions, the deformed geometric order of the grid, and in particular the dissolving of the grid in favor of the solitary architectures.

C. Identity

The new urban district continues the urban history without denying an own identity. Traces of the fortifications of the city, the harbor bay and the urban grid are harmonized with each other and the urban design history of Frederica is updated in a congruent way. However, the partial deforming of the grid's geometry provides an alternating rhythm in the plan site, so that the new quarter can form an own identity at an exposed location, although if the traces of industrial use are disappeared.

V. THE VIS-À-VIS: BASEL, 3LAND

A. Composition

Because of Basel's geopolitical meaning as a bordering city, the waterfront development planning is much more complex than developments in other cities with comparable spatial relations to the water. The quarters of the project are located opposite each other on both coastlines of the river. With their bilateral delimitation by the water, the planning is placed in the category "Vis-à-vis". The Quarters are nominally located in three different cities and even different countries: Weil am Rhein (Germany), Huningue (France), and Basel (Switzerland). Despite their proximity, divergative planning cultures created clearly visible city boundaries between the urban fabrics.

The simultaneous industrial past of the three cities and their port facilities provided the opportunity to identify similarities and to think the waterfront development as the integrated urban development project "3Land". A real connection of the urban areas by bridges did not take place before the planning. Correspondingly, the linking of urban areas was a major focus of the planning; this also includes the visual relationship of the coastlines.

The master plan has been translated into a spatial concept within the IBA Basel 2020, but has not yet been implemented. The plan area occupies gaps in the porous urban fabric at the western and eastern coastline of the Rhein. The plan site is divided into three focus areas [5]. In the middle of the water there is also a quarter between the harbor bays of the east coastline. While on the west side of the river constructed Wetlands border the coastline, bulkheads [4] are located on the eastern side.

B. Congruence

1. Paths

Due to the shared planning responsibility, the quarters are linked to different urban areas in Basel, Huningue and Weil

am Rhein and their path network. Striking is that the majority of new streets in proximity to the water are orthogonal to it. Due to the high density of these orthogonal streets, a high degree of accessibility to the waterfront is provided. The connection to the existing path networks is extensive so that the focus areas can be entered at many points. Compared to the surrounding urban areas and due to the stringency in the orientation towards the water and the granularity, this is an incongruent planning, which visually connects the sides of the river. In addition, several bridges connect the coastlines. Of particular importance is the new bridge, which connects the east coast along the harbor bays with the western coastline. In this area, the planning offers a variety of smaller bridges in a north-south direction to overcome geographical barriers.

2. Dimensions

The surrounding urban spaces have divergent dimensions of the buildings. They form an urban fabric like a self-made counterpane with dissimilar patterns. The planning for the development of the waterfront provides a large-scale complement to the existing urban environment. Subsequent to the most western focus area, the adaptation of solitary architectures and linear buildings is carried out. Small scaled architectures, such as those found in the north-west of Huningue, are seized only occasionally in the northern focus area. A few blocks, which can be found especially in southwestern Basel and north-eastern Weil am Rhein, will be located near to the coastline. The homogeneous design of the building heights on the west bank is remarkable. Also on the east side these heights are adapted, but blurred by terracing of the highs at the harbor bays. Along the bridge at the harbor bays, there are also high points at exposed places. North of the high points, the negation of the homogeneous heights is continued. Since the surrounding urban fabric have only few massive landmarks, the particular location of the district is underlined and the important bridge accentuated. The few existing buildings, which are to be kept, are no landmarks due to their volume. It is evident, however, that the new plots are aligned with the dimensions of the architectural heritage.

