

**Design attributes for a land-based experience of healing -landscaped blue-way system**

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**ABSTRACT**

This research addresses a research gap dealing with blue-ways and healing landscape. Mental health is the control point of human behaviors so there is a great need to draw the design process for the improvement of mental health. In a deep search to get new landscape design elements as a design for mental health strategy, the notion of blue-ways under the umbrella of healing landscape comes to light. This research discusses how to use the blue-way system as a tool to improve human mental health and achieve the blue mind effect using healing landscape design attributes and offers an applied framework for the land-based experience of a healing blue-way utilizing those attributes.

**Keywords:** Blue-ways, blue mind effect, Design for mental Health, Healing Landscape, Riverfronts, Waterfronts.

**INTRODUCTION**

Rivers have always been a great potential for the urban life of cities. Over time river cities have experienced terrible deterioration due to urban sprawls leading to pollution of river streams and degradation of their ecological corridor. Recently, designers start to give attention to the importance of urbanism adjacent to rivers that leads to different frameworks for the design of urban riverfronts specifically and waterfronts generally but when dealing with waterfront concept it misses the direct connection with water bodies depending on visual connection only. Therefore, there is a great need for a new perspective to experience waterfronts by creating a water-based journey rather than land-based one so blue-ways notion comes to light.

The fast-paced rhythm of life, as well as the industrial-biased type of urban development process, reflect negative effects on human mental health and trigger stress, this creates the need for a radical

change in how urban development is addressed from high tech-oriented spaces to nature-oriented spaces ( Kahneman *et al.*, 1999) indicated that even minimal exposure to nature will reduce stress levels and humans are naturally attracted to other living organisms as well as to the green hues of plants and blues of water as opposed to the grays of concrete and other unnatural materials. All these factors pointed out a major need for a landscape concept design that focuses on how to relieve stress and improve human's mental health leading to the concept of healing landscape. According to landscape design for mental health (Nichols, 2015) stated that there is a great healing effect of large water bodies' direct connection through water-based activities such as kayaking, surfing, and canoeing in terms of mental health and stress hormone. Therefore, it is stated that there is a great connection between river corridors and healing landscape.

## METHODOLOGY

The methodology includes the following:

-Theoretical frame that reviews previous literature to reach main definitions and components of blue-ways systems and healing landscape concept, proving healing theories and the healing effect of large water bodies.

-Analytical frame that analyzes the land-based experience of international blue-way case studies from a healing landscape perspective to establish the paradigm in dealing with river streams and their related waterfront corridor.

Both frames will help obtaining Blue-way system components and healing landscape design parameters and their different related design attributes.

-Application frame in which the researchers presented the results of both previously mentioned frames to a 30 experts in the field in a form of a questionnaire to extract the applied framework of healing land-based experience of a landscaped blue-way system that can be applied in Egypt.

## RESULTS AND DISCUSSION

### 1-Relation between healing landscape and blue-ways

#### 1.1 Generic overview of blue ways

Blue-way is a new perspective to experience waterfronts by creating a water-based journey rather than only a land-based one. Blue-ways have been treated as a network of multi-activity recreational trails whether water-based or land-based trails and sites whose main purpose is creating a great recreational system that provides visitors with an exploration trip through the city (Turner, 1995).

#### 1.2 Components of Blue-ways

According to the comprehensive definition of blue-way systems, the main components of blue-way systems are the trails rather water-based trails or land-based trails, The trailheads are the access sites for water trails and they should have some service facilities and there are two main types of trailheads; major and minor trailheads.

There are focal points or sites that attract blue-ways visitors and there are three types of them; landscape focal points, historical sites or natural wildlife and protectorate focal points.

The blue-way facilities provide visitors with services they need, such as restrooms, entertainment areas, and nature-based tourism amenities that are associated with touristic activities (Ripple, 2014).

#### 1.3 Designing of Blue-way System

To create a successful blue-way many dimensions are involved such as selecting a suitable location in terms of water trails' type, cities' focal points, and their types. Generally, the blue-way system should be accessible, reflect the character of the city, safe, respect the ecological system of the place and provide a different experience for its user. Each mentioned parameter can be achieved through specific attributes (Olowu *et al.*, 2014).

