

# Horizon 2020 Societal Challenge

Health, demographic change and wellbeing



## Project: 666773 – BlueHealth

Full project title: Linking up environment, health and climate for inter-sector health promotion and disease prevention in a rapidly changing environment

### BlueProfiles

**A review of projects providing access to urban blue space and derivation of design guidance**

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# 1 Introduction

Within Work Package 5, "Planning and design for blue health" there was a focus on the character and quality of places and spaces which facilitate and encourage the public to go to and make use of water-related landscapes (blue spaces). Here we define blue spaces as outdoor environments - either natural or manmade - that prominently feature water and are accessible to people either proximally (being in, on, or near water) or distally/virtually (being able to see, hear or otherwise sense water). It is a basic requirement that in order to obtain all of the proximal and some of the distal benefits, people need to be able to get to water, so the places which allow this most effectively are likely to provide valuable lessons for anyone wishing to plan and design a new blue space. The objective of the work presented in this report is:

To identify the key elements of a successful blue space regeneration project in terms of:

- General landscape and urban design aspects leading to spatial quality
- Potential for increasing physical activity and opportunities for improving mental health and well-being
- Accessibility for all to and within the project site
- Ways of providing interaction with water
- Provision of affordances for sitting and engaging in social interaction
- Microclimate amelioration and enhancing thermal comfort
- Ensuring good site management/maintenance
- Ensuring safe and secure sites

This report presents a review of a large number and wide range of relatively recent projects which have the aim of redeveloping or rejuvenating blue spaces for improved public use. These are projects which have been implemented and, in general, become established and well-used spaces within their local or regional urban setting. The review has identified a range of types of projects and has assessed them critically according to a number of criteria under the headings listed under the objectives above. From this review it has been possible to identify the key factors which make such projects successful in relation to the themes of the objectives and to develop a set of planning and design guidelines.

As the number and variety of projects we found and reviewed is rather substantial (around 180) and since they provide inspiration as to how blue spaces can be planned and designed, they are presented as the BlueProfiles in the BlueHealth Tools website for free use by professional planners and designers as well as the general public. This report focuses on the methods used to identify, collect and review the projects and to present an overview of the findings and main messages emerging from the process rather than a detailed set of recommendations or design guidance which is the purpose of the BlueProfiles.

## 1.1 The concept of the project review

A systematically-undertaken review of evidence from architectural/landscape architectural projects is an unusual but not unheard of activity (from a scientific perspective). Post-occupancy evaluations are becoming common in architecture and also in landscape architecture but these are usually of single sites or buildings, not a large selection of projects.

While in those scientific disciplines which publish results in peer-reviewed academic papers (e.g. the natural or social sciences) it is relatively easy to carry out a review since the evidence has been quality-controlled (through peer-review) during the publication process, what is an equivalent system for reviewing landscape architecture projects? In the art and design disciplines it is the role of criticism to perform the equivalent of peer-review and in architecture and landscape architecture this is also the case. In addition, there are design competitions where juries of experts evaluate entries in a totally anonymous way and finally, there are annual award schemes where the best projects are also assessed by juries of peers. This is the approach we have used in our review for selecting the projects worth assessing. The detailed method is described in the next sections.

## 1.2 Project search method

We developed the search method for identifying projects to include in the review based on the following criteria, which are broad and inclusive rather than narrow and exclusive (for the first collection):

- Projects should have been planned and designed to give access to water of any type and at any scale broadly within an urban setting (but could include more rural locations on the edge of a city)
- They could be from anywhere in the world
- They should be already constructed, not still under development or unbuilt projects (as we wanted to see how successful they are in reality)
- They should have appeared as a) a critical article in a respected professional journal, b) have been a competition winner, c) have won a prize awarded by a professional organisation, d) be known to the panel carrying out the assessment (from the Estonian University of Life Sciences team) or a combination of any or all of the above
- There should be sufficient information available for assessment - given that no site visits were possible – such as critical writing, recent from Google Streetview showing activity and condition, recent photos posted on websites, although some examples had been visited by team members and/or were quite well known directly
- Be visible as built projects in recent photographs and, especially, via Google Earth, showing them some time after they were first constructed and in use (in order to avoid perfect photos from the designers affecting the impression given)
- Be presented in English, German, Estonian, Latvian, a Scandinavian language or Russian (languages available among the team) or potentially Polish, French or Spanish (languages spoken by colleagues or students within the department) in the written sources or from specific websites.
- Have been constructed mainly within the last 10-15 years (although some older major projects were included since they were critically revisited by some journals and provided many lessons from a longer term perspective).

The search included an initial trawl through the internet, as many projects are presented by the designer’s websites and could be found there (in the range of languages noted above). Professional (and some scientific) landscape architecture journals were searched online or in libraries for projects which featured waterside redevelopments. These included those of the professional organisations in the USA, UK, Canada, Australia, China and Denmark as well as several specialised journals published for the profession and which feature critical reviews of projects from around the world. In addition, we consulted some recently published books (in English and German) where some projects were also critically reviewed. Table 1 shows the main journals, books and websites, their publisher, country of origin and focus of coverage used for identifying the projects.

An initial search of the internet using terms such as “waterfront regeneration projects”, “urban wetland parks”, “river restoration projects” led to the identification of almost 400 potential projects but further examination in the light of the criteria listed above allowed us to reduce that number to 180. This number became the database of evidence for the review and for the projects to be featured as BlueProfiles.

*Table 1: Selected Professional Magazines, Book and Web sites used for sourcing projects to be reviewed*

Magazine	Country	About the Magazine	Web reference	Publishers
Landscape architecture magazine, ASLA	USA	Landscape Architecture Magazine (LAM) is the monthly magazine of the American Society of Landscape Architects. It is the magazine of record for the landscape architecture profession in North America, reaching more than 60,000 readers who plan and design projects valued at more than \$140 billion each year. Beyond land issues the magazine looks into issues including cities, climate, environment, ecology, education etc.	<a href="https://landscapearchitecturemagazine.org/">https://landscapearchitecturemagazine.org/</a>	American Society of Landscape Architects; <a href="http://www.zinio.com">www.zinio.com</a>

Landscape architecture Frontier	China	Landscape Architecture Frontiers, launched in February, 2013, is a bimonthly journal co-published by Higher Education Press and Peking University and edited by the College of Architecture and Landscape Architecture of Peking University. It is administered by the Ministry of Education of the People's Republic of China.	<a href="http://journal.hep.com.cn/laf/EN/column/column13253.shtml">http://journal.hep.com.cn/laf/EN/column/column13253.shtml</a>	Higher Education Press and Peking University
The International Review of Landscape Architecture and Urbanism (TOPOS)	Germany	TOPOS is a magazine for landscape architecture and urban design and is a media partner of the International Federation of Landscape Architecture, International society of City and Regional Planners, and the LE:NOTRE Institute. The magazine reflects on critical thinking and evaluation of current landscape architecture and urban design practice from all over the world.	<a href="https://www.topomagazine.com/">https://www.topomagazine.com/</a>	Georg D.W. Callwey GmbH &Co. KG Streitfeldstrase, Munich
Landskab	Denmark	This is the Danish professional journal for garden and landscape planning. Landskab includes all aspects of external design in the town and countryside - from the small garden to the great works of landscape. The magazine investigates landscape's influence on the health of cities, environments, ecology etc.	<a href="http://arkfo.dk/en/shop/product/landskab-denmark">http://arkfo.dk/en/shop/product/landskab-denmark</a>	ARKITEKTENS FORLAG
Landscape- The Journal of the Landscape Institute	UK	Landscape is the quarterly journal of the Landscape Institute, the professional organisation in the UK, which showcases the best of design, management and thinking, and addresses the key issues facing the landscape profession. Its rigorously selected editorial is targeted to help landscape	<a href="http://www.landscapejournal.org/">http://www.landscapejournal.org/</a>	Landscape Institute

		professionals get a broader view of what is happening while also giving them the tools to make them better at their jobs.		
Landscape architecture Australia	Australia	Landscape Architecture Australia is an authoritative and contemporary record of landscape architecture and the urban design of Australian cities, towns and communities, Landscape Architecture Australia presents independent reviews of public, commercial and residential work, plus commissioned comment on the issues facing landscape architecture and its practitioners today. Climate change, sustainability, conservation, restoration and land-management are modern watchwords.	<a href="https://architecturemedia.com/magazines/landscape-architecture-australia/">https://architecturemedia.com/magazines/landscape-architecture-australia/</a> <a href="http://landscapeaustralia.com/">http://landscapeaustralia.com/</a> <a href="http://landscapeaustralia.com/reviews/">http://landscapeaustralia.com/reviews/</a>	Australian Institute of Architects, Australian Garden History Society, Planning Institute Australia
Landscapes/Paysages- Landscape Architecture in Canada	Canada	Landscapes/Paysages provides a comprehensive overview of landscape practices, industry involvement, critique and reviews of current landscape architectural practices in Canada and the rest of the world. It includes topics and discussions on various issues relating to landscape architecture and urban design.	<a href="http://www.csia-aapc.ca/landscapes-paysages-0">http://www.csia-aapc.ca/landscapes-paysages-0</a>	Naylor
Urban Design	UK	Urban Design is the leading journal in its field. It provides reviews, viewpoints and critics on the current issues in urban design, urban development and urban landscape projects.	<a href="http://www.udg.org.uk/publications/journal/">http://www.udg.org.uk/publications/journal/</a>	Urban Design Group, UK