3. Spaces

The south-west development area connects with its orthogonal paths to an urban park, in which paths are much more diffusely arranged and connected. Along these paths, however, solitaire architectures define a concise street space, which dissolves westwards into the park. Along the west bank is a promenade, which can be entered at many points due to the urban grid. This is also planned on the east side of the coastline. In addition, a park also connects to the rear building. The harbor bays are also lined with promenades. Due to their differentiated range of spaces and the connection to important path, together with the bridge, they form a future hotspot of the city society. In the surrounding urban fabric on both riversides, such a mixture of differentiated open-space typologies and such extraordinary precision of path correlations have not yet existed. The focus area, which is located in the north of the planning site, scales the

architectures to smaller volumes, so that the ratio of buildings and public spaces is even more shifted in favor of public spaces. Moreover, the orthogonal grid gives enough space to the Rheinpark on the east and a campsite on the west coastline.

C. Identity

Important for the identity of the waterfront development "3Land" is the panorama. While in many places a historical texture is set in order to create a certain identity, at this place, the identity is created by the geographically given vis-à-vis and the intention to overcome natural and national borders. With simple urban planning methods, visual connections and spatial connections are created. The existing buildings, which are to be transformed for a new utilization, do not negate the urban design concept, which propose orthogonality regarding the promenades.

VI. THE PENINSULA: COPENHAGEN, NORDHAVNEN

A. Composition

Copenhagen has changed from an industrial city to a knowledge and will have increased its population by 45,000 inhabitants from 2009 to 2025. The Nordhavnen is located in the district Indre Osterbro. Together with Ydre Osterbro, it represents the densely populated city area. The spatial structure of Osterbro is characterized by dense blocks structure, wide street spaces which cross the area and large green areas [6].

The possibility of a structural compaction of the city center has been exploited by the liberated areas of the harbor area, which in Copenhagen always close tangentially to the old fortifications.

In contrast to the already realized port areas, the Nordhavnen is located in an exposed position within the city. While the other port areas of Copenhagen are clustered in the waterway between the mainland and the Amager peninsula, the Nordhavnen forms a spatial ending point towards the open sea as a continuation of the waterway [6]. The planning site is bordered by the water on three sides and therefore belongs to the waterfront category "Peninsula". The Nordhavnen, with its bays aligned to several seashores, shows a differentiated spatial relationship to the water.

The intended location of a ship terminal for scheduled and cruise ships in the east of the planned area [6] has a major influence on urban planning and transport connections. Planning for the Nordhavnen is part of a large-scale planning campaign for several urban development areas. Many planings are directly located at the waterfront. Instead of a homogeneous area, the planning provides a development based on smaller heterogeneous quarters. With its basins, docks and the short distances between the water elements, the planning site has a complex relationship between water and land. While in the north, constructed wetlands and living shorelines are located, the rest of the coastline is mostly designed with seawalls and revetments [4]. The first construction phases are currently being implemented.

B. Congruence

1. Paths

Due to its geographic position as a peninsula, the Nordhavnen has a low connectivity to the existing paths in the area. Through their funnel function, the connecting paths are given a special urban conciseness. Because of these connection points, smaller path networks stretch along a circular route due to the planning site. The connection to the existing urban fabric is limited by the main street and the railway tracks in the south-west of the planned area. The barrier already existed before the planning, but was not affected by the development. In the planning site the numerous harbor bays, which are oriented in different directions are preserved and further areas are poured on in accordance with a natural delta. The less connective quarters should be entered over bridges. In this way, small, self-centered grids are formed and their connections are limited to a necessary extent. Unlike the urban grid of the surrounding area, the grid in the planning site is not based on the principle of the highest possible connectivity, but exhibits deformations in favor of small pocket parks.

2. Dimensions

In general, the in the adjoining urban space located typology of the blocks is congruently continued. However, almost all new blocks are more square and smaller in their base area and have terraced heights. Separately solitaires occupy parcels of the same size. In addition, the spatial bordering between architecture and street space is broken by the shift of plots and the pocket parks. In the north, the pattern of the blocks dissolves largely, so that the few remaining blocks continue to document the urban design pattern, but are perceived as an anomaly in the context of the smaller building typologies. However, the terracing provides a harmonious embedding. The plans propose individual landmarks, which either represent the revitalization of previously used buildings or are based on the dimensions of the urban heritage of the harbor. The surrounding urban space in the southwest has any landmarks. The planned high points in the planning site are proposed in the southeastern area.