#### 1.4. Generic overview of healing landscape

Research has proved the strong relation between healing effect and water trail activities through various theories such as the blue mind theory which is a trendy branch of the mindfulness landscape that results in the meditative state of calmness, peace, unity, and a sense of general satisfaction with life, it mainly considers water-based activities as a key for well-being and health. Therefore, neuroscientists have started to lend an eye to the role of

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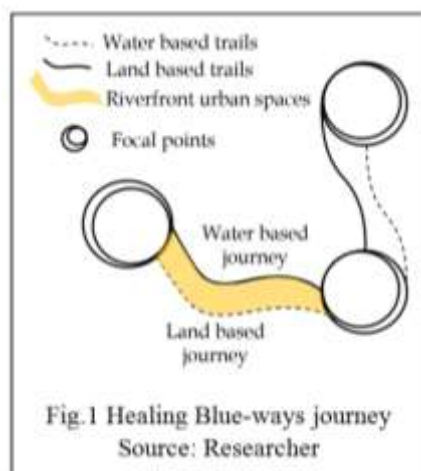
connection with large water bodies in proven substantiated studies which have shown that connection with water reduces the stress hormone and improves human's mental health (Macintyre, 2019)

In 2014, Based on blue mind theory a study by Nichols (2015) in the American Journal of Occupational Therapy on the effect of surf therapy showed reduced symptoms of post-traumatic stress disorder and depression affecting human's mental health.

Healing by water becomes on the head of all healing types, Urbanites start to look beyond yoga studios out to surfing, diving and float therapy as new-wave solutions to wash away the anxieties from the past year and connect with their blue mind (Nichols, 2015)

### 1.5 Healing Blue-way Notion

Healing blue-way is more like a healing journey rather than a healing design of a specific spot therefore to extract a paradigm for healing blue-way, healing elements should be added to each component of the blue-way system related to each journey (Fig.1)



- The healing blue-way system is composed of two healing journeys:

1. Healing water-based journey achieved in water trail activities.
2. Healing land-based journey achieved in:
  - i. Riverfront corridor.
  - ii. Focal points which have three types:
    - a. Special habitat or protectorate.
    - b. Public landscape settings.
    - c. Historical focal point.

This research focused on healing land-based journeys with public landscape focal points.

### 1.6 Healing Landscape of blue-ways system

Healing landscape of a blue-way can be addressed in landscape focal points of blue-way system and the riverfront corridor. It has been defined as a way of preventing health problems and promotes overall wellbeing (Tannenbaum *et al.*, 2009). WHO (2001) had used depression, anxiety as prototype mental health disorders because they are two of the most common neuro-psychiatric illnesses reflected on stress hormone. There are some requisite parameters and attributes that must be followed to create public healing landscape design precisely. These parameters can be extracted using some healing related theories;

**The Attention Restoration Theory** which referred that human has two different types of attention, direct and spontaneous attention, the direct one leads to mental fatigue, therefore mental restorative environments have some characteristics. The most essential is that the environment should be a large domain providing enough to see and experience (Kaplan, 1996).

**Designing for mental health theory** which claims four main types of involvement that should be achieved within public healing landscape which is explained by the pyramid (Fig. 2) This includes:

1. Outgoing Involvement such as being the leader of a group or joining a group of strangers.
2. Active Participation such as being a part of a larger group and being actively involved.
3. Emotional Participation such as being physically inactive and emotionally active with people.



4. Directed Inwards Involvement such as people that want a quiet place and may simply want to be in silence with nature (Mullins, 2015).

**The eight perceived sensory dimensions theory**, this theory states that people perceive green spaces in terms of certain dimensions, and the more achieved dimensions within the park the more provided healing effect (Stigsdotter and Grahn, 2002). This is a generic order of people's preference to the eight dimensions: Serene, Space, Nature, Rich in Species, Refuge, Culture, Prospect, and Festive therefore

a better healing effect is achieved when a variety of rooms are provided.