World Landscape Architecture Magazine	China	World Landscape Architecture is a webzine providing landscape architects with news and information about the profession by the profession. World Landscape Architecture seeks to work with landscape architects, allied professionals and the landscape industry to improve the profession across the world. It endeavours to promote landscape architecture and increase public awareness of the profession.	<a href="http://worldlandscapearchitecture.com/">http://worldlandscapearchitecture.com/</a>
<b>Selected Books and conference proceedings</b>			
Basics Landscape Architecture 02: Ecological Design	UK	Nancy, R., Ken. Y., (2011), Basics Landscape Architecture 02: Ecological Design, AVA Publishing	
River.Space.Design	Germany	Prominski, M., Stimberg, D. Stokman, A., Zeller, S., (2012), River.Space.Design , Birkhaeuser	
Waterfront Regeneration-Experiences in City-building	UK	Smith, H., Ferrari M.S.G. (eds.) 2012), Waterfront Regeneration-Experiences in City-building, Routledge, Taylor & Francis Group.	
ECLAS Conference Proceedings (various)	Europe	European council of Landscape Architecture Schools	
<b>Selected Websites</b>			
Landezine	Slovenia	<a href="http://www.landezine.com">http://www.landezine.com</a>	
ArchDaily	Worldwide	<a href="http://www.archdaily.com/">http://www.archdaily.com/</a>	
Project for Public Spaces	USA	<a href="https://www.pps.org/">https://www.pps.org/</a>	
PLANETIZEN	USA	<a href="http://www.planetizen.com/toppublicspaces">http://www.planetizen.com/toppublicspaces</a>	
Coastal and Waterfront Smart Growth	USA	<a href="http://coastalsmartgrowth.noaa.gov/casestudies.html">http://coastalsmartgrowth.noaa.gov/casestudies.html</a>	
Waterfront Centre	USA	<a href="http://www.waterfrontcenter.org/">http://www.waterfrontcenter.org/</a>	
Landscape Performance Series	USA	<a href="https://landscapeperformance.org/">https://landscapeperformance.org/</a>	

ASLA Honours and Awards	USA	<a href="https://www.asla.org/HonorsAwards.aspx">https://www.asla.org/HonorsAwards.aspx</a>
GreenFlag Awards	UK	<a href="http://www.greenflagaward.org.uk/">http://www.greenflagaward.org.uk/</a>

### 1.3 Initial classification of projects

Once we had identified the total number of projects fitting the criteria we entered them into a database according to a number of key features which the team considered important in explaining some of the aspects we were interested in, as follows:

1. The country where the project is located
2. The type of owner of the place
3. The year of completion of the project
4. Blue space type – we used the categories developed for use in the BlueHealth project and featured in the list for the BlueHealth International Survey (BIS) and the BlueHealth Environment Assessment Tool (BEAT). This gives us some possibilities for cross comparison later in the project.
5. The type(s) of water-land interface – we wanted this because potential for physical access to water depends very much on this factor.
6. The type of built environment surrounding the project site – which affects the levels of use, for example.
7. The scale of impact of the project – from very localised to having a regional (or even a national) impact
8. The scale or size of the project – such as the overall area or length (if a linear project)
9. The type of intervention - the main focus and objectives of the project
10. The climatic zone of the project site – using the Köppen-Geiger system – since the use of water depends very much on the climate and seasonality
11. The location of the project site within the urban-rural gradient of the host city.
12. The character of the water element – such as enclosed by buildings or open to the horizon, which determines the way the water affects the experience and how dominant it is in the scene
13. The image of the place and its aesthetic character and sense of genius loci – in order to capture the landscape qualities
14. The opportunities for undergoing activities potentially conducive to enhanced general health and wellbeing
15. The type of interaction with water

All this information was gleaned from the available descriptions and critique as well as an initial categorisation by the team. A spreadsheet was compiled for each project using Excel. Each sheet also contains fields for summarising the conclusions of the assessment of each project and links to Google Maps and other image sources for reference purposes. This spreadsheet will form the basis for the information that will be made available in the searchable database described earlier. Appendix 1 presents the blank spreadsheet, of which the Excel original has drop-down lists for each of the categories listed above (not operating in the Word version).

#### Method of critical review

Once the spreadsheet had been compiled, a detailed questionnaire was developed for the critical assessment of each project. This was assembled in draft using many of the questions extracted from the space assessment tools evaluated as part of the BlueHealth Environment Assessment Tool (BEAT) development. We went through these to remove any duplication. These aspects were to be scored using a 1-5 scale where 1 was where the attribute was the least present and 5 the most present. A score of 0 meant that the attribute could not be assessed (due to inadequate information) or not relevant to the project under review. These form the basis for the spidergrams used to present each project in the BlueProfiles.

A panel of landscape architects, comprising the EMÜ BlueHealth team (landscape architects) plus departmental colleagues not on the BlueHealth team (seven persons in all) was convened to carry out the assessment. The evaluation process was started by piloting and refining the questionnaire checklist and then carrying out a training task on several of the projects in the database as a group. This was carried out by presenting the materials compiled for each project, after which each panel member carried out their own assessment. Then each panel member's scores were reviewed for each question and any differences were discussed. This allowed a measure of calibration to be achieved and for uncertainties in the meaning of the question or how it should be scored to be resolved. Each panel member then completed the assessment for the first 10 sites so that a subsequent calibration check could be carried out and the database adjusted in the light of any member who was consistently under or over-scoring compared to anyone else. Since each assessment took up to 30 minutes to complete, even when the assessor was trained and efficient, we decided to split the remainder of the work among the panel so that at least 3 people assessed each project. To ensure coverage and to remove any biases, each panel member was assigned a random selection of 60-65 further projects to complete. The scores were recorded in the spreadsheet and each set of three (by the three evaluators) were normalised for subsequent analysis and for the creation of the spidergrams.

Owing to the complexity and detail of the entire assessment, this report presents a simplified overview of the main characteristics of the projects evaluated and a summary of the main findings. It is our intention to publish more detailed results in an academic paper in due course and, as noted above, to present each project in a searchable database.

## 2 Analysis and results

### 2.1 Analysis method

The database was analysed by a combination of descriptive and comparative statistics. Owing to the large data set and number of questions on the checklist the permutations for analysis are too great for a complete picture to be presented here. However, an overview analysis was carried out using the recorded data from the first spreadsheet (Appendix 2) presented in section 2.2 below and, through a workshop by the panel members, the main first subjective impressions, backed up by scrutiny of the scoring, was used to produce the first overview of key factors which were used to form the results presented in the second part (section 2.3 below).

### 2.2 Results: Main characteristics of the projects reviewed

In this section the overall features of the samples are summarised and presented as a set of bar charts. They show the main characteristics of the sampled projects, which we believe form a rather representative picture of what is going on in current waterfront planning and design practice.

#### 2.2.1 Country where the projects are located

Figure 1 shows the pattern of the location of the projects reviewed. This clearly shows a focus in certain areas such as the USA, Australia, Canada and some European countries but also a very wide range of countries. It must be understood that since we only reviewed projects which had already received critical acclaim and had been written up there were other projects of lower quality or for which material was unavailable which we excluded from the review. It must also be noted that these projects are located in countries with strong planning and landscape architecture professions and where high quality work is the norm.

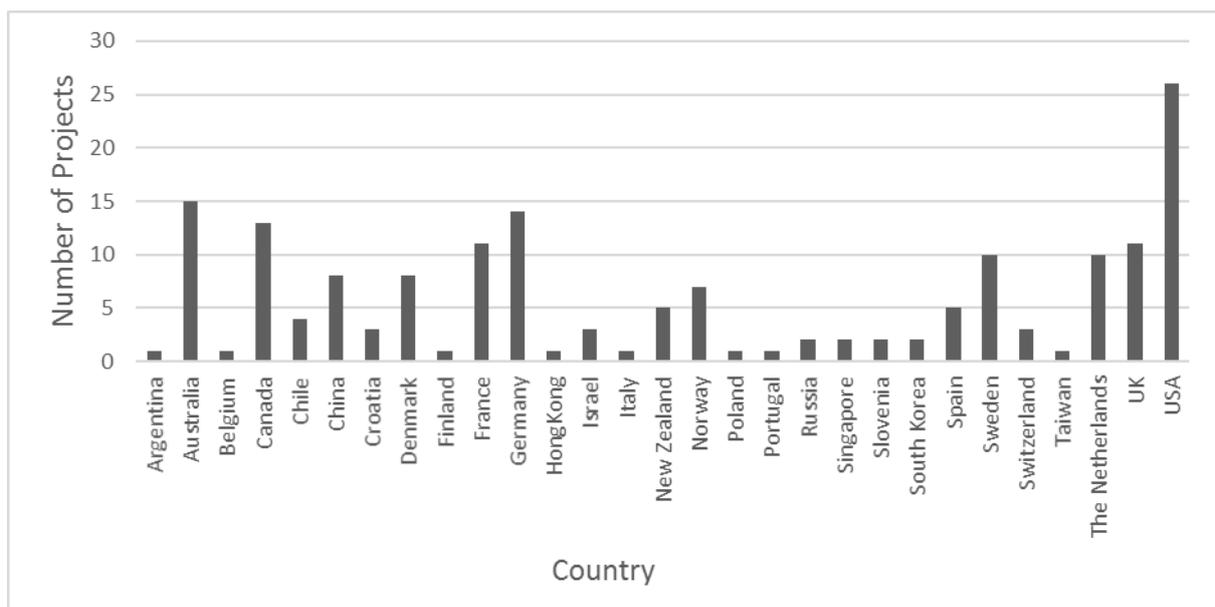


Figure 1: Countries where reviewed projects are located

### 2.2.2 Ownership of the place

Figure 2 shows that the vast majority are under public ownership, mainly by municipalities (local authorities) with very few being privately owned (but publicly accessible) or owned by a trust or other form. It is clear that public investment is especially common.