3. Spaces

The polarity between inner and outer urban space is preserved. However, the shift of the parcels and the resulting pocket parks are fundamental for the planned public spaces. Due to their high number and density, they represent a kind of hybrid of street and public space, which does not occur in the adjoining urban space. They are often located along two-ways with buildings lined streets and at crossroads. One-sided lined streets, especially on the southern coastline, are designed as promenades and sometimes have enormous widths. In many places the water can be reached directly by stairs. The distinction between streets and public spaces is less polarized than elsewhere in the inner city area. Harbor peaks are reserved for urban green spaces and landmarks. However, the harbor bays, which have small ports and artificial islands, are more relevant for the public space design. The squares along

the route, which are allocated to the revitalized industrial buildings, complement the differentiated offering of public spaces in the planned area. Compared to the adjacent urban area, it is noticeable that the number, diversity and density of public spaces in the planning site are significantly higher. With the hybrid of street and public space and the promenade, the planning site has street typologies with high quality of stay. Especially in the northern direction, instead of urban areas, urban green spaces and even nearly natural spaces are offered. The peninsula closes with a constructed wetland [4] in the north.

C. Identity

The planning site is in an enormous transformation process. The large number of existing buildings and their inclusion in the planned urban design are remarkable. In addition to the existing landmarks, smaller existing buildings will also be preserved and harmoniously integrated using by terracing the heights of the new buildings. In addition to the shipping terminal, in particular, the multitude of smaller port facilities produces a small-scale character in the planning site. The enormous quantity of nearly natural spaces and urban green spaces also transport the polarity of urbanity and nature.

VII. THE ISLAND: HAMBURG, HAFENCITY

A. Composition

Hamburg is the second largest city in Germany and is located in the north of the Country at the Elbe. The HafenCity project is located south of the geographic center of the city close to the city center. Nowadays the port facilities are located on the southern side of the river, so that the northwestern side of the Elbe offered space for developments [7].

The proximity to the inner city and the spatial dimensions of approx. 157 ha make the project the largest city center extension in Europe. As part of the project, the area of the city center will be enlarged by 40% by 2030 [7]. The quarters of the HafenCity are located adjacently to each other in the city area and are surrounded by water on all sides. The plan area therefore is part of the category "island". On the opposite sides of the river, existing city districts and the new inner-city industrial harbor facilities are located. The island of the HafenCity is connected by bridges with the surrounding urban spaces and is framed with bulkheads and revetments [4]. Aims of the planning were intensive relations between existing and new buildings and to the water, the public character of many ground-floor utilizations as well as the development of various quarters within the HafenCity and their gradual realization. The development on the Waterfront is intended to produce not only a viable urban space, but also to develop a model for the European inner city of the 21st century [7]. Many parts of the project have already been implemented.

B. Congruence

1. Paths

Basins and harbor bays that divide the island into linear

spaces in the west and southeast as well as two central areas characterize the HafenCity. Not only the planning site is connected with the existing urban fabric by bridges, but also the described linear spaces and areas within the planning site among themselves. Logically there is a low spatial congruence between the new and old path network, and the bridges are a kind of predetermined breaking point. Nevertheless, the perception of the bridges has a comparable high relevance in the surrounding urban area. However, the barrier effect of the Willy-Brandt Street north of the plan area is evident. Although the waterfront area is connected to the direct city surroundings, the six-lane street ensures that a direct spatial connection to the old town is not perceptible.

2. Dimensions

With the intended building typologies and heights, the plans are essentially connected to the adjoining urban areas. However, the higher density of landmarks is a perceptible difference to the existing urban fabric. In particular, because almost all the landmarks of the inner city are church towers, which are not similarly massive. The landmarks occupy exposed locations at endpoints of harbor bays, as well as at public spaces and near bridges. In addition, the area has a higher variance in the size of the plots and therefore also in the dimensions of the buildings. It is also obvious that small plots do not form a block like in the old town area, but rather have interstices that allow visual connection between inside and outside. The space inside a block is not as precisely defined by the public space as the surrounding area. In southeastern direction, a small-scale development is planned.