Healing riverfront corridor is composed of land-based trails and public urban spaces, healing land-based trails are trails that go through different communities, it helps to reduce stress enzymes, they could be more natural and suitable for barefoot walking to allow users to feel the healing energies of Nature and the Earth (Kirkaldie, 2017). However they could wander within urban settings of riverfront corridors aka urban healing trails, they achieve the healing process through social interaction with the built environment and to maximize the healing effect make the healing path meander within historical sights to motivate sense of belonging.

In general, (Mullins, 2015) concluded healing landscape design parameters in ten main parameters,

1. Engagement with nature.
2. High Vegetation to Hardscape Ratio.
3. Sense of control.
4. Opportunities for social interaction.
5. Opportunities for physical activities.
6. Accessible.
7. Variety of Rooms.
8. Adds to the genius loci - sense of place.
9. Relies on interaction through the senses.
10. Landscape is a large domain.

**2. Comparison of healing landscape and blue-way design parameters** is shown in Table (1).

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Table 1. Abstracted healing landscape and blue-way design parameters

Healing landscape design parameters	Blue-way design parameters
Engagement with nature.	Location Enriched by local culture, heritage, arts, and visitor attractions
High Vegetation to Hardscape Ratio.	Safety.
Sense of control.	Accessibility
Opportunities for social interaction	Reflect the character of the city.
Opportunities for physical activities.	Respect the ecological system of the place.
Accessible.	Provide different experiences.
Variety of Rooms.	Apply a sustainable development plan.
Sense of place and belonging.	Being active in nature.
Relies on interaction through the senses.	Exploration of waterscapes.
Design for mental health.	Service providers enabling easy access for all.
Landscape is a large domain	Multi-activity trail options.

Source: (Researchers after Mullins, 2015; Olowu *et al.*, 2014)

### 3. Healing landscaped and blue-way design parameters (HBP)

There are twenty-one parameters of healing blue-way system, considering different types of focal points, different types of healing environments, and

different healing experiences. As this research focuses on landscape healing environment and land-based experience, Table (2) shows a combined list of blue-way design parameters and the design parameters of only healing landscape environment.

Table 2. Merged healing landscaped blue-way design parameters

Parameter code	Design parameter
HBP1	Engagement with nature.
HBP2	High Vegetation to Hardscape Ratio.
HBP3	Sense of control.
HBP4	Opportunities for social interaction.
HBP5	Opportunities for physical activities.
HBP6	Accessibility.
HBP7	Variety of Rooms.
HBP8	Sense of place. (Genius loci) (Location Enriched by local culture, heritage, arts, and visitor attractions).
HBP9	Sense of belonging.
HBP10	Relies on interaction through the senses.
HBP11	Design for mental health.
HBP12	Safety.
HBP13	Reflection of city's character.
HBP14	Sustainable development strategy.
HBP15	Multi-activity trail options.
HBP16	Respect the natural system of the place.
HBP17	Landscape is a large domain.

Source: (Researchers after Mullins, 2015; Olowu *et al.*, 2014).

While reviewing literature, each parameter can be obtained by some attributes

in terms of healing landscape design attributes and blue-ways design

attributes. Table (3) shows the extracted healing landscape design attributes and the land-based journey of blue-way system design attributes.

Table 3. The proposed open list of design attributes for healing land-based experience of landscaped blue-way.