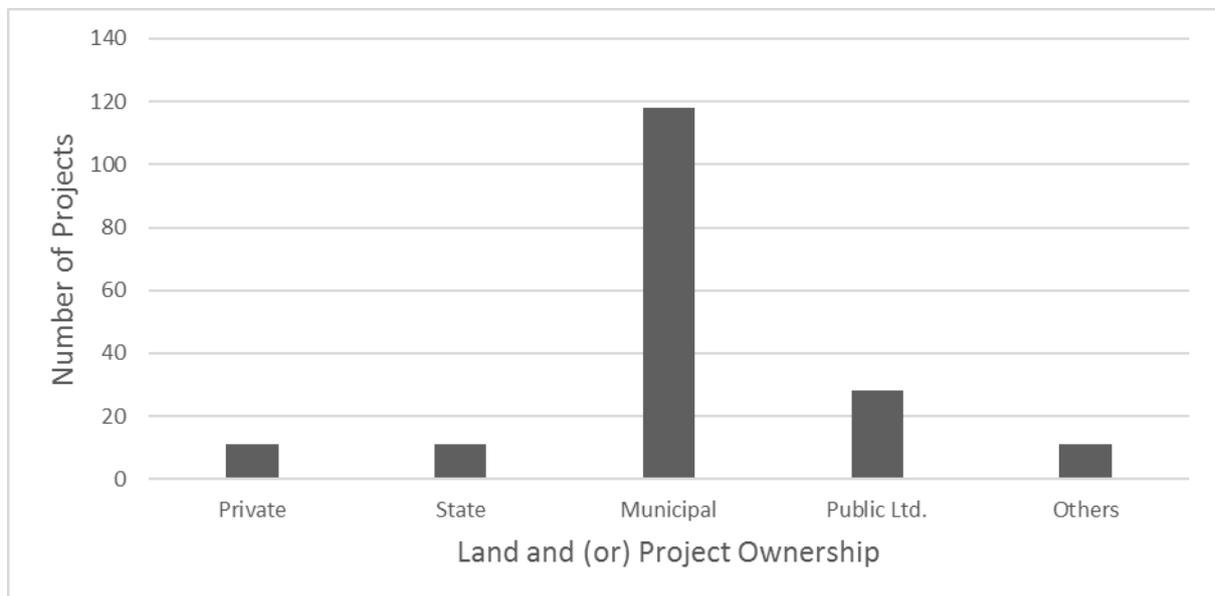


Figure 2: Ownership status of the reviewed sites/projects

### 2.2.3 Year of completion

Since the first waterfront redevelopments were undertaken in the 1980s, and especially since the millennium, there has been a steady increase in the number of projects being completed, as shown in Figure 3 (although the low numbers in the early years are in part at least due to less searching by us). The decline in 2015-2016 is an artefact of the availability of information about recent projects, not an actual decline in construction. It is clear that waterfronts have become high on the policy and planning agendas for good reasons. This means that, while some public areas have become privatised and public access is limited, nevertheless urban citizens have never had as much opportunity to gain safe and good quality access to water as they have nowadays, and the picture is continuing to improve.

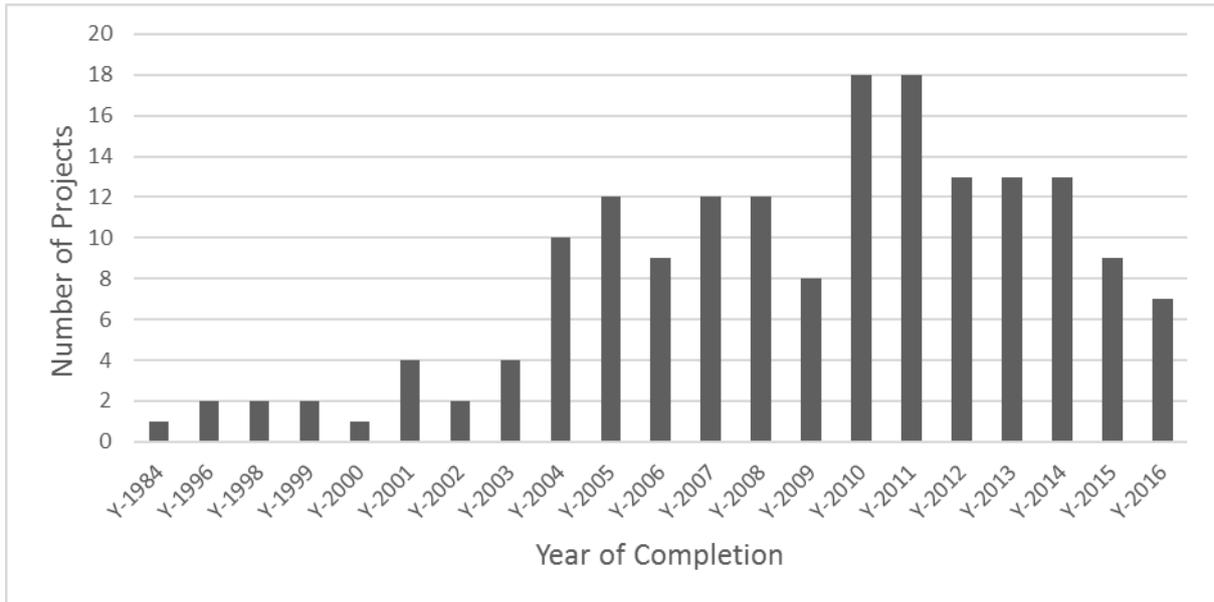


Figure 3: The year of completion of the reviewed projects

### 2.2.4 Blue space type

We found that almost all urban blue space types were present in our sample but that some, such as redevelopment of former harbours on rivers or at the coast stand out as being the most common as shown in Figure 4. This is in part because of the recent push to reuse brownfield sites as well as the planning policy to restore the connection with water when in the past, due to industry and transport, cities frequently turned their back on water, or even removed it and buried rivers, for example. This is a very positive trend and looks set to continue. It means that more and more urban dwellers have the opportunity of closer access to water.

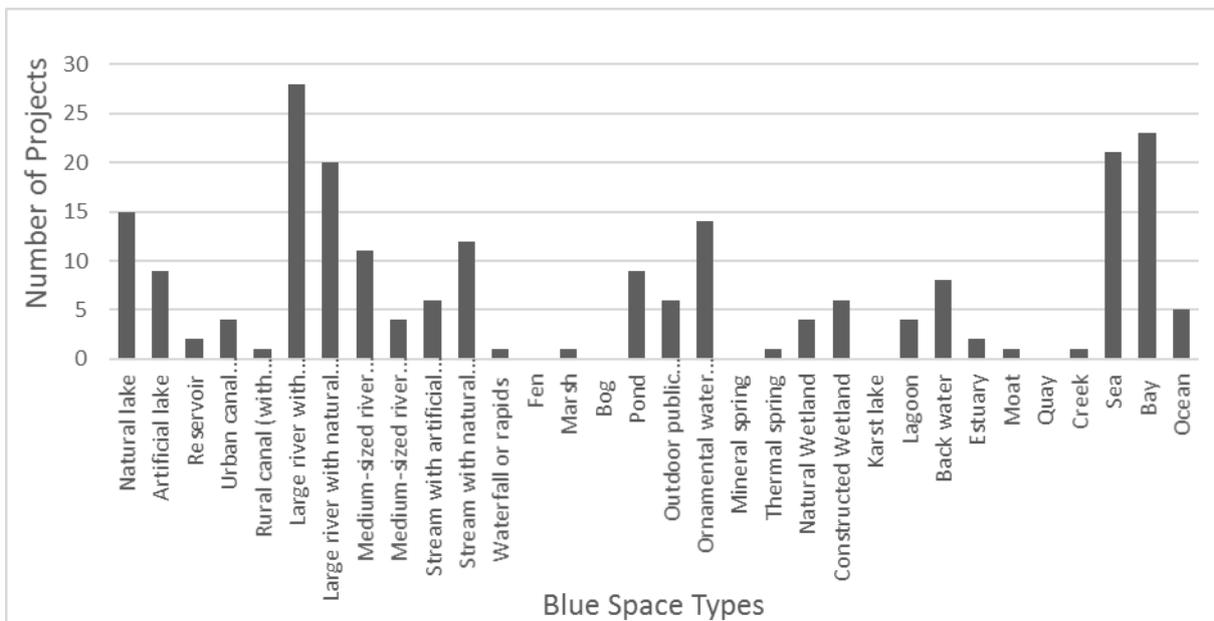


Figure 4: The blue space types where reviewed projects are located

### 2.2.5 The type(s) of water-land interface

It is possible for a single project to have several interface types – such as a section of beach and also a section of dock wall or flood protection structure. Figure 5 shows the range of different types found in the sample. In general, we found that there are two main categories – those where the water is mainly or completely physically inaccessible such as those with dock walls, riprap edging (large rocks or concrete blocks making a sea defence), harbours and piers – and those offering direct access to the water via beaches, terraces, steps and promenades so that people can physically interact with it. The reason for that is partly the type of project – seaside and lakeside areas usually involve direct access via a beach or built structures to allow water recreation to take place while former docks or ports with vertical retaining walls do not. Often this is combined with water quality and hydrology issues – docks may still have polluted water and rivers may have dangerous currents. A number of projects also have attempted to create a closer connection, for example by building decks which are close to the water, even if no physical access is possible so that the sensory connection is stronger.

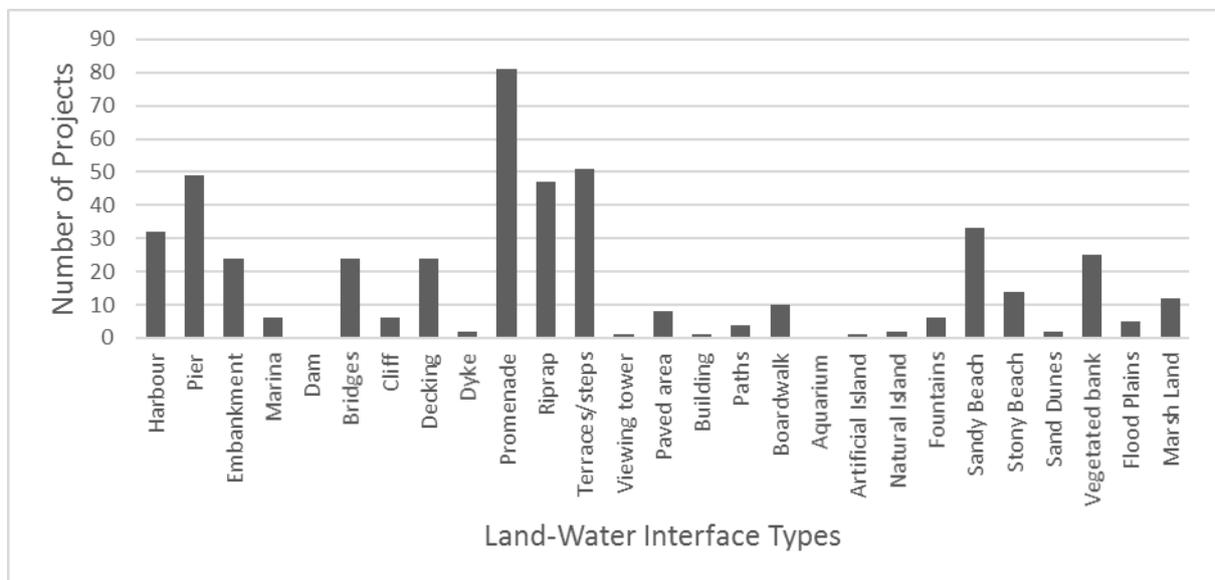


Figure 5: the range of land to water interface types found in the reviewed projects (the total adds up to more than the total of all projects due to some having several interface types within them)

### 2.2.6 The type of built environment surrounding the project site

Owing to the variety of locations of blue space projects, the built – and by implication social (i.e. if residential) – context of the surroundings also varies considerably. Figure 6 shows the range of built/green characteristics associated with the project sample. This shows that about half of all projects are in heavily built-up parts of cities where the addition of access to water is sure to form an extremely valuable addition to the public space infrastructure. Even in projects where the green element is limited for technical reasons the blue space takes on a role which would be occupied by green space elsewhere, such as in harbour redevelopments.