3. Spaces

Buildings located on promenades define semi-public, often green areas. The distinction between public and private is much more differentiated in the new district than in the surrounding area. Important areas in the district remain free of cars. Almost all of the traffic disappears in the building bases. Because only few areas have to be given for parking in the street, the street spaces in the HafenCity can also be designed as attractive public spaces. The polarity of traffic and free space is thus also less pronounced compared to the adjacent urban fabric, as does the polarity of block interior and block exterior. On two sides by buildings bordered streets offer possibilities of a more attractive furnishing, but have not fundamentally different conditions in the street profile to comparable streets of the existing urban fabric. One-sided by buildings bordered and on the waterfront located streets are designed as promenades with larger proportions and cantilevers above the ground floor of adjacent buildings. In the adjacent city netting, these areas are mostly occupied by important traffic axes, so that comparable leisure qualities cannot be offered there. In addition to the promenades, the public spaces within the harbor bays and at the harbor peaks are particularly striking and have not existed so far in the city in this form. The east of the planning site also has a higher density of urban greenery and park facilities. This open-space typology is only located at the western to northwestern

boundaries of the inner city yet. As parks are less common in urban areas than public space, no premature conclusions should be drawn.

C. Identity

Part of the planning site is the Speicherstadt to the north and its urban heritage. The former mostly as storages used buildings house offices as well as commercial premises. The plans provide an addition as a linear urban structure that frames the harbor bay in the south. Particularly striking are the small-scale urban layouts, which form quarters along the bays' quarters. The patterns are intersected by axes leading to the bridges and mostly close with solitary major architectures such as the Elbphilharmonie at the harbor peaks. The various sub-regions of the grid are formed with alternating building types, but in the immediate vicinity largely homogeneously. The specific correlations with the public spaces result in quarterly identities.

VIII. PARADIGMS OF URBAN WATERFRONT DEVELOPMENT

The case studies are located in the inner city in alternating geographic relations with the urban fabric and the water. The plans have a different set of guidelines and are developed regarding local conditions. However, they represent coherent urban extensions of the surrounding urban spaces, which differ not only in their spatial conditions, but also in the degree of their congruence.

The paths of the investigated planning sites are interlinked with the surrounding urban fabric in different ways. However, there are similarities, in particular, in the orthogonal orientation of streets and the intensive use of the promenade as a special way of bordering the coastline. In order to offer more promenades, even artificial bays are created. Small path networks can be entered over bridges. This less connectivity created a special address and highlights the bridges as a link between the quarters. In this way, a dramaturgy of connectivity and a smaller granularity is created. As a paradigm of the paths, a dramaturgy of the design and the way of entering the site can be identified. The quarters have a high intern connectivity. However, their networking with the other quarters is deliberately narrowed down to create special places. In addition, paths along the coastline are designed as promenades and artificial coastline extensions are built up.

Mostly, the plans of the case studies take up the heights of the surrounding building. However, they have a greater degree of heterogeneity within the new quarters. In addition to terracing of individual buildings, the planning is partly also characterized by more differentiated building types. Individual types clearly differ from the dimensions of the existing buildings in the adjoining urban areas. For example, landmarks occupy harbor peaks, important places of the path network or urban squares. Smaller architectures often form small-granulated quarters and are located in close proximity to parks and nearly natural spaces. On the other hand, urban grids and blocks are often adapted by the surrounding urban structure or developed out of the natural structure [2] of the planning site. The depolarization of block interior and block

exterior spaces is a recurring phenomenon. This gives rise to a wide range of views between different coastlines. Cantilevers and arcade-like urban areas in the harbor bays often create a relationship between public space and architecture. The dimensions of the planning are thus characterized by the paradigm of the heterogeneity of the building types. Terracing, however, is extremely deliberately used for addressing. In particular the landmarks and the exposed integration of the historical building stock are goals, which are followed uniformly. The blocks are also modified in favor of a heterogeneous spatial composition. The resolution of the polarity between the indoor and outdoor areas is accompanied by that.