Figure 6: The variety of built environment types where the reviewed projects are located

### 2.2.7 The scale of impact of the project

On studying each project, it was clear from the information and descriptions provided in the sources, that while some of them were targeted at very local places and people neighbourhood the entire city is the primary catchment of users and the expected scale of impact. Others are large projects where the impact can be beyond the city. Of course, the broader scale of impact does not exclude benefits to the local neighbourhood residents but the project may also become a destination for tourists (the international scale of impact). In our classification we recorded where different levels of impact operated simultaneously within a single project. Figure 7 shows the numbers of projects with each of these levels of impact. We found it rare but not impossible for a project to have a city or regional impact but no local one, simply as a result of its location, for example in an industrial area well-away from local residents or in an urban fringe area, also where there are no local residents within easy reach.

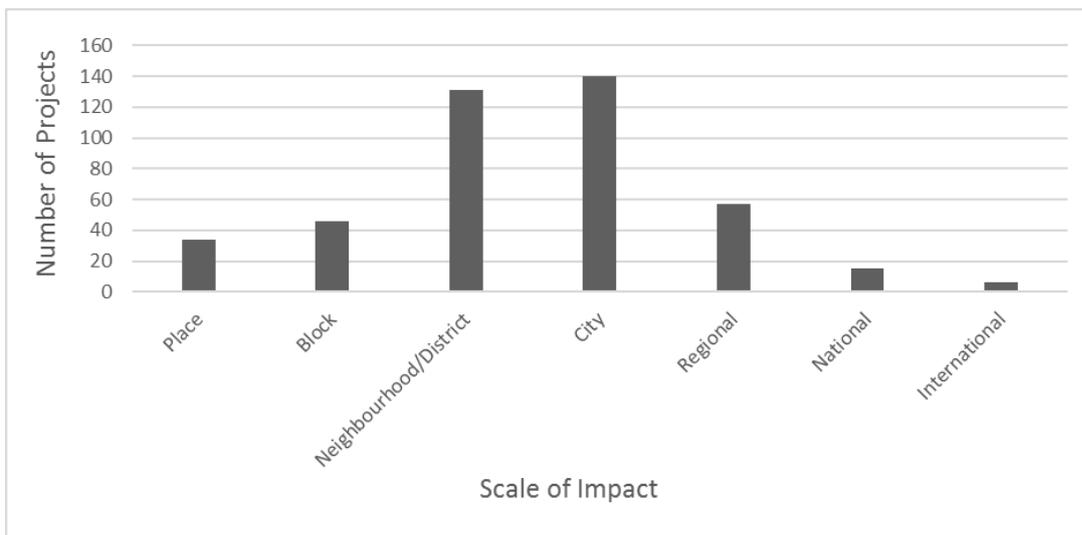


Figure 7: The scales of impact of the reviewed projects

### 2.2.8 The scale or size of the project

In the review we encountered a range in the scale or size of the projects. Figure 8 shows this variety across the sample. Projects ranged from very small-scale interventions, such as a single unique water feature or a small object such as a deck placed in one spot, to promenades of several kilometres in length or large wetland parks of several hectares in area. At each extreme we found major benefits – small can be beautiful but large also has clear benefits in densely populated cities where the risk of overcrowding is significant. Some of the largest projects were those which also had a role in water purification, such as wetland parks, where water is filtered in ponds and wetlands while the public is also allowed access to the area. Equally some of the most elegant and restrained developments made a significant contribution and helped to restore the connection to water symbolically as well as physically – this could be as or more important in some places where the contribution to Genius loci is especially strong.

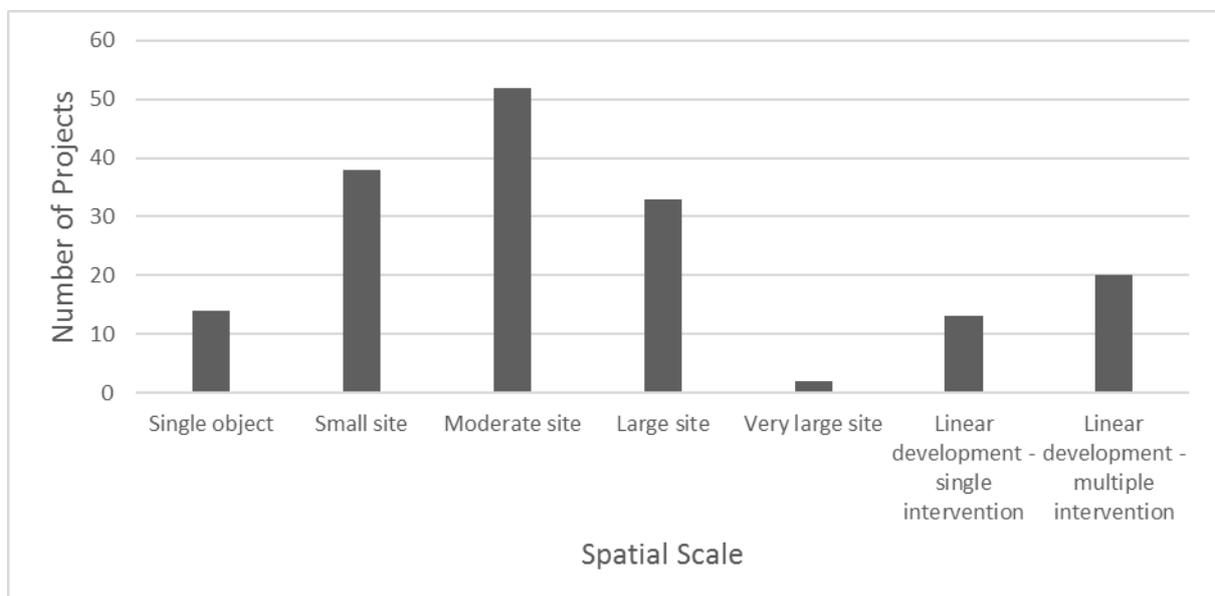


Figure 8: The range of sizes/scale of the reviewed projects

### 2.2.9 The type of intervention

We developed a set of categories which described the main objectives of the project. Each project could have several objectives and we ranked these in order of importance (as we understood them) according to the information available about the project. Figure 9 shows the frequency of objectives. Recreational use was generally the main objective but in a large minority of cases this was an important but secondary objective to, for example, water treatment (found in the wetland restoration projects), green space regeneration or urban waterfront re-development (found in the dockland projects), river restoration or flood protection. The fact that almost all of these included access and recreation suggests that the planners and designers have a good vision for the area and want to include many objectives and to obtain a good synergy between the different interests involved in the area.

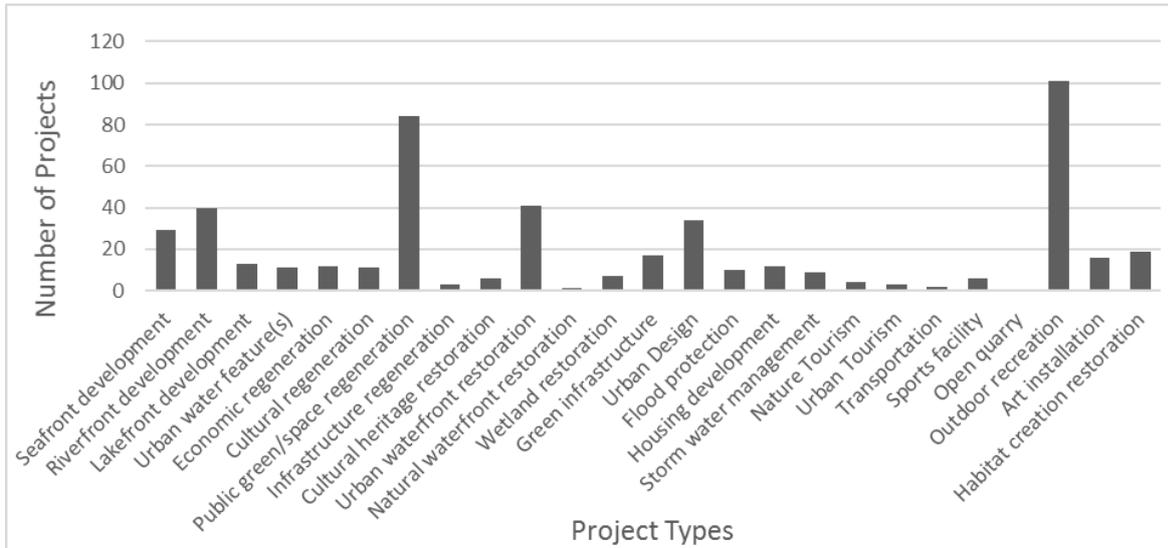


Figure 9: The range of intervention types and their objectives (includes primary and secondary)

### 2.2.10 The climatic zone of the project site

The projects were found in a wide range of Köppen-Geiger climatic zones but two zones in particular stand out: Cfb (temperate oceanic climate covering large part of western Europe and the coastal USA) and Dfb (warm-summer humid continental climate covering continental Europe, parts of China and the USA). Csb (warm-summer Mediterranean climate – covering the Mediterranean, California and Australia) is less common but features in a number of projects as does Cfa (humid sub-tropical) and Dfa (hot summer humid continental). Figure 10 shows their distribution. Projects in warm temperate and Mediterranean (Australia, California, Spain) or tropical (Singapore) locations usually also have good access to the water (when it is not polluted) as it is generally more useable all year round for swimming and water sports than in cooler, more seasonal oceanic climates (the UK, New England). In more northern continental climates there is distinct seasonality yet water can become quite warm in summer (Finland, Estonia, Hungary), while in oceanic cool temperate locations the sea and lakes may remain cold all year round (the UK, Oregon).

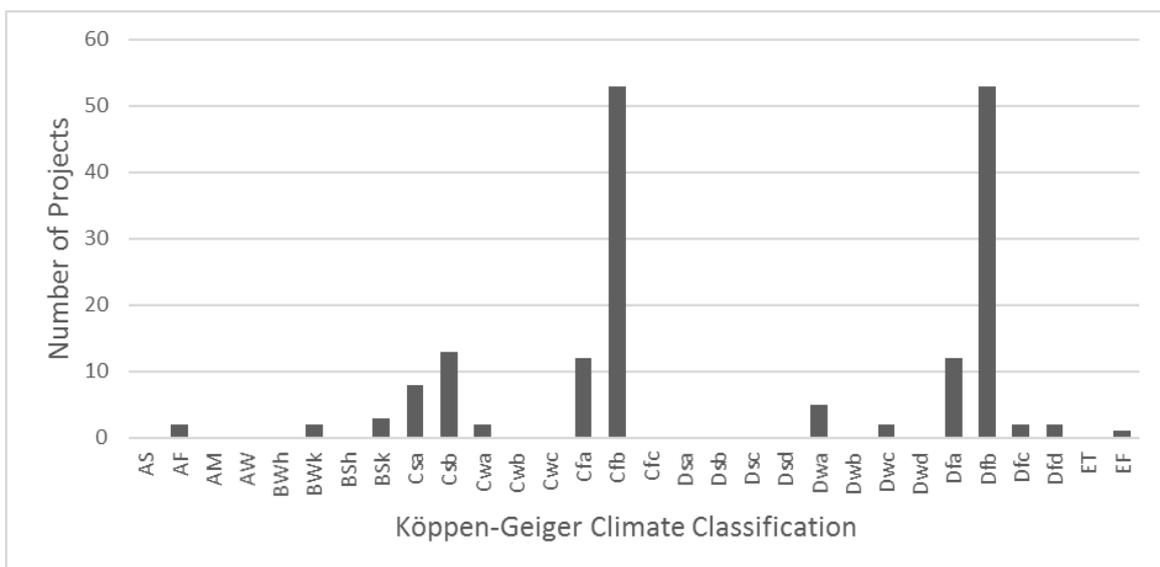


Figure 10: Distribution of projects according to climatic zones

### 2.2.11 The location of the project site within the urban-rural gradient

While we focused generally on urban projects we also considered where in the urban-rural gradient they were located. Figure 11 shows the distribution of projects according to this – from the inner urban core to the edge of the city in the immediate rural hinterland (but accessible to and used by urban residents). It is clear that the inner urban area is the location for the vast majority of projects which fits well with prevalence of dockland redevelopment, coastal towns and rivers running through cities. The location clearly has an influence on the number of people living near the development as well as its socio-demographic makeup, transport accessibility and relationship to other green-blue spaces, ecological corridors and so on. In other cases, there are water features further out from the centre or especially on the edge of the urban area, such as in green belt.

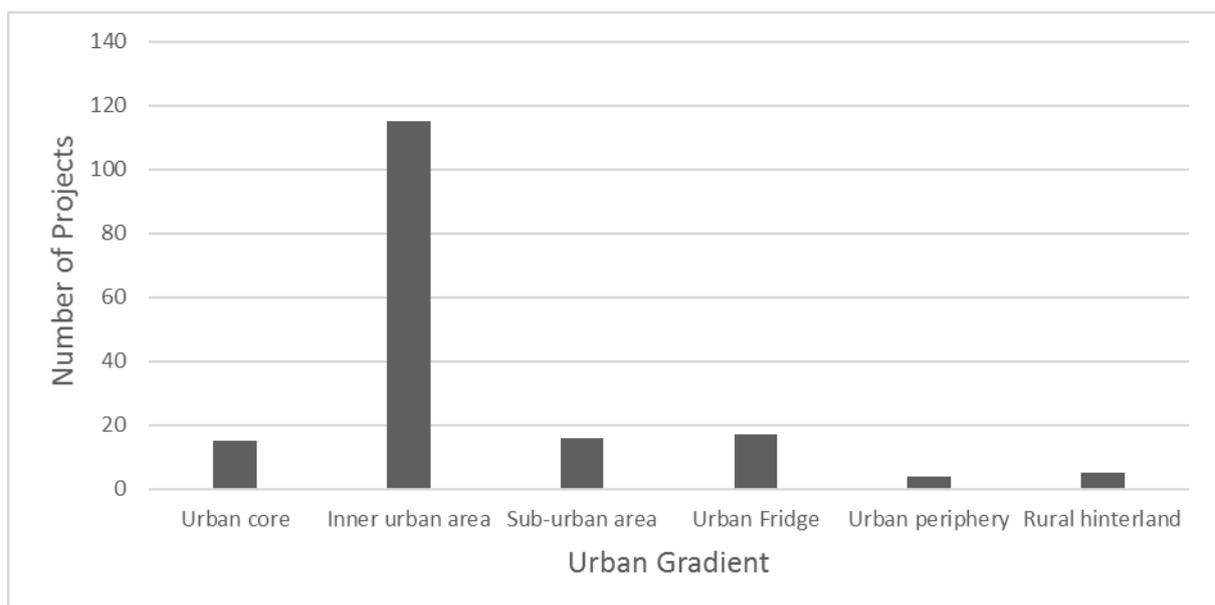


Figure 11: Location of reviewed projects according to the urban-rural gradient

### 2.2.12 The character of the water element

This factor tries to capture the way that the water body forms an element within the landscape and the relative dominance it has in the scene, as well as the potential impact it has on the viewer. Figure 12 shows the range of open/enclosed character of the sample of projects. From this it is clear that the vast majority have a fully contained view with more the horizon occupied by other urban structures or possibly landforms and vegetation. Few have a clear open view to the horizon. Thus the water space tends not to be a dominating aspect of the character enabling) to get an immediate sense of being away. By contrast, enclosed water in an old dock surrounded by high rise buildings does not have the visual or sensory impact of the open sea with waves rolling in.

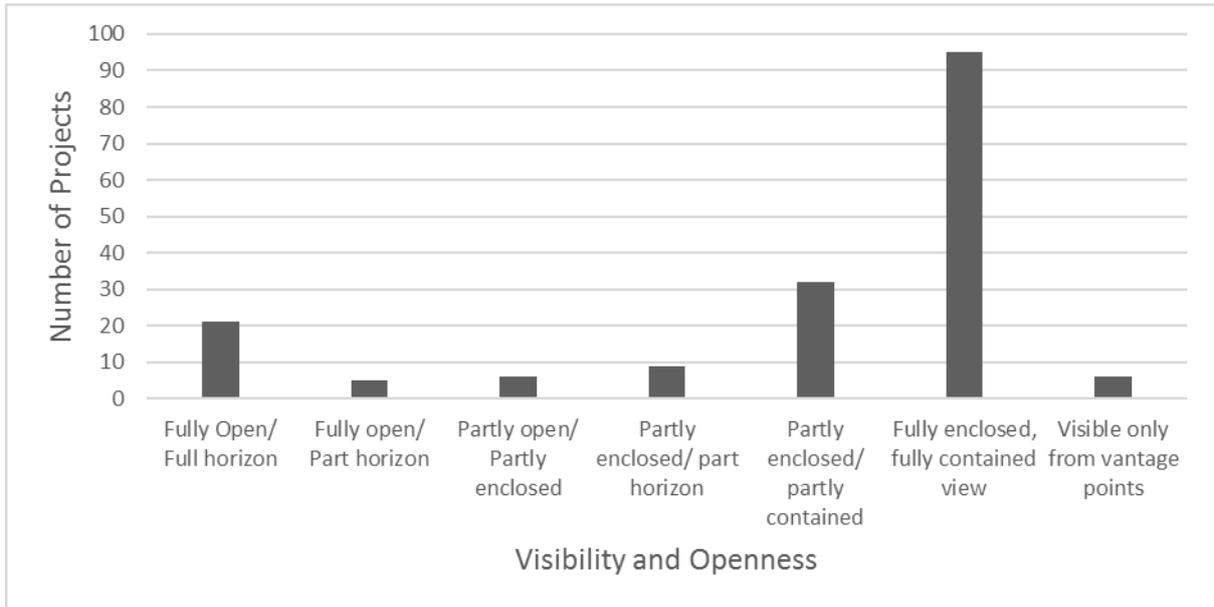


Figure 12: The degree of visibility and openness of the water of the reviewed projects as part of the character of the experience possible.

### 2.2.13 The image of the place, its perception and meaning

This factor attempts to identify the main aesthetic aspects which help to give the place its sense of identity. Places with a strong image tend to form a focus of attraction, help to give the place a stronger sense of identity and, in the case of redevelopment, to blend aspects of the former identity (if there was one) with the new one created by the planners and designers. Each project could have several factors identified which contribute to this and Figure 13 shows the main influences on the sample. The main ones are: imageability (where the design presents a strong image through the use of the spatial layout, design features and overall concept), accessibility (meaning that the site has a strong pull for people and attracts them to go to it) and legibility (meaning that the place a strong and understandable structure) with place identity following closely behind.