Overall, all case studies show an increased number and high density of public spaces. The diversity of typologies is particularly noteworthy. The public spaces at the waterfront are offered not only sequentially but also continuously in the form of hybrid street typologies and promenades, unlike in the surrounding urban areas. Public spaces are often located at landmarks, in particular historical buildings, at harbor bays and near bridges in the planning sites. The paradigm of the spaces is the depolarization and the associated diversity of the public space typologies as well as a high variability of utilization. In favor of a perceptible urban rhythm, the sequence of public spaces is arranged in a special way, in order to differ from the continuous public spaces in the form of promenades, etc.

Superordinate planning goals such as the preservation of existing buildings, the networking of green areas or the continuation of an urban grid are equal but locally justified principles of planning. Thus, in particular, their superposition donates identity to the site. It is obvious that the barriers crossing bridges are often located in the immediate vicinity of the historical building stock, as well as of landmarks and solitaires. The dramaturgy of entering the site is also largely superimposed by public spaces. In addition, there are often views between the coastlines at these places. Common characteristic are therefore a larger publicity than in the surrounding existing urban spaces and a more dramatic, but less polarized urban rhythm because of the special spatial conditions of the waterfront development.

REFERENCES

- [1] D. Wrenn, John Casazza, and Eric Smart, "Urban Waterfront Development" (quoted Toronto: City Planning and Development Department, "Waterfront Precedents", 1976), 1983
- [2] U. Timur, "Urban Waterfront Regenerations" in *Advances in Landscape Architecture*, 2013, pp. 169-206.
- [3] Kees Christiaanse *et al.*, "FredericiaC Phase 2 Development Plan" (Proposal in FredericiaC Parallel Competition), 2011
- [4] A. Burden *et al.*, "Costal Climate Resilience: Urban Waterfront Adaptive Strategies" (Published Study by Department of City Planning New York), 2013
- [5] Fin Geipel *et al.*, "Urban Concept – Prototype Space for Europe", "Raumkonzept – Pilotraum für Europa" (Project description for IBA Basel 2020 nomination), 2015
- [6] R. Gorny, and S. Stoll, "Edge Phenomenon", "Randerscheinung in 1 : 500" (Unpublished Diploma Thesis), State Academy of Fine Arts Stuttgart, 2009
- [7] H. Harms, "Changes on the Waterfront – Transforming Harbor Areas: Comparison and Evaluation of Waterfront Developments in Two

Contexts: San Francisco Bay Area and Hamburg, Germany” (IURD Working Paper Series of the Institute of Urban and Regional Development, UC Berkeley,) 2008, pp. 37-48.

Beate Niemann is an architect and urban planner. She studied architecture at the PBSA Düsseldorf, 40213 Germany, and received her doctorate degree at TU Berlin, 10623 Germany, with “Haptics Space Semantics”, a study on architectural and urban effects of selected contemporary architecture. She was a partner with Professor Jürgen Pahl, Office for Urbanism in Düsseldorf. In 1998, she founded the NIEMANN + STEEGE Ltd. in Düsseldorf with Claudio Steege. Having taught as assistant professor with Kees Christiaanse at TU Berlin, PBSA Düsseldorf and Leipzig University, 04109 Germany, she now holds a professorship for urban design and regional planning at Wismar University of Applied Sciences Technology, Business and Design, 23966 Germany.

Fabian Pramel studied Urban Studies at the Bauhaus University in Weimar, 99423 Germany. As a research assistant, he worked at the Faculty of Architecture and Urban Studies at Bauhaus University for Prof. Dr. Welch Guerra (Chair of Urban Planning and Research). In Addition he worked for urban planning companies focusing on integrated urban development concepts. Actually, he works for NIEMANN + STEEGE Ltd in Düsseldorf.