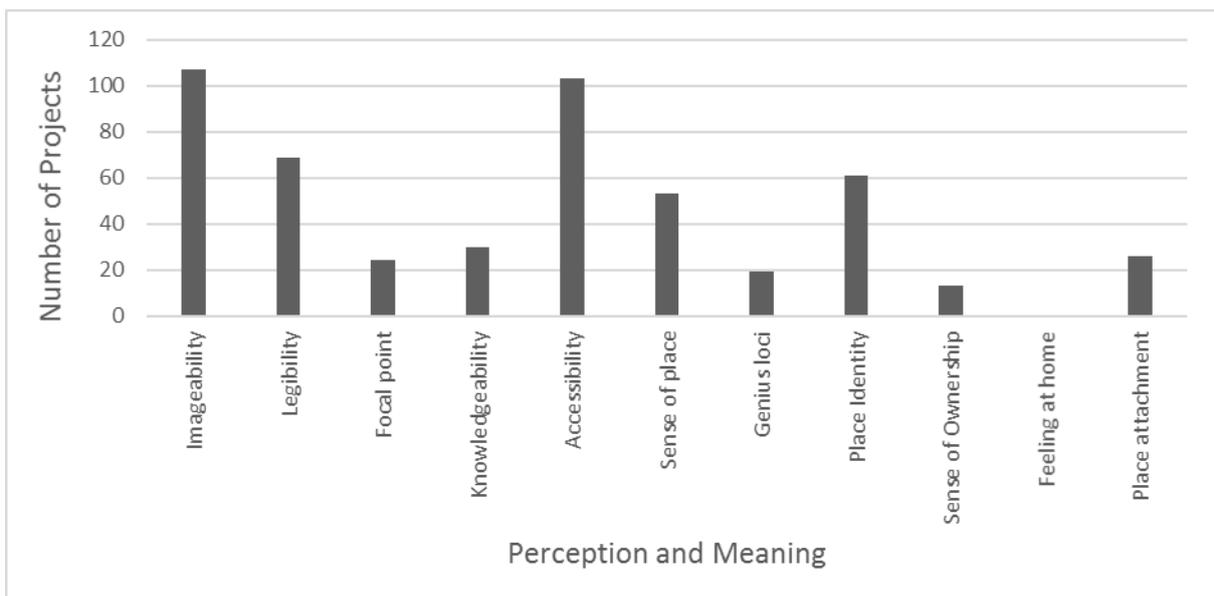


Figure 13: The different aspects of perception and meaning expressed by the reviewed projects

### 2.2.14 The general health and well-being possibilities

The character and atmosphere of the place as well as a number of design factors can be used to promote different aspects related health and wellbeing, be it possibilities for increased physical exercise or mental well-being, stress reduction and mental restoration (we are not assuming that these benefits are yet proven to be related to water but wanted to see if the opportunities for these had been considered in the design). We assessed each project for these factors – again, each site could have more than one, but ranked in importance – and the frequency distribution is found in Figure 14. We can see that rather general flexible affordances for all kinds of programmed or informal activities are included in the projects – they are often designed in this way so that new activities can also be incorporated and spaces free of specific elements allow this. The other main opportunity in most projects is for increased physical activity on land or on water. This is facilitated by the path networks on most sites as well as facilities for water activities and other sports. Increased social interaction is a common goal as is the potential for solitude if desired, often through the placing of seating and views. Aesthetic pleasure is also a specific possibility in many designs.

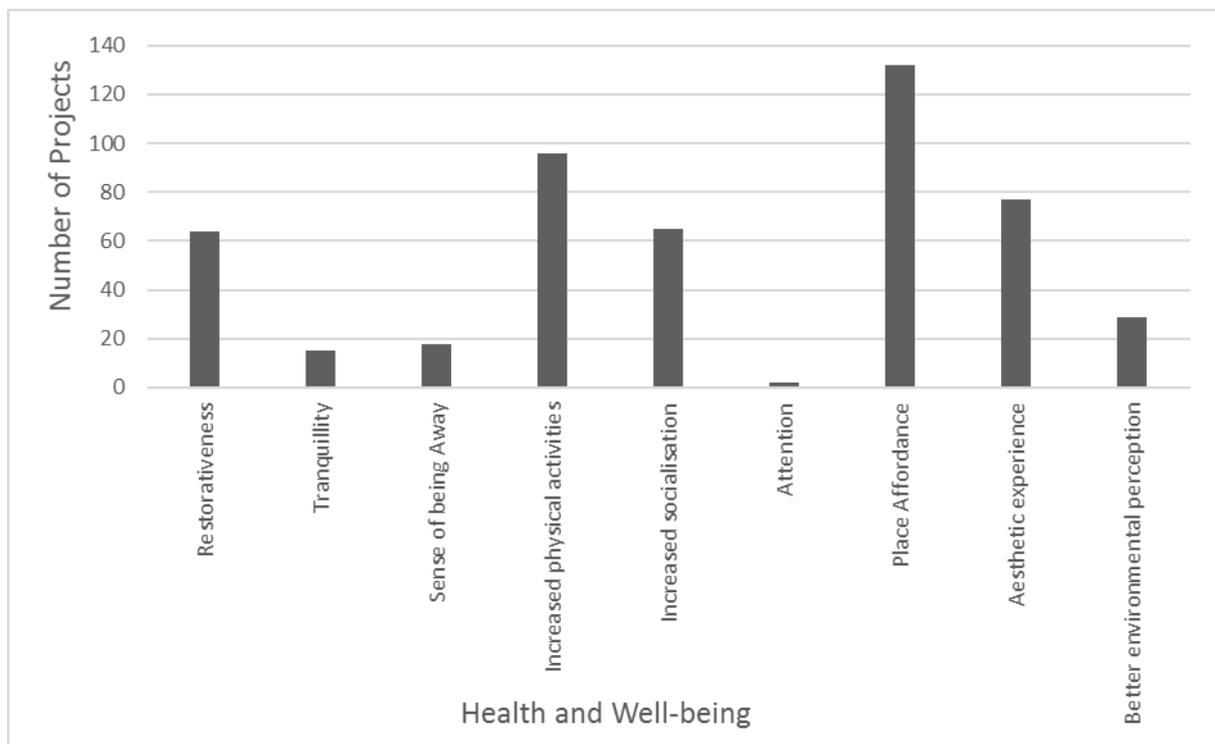


Figure 14: The health and well-being possibilities offered by the reviewed projects

### 2.2.15 Interaction with water

The ways in which people can interact with water vary. Depending on the location, the type of project, the quality of the water and the structure of the water-land interface, direct access to water is not always possible. However, most designers have gone to great lengths to ensure as good access as possible – if not physical, then at least visual – is incorporated in the project. Figure 15 shows the distribution of the different potentials. It can be seen that visual access is possible in all projects, while a majority also allow some physical interaction such as dipping a hand or foot in the water or feeling spray from a fountain. A little under half actually allow full immersion in the water.

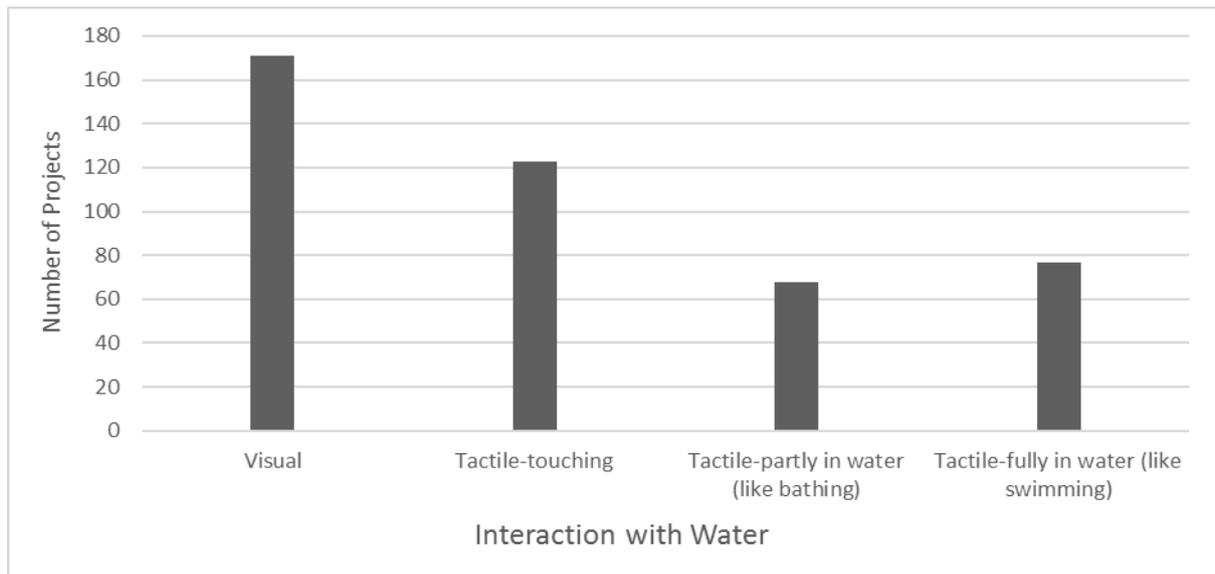


Figure 15: The distribution of means of interacting with water

### 2.2.16 Conclusions from the initial analysis of the main characteristics

From the analysis presented above (see list in Appendix 1) we can see a clear pattern emerging:

- Waterfront re-development or revitalization projects are currently a very important part of urban regeneration and include a wide range of types which all have a positive impact on urban life at a range of scales.
- Planners and policy makers have clearly recognised that, whether the motivations are economic regeneration, flood management, water quality improvement, cultural enhancement, provision of recreation and access or restoration of nature (and usually most of these go together in some way) blue space is a critical feature of many urban areas. The de-industrialisation of many cities, the movement of ports to larger sites for container ships, the need to clean up pollution and the recognition that flooding risks and urban microclimate issues are increasingly important are all factors driving these changes.
- The importance given to public access, the creation of waterfront parks, of offering visual and physical access to water and enhancing the quality of the landscape by investing in good design has led to the vast majority of projects being given a big role in enhancing quality of life, of neighbourhood liveability and in enhancing the attractiveness of inner urban areas as places to live.
- The brand identity of many cities has been significantly strengthened by the design of iconic water front redevelopments including public spaces and this attracts inward investment and builds tourism. It also means that people want to come to live and work in such environments and this choice is in part due to the presence of water and the opportunities for engaging with it.

- The climatic zone has no specific impact on whether water is attractive to people – it just affects how much people can use it directly for swimming and recreation and what the degree of seasonality offers for different activities. Even frozen waterbodies are attractive for skiing and ice fishing in winter.
- Small-scale interventions can have as big an impact on people as large projects and if they are all that is possible then they should take place. Water features which promote playful behaviour in children and adults seem especially attractive, especially for hot weather.

## 2.3 The results from the detailed project assessment

Following from the panel assessment and the averaging of the scores by each panel member it was possible to see what factors stood out as contributing to the success of a blue space project. These findings are summarised in this section.

### 2.3.1 General landscape and urban design aspects leading to spatial quality

The view to the water, the land-water interface, how the design incorporates the presence of water, the suitability of the design (including elements and materials) to the place context and place affordances are the main factors determining the outstanding and the most aesthetically appealing projects. The design innovation and design sustainability are also important factors. This is often a very subjective aspect to evaluate but is crucial to the image and way in which people respond to the place. Each of the reviewed projects included some specific feature or set of features as a major part of the design concept which contributed to their unique character. These included the reference to the former use of the site, for example ports or harbours, and the incorporation of elements into the design such as cranes, railway tracks, bollards and other structures large and small. In other examples a strong, bold focal feature – not necessarily art as such, though this could also be found – gave a new identity and focal point, a strong image (which also helped with the brand) and means of creating a new place.

Many examples used the water as a means of establishing the new or restored identity of the place, for example the imaginative ways in which designers brought land and water together physically or visually, maximised the aesthetic and sensory impact or used design to screen out the urban background in order to focus on the water.

It was also possible to see a certain contemporary “look” to many projects in the way that forms, colours, materials and textures were used. This is because designers look to precedents and there are stylistic movements which inevitably affect what people do, as in all design professions, even when designers try to be individualistic and unique. It is also affected by the types of site furniture, lighting, paving materials and so on which are available off the shelf as opposed to designing all elements individually and from scratch. Equally, maintenance and sustainability are easier and cheaper to ensure if elements are simple to replace or repair.

It is notable that, compared with green space projects, owing to the often high degree of construction required at waterfronts, unique solutions are more common in blue space projects. It is often found that structures perform dual roles as edge protection and water

access provision using interesting combinations of aesthetically designed and structurally engineered solutions.

Larger sites are normally subdivided into different functional and aesthetic zones. Some may divide formal (eg sports) from informal activities, different types of children's play, different types of vegetation or different types of water. This can also increase the attraction and interest of the site by providing a variety of aesthetic experiences, different wildlife and also reduce the sensation of crowding by visually separating spaces so that the site cannot be seen all at once.

### 2.3.2 Potential for increasing physical activity and opportunities for improving mental health and well-being

All sites, apart from the very small interventions such as water features, offer good potential for increased physical activity, even if this is solely land-based. Foremost among these is walking and jogging/running while other exercise facilities and formal or informal sports are also very widespread. The evidence also shows lots of people undertaking such activities – which were often not provided before in the area. Whether this is new activity, people using the new park instead of other places (displacement) or instead of less-safe routes we cannot tell. However, all places are well-used.

The sites are almost all well-designed for providing opportunities to gaze at the view, to sit alone, to contemplate and so on but owing to the popularity and draw of the water's edge solitude is often a problem except perhaps at certain times of the day. In the larger sites the main places for solitude are away from the water's edge, perhaps in the vegetation immediately behind the waterfront (where this is the case).

Most sites were found to be rather urban in character so that the possibility to put the urban context out of sight and mind is less possible, perhaps with less potential for stress reduction (if this proves to be a factor) than when the views to the water are open to the horizon, even if the city is right behind one.

### 2.3.3 Accessibility for all to and within the project site

One of the main aspects we assessed was the accessibility of the site to people from nearby or further afield. In the vast majority of cases the site was easily accessible on foot, by bicycle and from public transport. Car access was also often good, even in inner city areas, due to the provision of car parking. Car parking was more of a standard feature in projects in the USA and Australia – where there is more of a car-borne society – than in e.g. Germany or China. In a few cases – in some former dockland park developments and in urban fringe locations elsewhere there was no public transport and walking distance was rather far so that car access was the main means. However, this was true only in a minority of projects.

In a significant minority of cases access to the area from the water is also part of the design. In some cases, this was from passenger ferries which have terminals next to the new park, in others there are marinas or small docks where pleasure boats can tie up and allow people to disembark in safety. This is possibly an underused opportunity in some places.

Accessibility within the site was also a strong feature of most projects – even in situations where the terrain was quite steep, ramps supplemented steps in gaining access down to the water. In a few limited examples it was not physically possible to make everywhere universally accessible but these were a clear minority. Mainly, however, a lot of effort has gone into making all sites universally accessible. In sites which are not narrow and linear in form internal circulation is important – connecting different areas or zones within the site as well as offering a range of different paths around the site. This may also form part of the functionality where entrances may be located around the perimeter and connections across the site to key focal points need to be made. This is a normal aspect of site design but may be especially important and challenging in blue-space circumstances due to the location.

Design of pedestrian circulation also needs careful planning to avoid people damaging sensitive areas, which may also be a factor in water-edge locations with fragile soils and vegetation. In addition, safety is a factor and people should not be led to places which might pose serious risks without adequate protection such as guard rails. This has to be balanced with the need to maintain the naturalness of the water/land interface and opportunities for experiencing the wild qualities of water, so a balance of risks and hazards needs to be considered in access planning.

Bicycle access was generally possible although cycling within many sites was not possible and there seemed, from the evidence available, to be inadequate cycle parking in many sites. This depends on the cycle culture of different countries and it was not an issue in e.g. the Netherlands or Denmark.

Access to the water depends a lot on specific circumstances. Seaside and lakeside areas are mainly developed with direct access into the water as a key objective – and many are there to enhance access, especially for older or disabled people or to create safer and less damaging access in ecologically sensitive areas. Inner-urban rivers and former docks pose greater challenges and the designers tend to try to give opportunities for closer proximity and visual and sensory access but cannot, due to hydrological or water quality reasons allow people to get into the water directly. The same is true of projects which combine water treatment through vegetation filtration systems with a park. People cannot be allowed direct contact but in all other respects the area is a wonderful place, especially to see water-based habitats and wildlife.

Compared with steps, ramps take up a lot of space, especially when installed on steep and high slopes in order to provide access down to the water. In some projects ramps and steps have been incorporated as key features of the design and made the central concept of the project, with a form which is integral into the aesthetic quality evoked by the project. Handrails are also necessary items to help people use both steps and ramps – they can make a real difference when older people are frequent users. Some sites needed more of these.

Linkages from one site to another featured quite often – in some areas, such as the former docks of Manhattan, a number of small individual parks have been designed which are linked by walkways, forming a more extensive system. Coastal promenades, long distance paths

and river-edge walks are also found to help in connecting different areas and also offer ways for people to connect into the larger structures.

In many of these linked settings it was clear that physical activity is popular – there was plenty of evidence of people walking, running, jogging, cycling, skateboarding and occasionally skiing along these longer routes. The availability of public transport and bus stops helps users to get back to their base if they do not want to return the same way. Many larger parks have circular routes and a range of options so that exercising does not mean following the same route each time. We have no evidence of the actual numbers of users but since many projects have established physical exercise opportunities in places where few or none were before then it is clear that they are fulfilling a valuable role and that many people are attracted.

Thus we can conclude that a key feature of success is a well-thought out accessibility strategy. This involves not only the planning and design of the site but how to get there. This involves planning together with authorities responsible for transport, road management, occasionally railways or metros and sometimes harbour authorities. The walkability or cycle-ability of streets around sites and aspects such as safe road crossings play a role as does the location and walking distance of bus stops, metro stations and car parking.

Within sites it is vital to ensure that universal access is maximised and that the internal circulation allows free movement, choices of routes and the ability to find quiet stretches away from crowded areas. Safety, avoidance of unacceptable risks and damage to sites is also an important part of access planning, more so for water edge landscapes than for many others.

#### 2.3.4 Ways of providing interaction with water

A key aspect of all projects reviewed was to maximise the potentials for engagement or interaction with water. As noted already, in a number of cases it is not possible for people to come in direct contact with water for practical or safety reasons. However, visual and other sensory contact is an extremely important part of any project and in some cases it is very creatively achieved.

In some projects the site lies next to an embanked or canalised river or dockland where it is impossible to gain physical access. On the adjoining quayside or embankment water features have been installed which provide interaction with water jets or fountains – children and adults both enjoy splashing or being soaked by the jets in hot weather. In other cases, the site is nowhere near a natural waterbody but the appeal of a fountain or water feature is so strong that installations feature as focal points in a new park or urban square. Some of these are small and others huge with orchestrated, computer controlled displays. This is in part due to the movement and changing nature of water as a result of its fluid state – jets, mists, mirror-like surfaces, swift currents, crashing waves, tides and so on demonstrate the dynamic quality of water which is such a contrast to the land. In winter, stable or moving, cracking ice, moist or dry snow, thawing periods, freezing fog, blizzards and other phenomena also give special character. Interacting with frozen water is a different experience, often with a hint of danger.

In situations where there are vertical dock walls or flood retention embankments the site is often high above the waterbody. Opportunities to enable people to descend down towards the water are key aspects of the design in a number of projects. This may include installing structures which float or else may be submerged during flooding episodes but the feeling of getting down close to the water, if not in it, is a valuable aspect. It may also be possible for boats to tie up and use the lower-level terraces or quays, so increasing the interaction with the water and water-based activities even in cases where the water itself is not too clean. If the water, while not suitable for swimming, is clean enough for fish then fishing can also take place from lower-level structures.

Closer access obtained by siting piers or other decking structures down by the water can also be incorporated in projects with river re-naturalisation as an aim – the river may be swift and volatile but the chance to get close, even if a bit risky, can provide a special experience – akin to the sublime – which may contribute to a feeling of escape from the city and help in mental restoration. Safety considerations may be viewed differently in different countries but clearly, risk management is needed in such designs.

Interaction with water at the beach – whether at the seaside or lake side - is clearly a long-standing and popular activity but overcrowding, erosion of the soil and vegetation and changing coastal or lacustrine processes can lead to degradation. Many projects incorporate restoration of beaches and beachfront facilities, even to the extent of importing sand and using structures to prevent the beach washing away. Vegetation restoration is also a feature of many projects. This means that, while going into the water is still the main focus, built structures play a more important role in mediating between people and the land/water interface. These also use the opportunity to increase accessibility (see above) and to make it easier for disabled people to get into the water or to make it much safer for children to paddle and swim.

It was noted in the project analysis that many places appeared to have greater potential for activities on the water or access to the sites from the water than was realised by the projects. There seem to be missed opportunities for developing greater interaction and these should be explored as to why this has not been maximised.

### 2.3.5 Provision of affordances for sitting and engaging in social interaction

All projects reviewed pay special attention to seating provision. Some sites are equipped with large numbers of standard benches and from the visual evidence these are well-used. In some places picnics and barbecues are popular and tables, often supplied with grills, are also placed for this – which is associated with some cultures more than others. Bench designs may be off-the-shelf units (cost effective, easy to maintain etc) or made specially for the project. In a number of projects special attention has been paid to the use of recycled materials – often directly from the site – in benches and other structures which is sustainable and also can keep connections with the cultural heritage of the area, for example by incorporating bits of dock equipment into bases for seats.

Seats may be fixed in place – for safety, theft protection and maintenance purposes – or they may be moveable, which allows them to be used more flexibly and for groups of people to

create private corners for socialising and a measure of privacy, especially in busy places. Equally, this allows seating to be moved to find sun, shade or shelter, depending on what is needed at the time, although security and theft risks may be an issue in many sites.

However, there is also a major trend for seating to be built into the design in a more fundamental way – using terraces, steps and low walls as flexible structures with many affordances and with a lower need for maintenance as well as keeping sites simpler and less cluttered by lots of objects. These structures may allow sites or parts of sites to double as performance venues, increasing the social and cultural values and attracting people to them at different times of the day or evening.

In some examples, where there are tides and a warm sea, steps leading down into the water can provide seating which is half-in and half-out of the water at any time of the tide, ideal for older or disabled people to enjoy the feel of water on their bodies. Floating structures may also provide the same seating and dipping of feet into the water but they respond to changes in water level.

Another popular type of bench is a fixed or moveable sun-bathing bed with a sloping section for sitting, lying, reclining etc. These are especially popular in a number of inland artificial “beaches” which provide sunbathing opportunities in the middle of the city. They are also useful in places where the beach is rocky, where there is no beach or where damage and erosion are problems.

Not everyone wants to sit or lie on a formal or informal bench but prefer to sit on the sand, rocks or grass. This is of course possible in many places but not in others for very good practical reasons. However, there is something very attractive about “*dejeuner sur l’herbe*” and sites with extensive lawns are mobbed on sunny days in whatever type of park they are found and as long as the grass is clean and dry at the time.

Hanging out at the beach or on the promenade is a very popular activity and permits good social interaction, relaxation, winding down, people watching, contemplation and opportunities for eating and drinking. A range of options should be provided and seating which is flexible in many ways should be offered as well as seating conceived as part of the structure of the design. There are cost benefits in using standard designs or recycled materials but also other values from using bespoke designs fitted to the specifics of the site and in keeping it clutter free.

In all sites visitors are generally more likely to spend more time there by taking refreshments. Picnicking is available either informally or using tables, while in a number of sites grilling and barbecuing are popular and well-provided for – this appears to somewhat culturally dependent. This also facilitates social interaction. Food sales, ranging from ice cream stalls to full-blown restaurants, bars and cafes are features of many sites

### 2.3.6 Microclimate amelioration and enhancing thermal comfort

Waterfront areas are frequently exposed to strong sun and wind, to rain storms or to freezing conditions. Keeping them comfortable to use all year round can be a challenge. Since many sites in inner urban areas are devoid of vegetation or only have limited planting

(such as former ports and industrial areas) they are often particularly exposed to the elements but, due to the lack of soil and drainage problems, pose problems for tree establishment. In any case, since trees or bushes take time to grow to a size where they can provide good shade or shelter, many projects, while featuring planting, also use constructed elements to do the job instead or as well as trees.

Solid elements such as walls can, if not located properly, cause turbulence and make wind exposure worse – they should be semi-permeable, such as formed from slats instead. Walls which form cosy niches can also warm up and radiate heat making sitting in cooler weather more comfortable in cool-temperate countries. The opposite is true in warm temperate countries where glare from concrete and brick can be a real problem and where breezes are encouraged to help the site to remain cool. Lots of concrete paving can be a big problem in hot climates, radiating heat and glare. Some projects of more architectural than landscape architectural origin

Thus, micro-climate sensitive design is a feature of a number of successful projects – of course, with different solutions in different places. It is clear that much thought and ingenuity has gone into this aspect in many sites. Shade (and rain) umbrellas, canopies which can be furled and unfurled, slatted overhead frames with climbing plants and closely spaced semi-mature trees (in order to get an instant result) are examples of good solutions.

Where there is adequate vegetation already then the designers have recognised that keeping it and managing it while adding to it for the longer term is important. Coastal sites offer challenges for growing trees and woody plants due to salt, winds, rocky soils and so on so the solution of planting and the selection of the correct species or varieties may not be as simple as for a regular park. Evergreen species tend to supply both shade and shelter more effectively all year round.

Since extending the season of use is important if people are to benefit from contact with blue spaces this is a factor that should receive more attention in designs. In tropical climates year round use is the norm but where winters are windy, wet, snowy and/or cold then special consideration should be incorporated into the design to maximise its seasonality. In fact, celebrating and emphasising the seasonal differences is an aspect that can be developed more as part of the local climate amelioration possibilities. Temporary installations can be used to create shade in summer or shelter in winter, for example, or the same structures can perform dual functions, such as some types of shelters found on a number of sites.

### 2.3.7 Ensuring good site management/maintenance

For almost all the projects reviewed, good site management and maintenance was an important factor. There was little evidence of damage, vandalism or worn out vegetation in any sites and almost all were well-equipped with litter bins, which appeared to be well-used and regularly collected. This is a good thing because the investment put into most of the projects is considerable and, since landscape projects (as compared to architectural projects) need time to establish and mature, sufficient funding for management and maintenance is a must (and not always sustainable in the face of spending cuts etc).

In many projects the design, use of materials and quality of construction helps towards ensuring that management and maintenance is likely to be cost effective and straightforward. Simplicity is often a feature of the design as is the use of standardised elements which can easily be replaced or repaired if necessary.

There is one exception to the general rule and that is for some Chinese projects where, due to the way contracts for construction are administered and quality control of construction is not always strong, the sites need more maintenance and repair (they are also often under extreme pressure of use). Chinese designers are very much aware of this shortcoming!

Good maintenance is one signal to users that a place is cared for and this translates into a message that the site is safe and welcoming to use. Damage and vandalism are usually more likely in run-down neighbourhoods and in places where there is little use at night (or where anti-social activities take over at night). Few of the sites which were to be found in such conditions showed any such problems. This might be because the project sites are so well used that such problems are displaced elsewhere – informal self-policing or supervision by users can be important in this respect as can the fact that many sites are overlooked from nearby residential areas.

Different climatic zones may imply more or less maintenance requirements. In warm humid climates there is more likelihood of timber rotting, metal oxidising and plants overgrowing. In dry climates vegetation needs irrigation and soil may be bare and plants dry for much of the year. In oceanic climates with salty water and wind blowing salty air inland this can be a problem for metals and some hard surfaces. In cold climates with hard winters concrete and brick can be cracked by freezing water, metal is dangerous to touch with bare skin and ice movement on lakes and the sea can destroy timber structures. In most projects the use of materials to fit the climate has been well-considered from a maintenance perspective.

### 2.3.8 Ensuring safe and secure sites

Most sites seemed to be welcoming and safe. Safety in relation to the water is clearly an important issue. In projects in e.g. the USA, railings along edges are normal but in other countries there are fewer of these and it is theoretically possible to fall off edges. This means a balance has to be struck between too little and too much risk and risk-averse culture with liability top land owners is more developed in some countries than others.

Provision of water safety equipment such as life-rings or equipping beaches with lifeguards and boats etc. is surprisingly minimal in many projects, even those with sea swimming access. It may be that the evidence is not available, yet we found plenty of photos of sites at the height of summer with little or no equipment.

Personal safety, e.g. from crime, did not appear to be a major problem. Designers are now aware of how to make sites feel safer by reducing the availability of locations within the design where anti-social or illegal activity can take place, by good lighting at night, by ensuring that places police themselves as a result of plenty of people using them and so on. Few sites had any video surveillance as far as it was possible to see. Vegetation was normally set back from paths or was not dense, signs which women in particular feel reassuring on a site.

The perception of safety is also affected by the context of the surroundings to the site. Most are also well-kept and many are mixed areas of residential and commercial premises. However, some sites are in industrial districts or otherwise rather run-down areas so while the site itself might be safe, getting to or from it by using neighbouring streets may deter some people. Crossing busy roads can also be dangerous and may reduce the number of children allowed to go there on their own, given current concerns about allowing children out on their own.

Most sites had good vehicular access for maintenance purposes which would also facilitate access by ambulances or other emergency vehicles. This ensures that any accidents can be dealt with quickly.

### 2.3.9 Conclusions

We can see from the results presented above that waterfront developments and water-accessibility projects form a major part of landscape architecture and urban design practice at the moment and this has been a rising trend since the initial projects were started following de-industrialisation and new port technologies for example, in the 1980s onwards, as well as the need to introduce better means of dealing with storm water and other factors. Planners and designers are clearly aware of the need to make such places attractive, iconic, accessible, safe, easy to maintain and offering as close a contact to water as is possible given practical and other constraints. All the sites we reviewed aim to increase the potential for physical and mental health and wellbeing improvement by offering opportunities for physical activity, for socialising, relaxing, getting closer to nature, soaking up the sun and de-stressing. It is also clear from the evidence that the vast majority of the sites are extremely well-used wherever they are located and that in dense cities with little green space, blue space offers an additional or substitute environment.

## Appendix 1: Project review form

In the original Excel form each box is selected from a drop-down menu (not possible to show here)

### Project Description

Project Name

Place

Country

Architect/ Consultant

Completion Date

Owner Type

Manager Type

Source of Information

Keywords

### Project Characteristics

Criteria	Options	Types
1 Blue Space Types	1	
	2	
	3	
2 Water-Land Interface Types	1	
	2	
	3	
3 Built Environment Types		
4 Scale of Impact	1	
	2	
	3	
5 Intervention Scale (Spatial)		
6 Project Types	1	
	2	
	3	
7 Climate		
8 Urban/ Rural		
9 Visibility and Openness		
10 Perception and Meaning	1	
	2	
	3	
11 Health and Wellbeing	1	
	2	
	3	