Attribute code	Proposed design Attributes	Related-environment
H1	Create a variety of spaces.	Healing landscape environment in a blue-way system
H2	Function spaces and Anchor points.	
H3	Allow possibility of napping or laying on grass.	
H4	spaces respect different involvement preferences.	
H5	Preserve natural elements of landscape.	
H6	Preserve original heritage features of the space.	
H7	Symbolism and Mimicry of natural forms.	
H8	Create variety of habitats.	
H9	Abundance of flora and fauna.	
H10	Prevalence of green materials.	
H11	Wild nature plants, rich in species to encourage wildlife.	
H12	Creating features that attract wildlife.	
H13	Provide necessary water elements.	
H14	Provide land-based trails that allow movement and exercise.	
H15	Provide natural, subnatural, and urban healing trails.	
H16	Provide meandering paths avoiding dead ends.	
H17	Natural paths are suitable for barefoot walking.	
B1	Focal point should have distinguished features (landscape or heritage)	Blue-way system (Land-based experience)
B2	Provide Interpretive Signage at focal points.	
B3	Providing multifunctional paths such as cycling and walking.	
B4	Provide light structure and mobile service facilities.	
B5	Provide signage system throughout the system.	
B6	Provide accessible camping areas.	
B7	Provide community to water connecting paths.	

Source: Researchers after (Mullins, 2015; Kirkaldie, 2017; Olowu *et al.*, 2014; ElBarmelgy, 2013)




#### 4. Healing blue-way case studies

The researchers have chosen three case studies that consider the healing land-based experience through riverfront corridors and landscaped focal points, how

to take benefit of special natural and landscape settings to provide a focal point and how to transform degraded riverfront corridors into a river-paralleled continuing healing artery. The analysis of these three case studies is shown in Table (4).

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Table 4. Analysis of the land-based experience of urban healing blue-ways in three case studies at Ireland, Bagmati in India and Miami in US.

	<b>Ireland</b>	<b>Bagmati</b>	<b>City of Miami</b>
Site (Location)	Ireland 	India 	Miami, Florida, US 
Description	It applies the comprehensive paradigm of the blue-way system, taking into consideration the parallel land-based healing journey through riverfront land-based activities.	It is treated as only a riverfront system and the connection with the water body is an indirect visual connection considering only the land-based healing experience.	It applies the comprehensive paradigm of the blue-way system, taking into consideration the parallel land-based healing journey
Elements	Landscape focal points, Riverfront corridor public spaces, activities, and trails.	Riverfront corridor public spaces, activities, and trails. Riverfront promenades, Landscape focal points.	Waterfront promenade Landscape focal points, Waterfront corridor public spaces, activities, and trails.
Design Attributes Analysis	<p><b><u>Landscape Focal points</u></b> The blue-way is distributed within many forests and natural settings such as Portumna forest parks, organicedible garden with an abundance of fruits and vegetables, and birdwatching hides which encourages community involvement, social interaction and evokes the existence of different habitats and wildlife. Promotion of visitors' mental health through different involvement preferences and variety of rooms. There are wide green open spaces, woodlands, lakeside walks,</p>	<p><b><u>Landscape Focal points</u></b> Floating organicedible gardens with an abundance of fruits and vegetables. And wild natural plants to attract different wildlife. Wetland areas attract new habitats creating biodiversity in river's ecological system. Redevelopment of a brownfield zone and transform it into an important social hub.</p>	<p><b><u>Landscape Focal points</u></b> natural distraction through bird watching activity. It provides different landmarks and function spaces. It provides prevalence of green materials to encourage napping on grass. It mimics natural forms of hills in creating hills of natural plantations and grass. The Park provides opportunities for social interaction. The Park provides a variety of spaces that respect all involvement preferences, it provides a large domain of activities. The monument island preserves the landmark statue which represents the history of the place providing sense of belonging.</p>

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	<p>offshore islands. In Portumna garden preserving original and heritage site features providing sense of belonging.</p>		
	<p><b><u>Riverfront Trails</u></b> Meandering looped walking trail that is wheelchair friendly wandering through woods and lakeshore, 'easy' grade, and dual surface looped mountain bike trails suitable for children. Combined walking/cycle looped track with lake views. Trails have benches nestled between elder trees overlooking bodies of water that provide framed views through the planting masses. Healing land-based trails are classified into two types; natural healing walking trails (slina slainte) they are suitable for barefoot walking, they meander within natural forests, and urban trails wandering within communities bringing the streets and buildings alive with stories of the past, those healing trails are marked with signs and focal points to make wayfinding for their users.</p>	<p><b><u>Riverfront Trails</u></b> Trails can be categorized into four types: temple walkways, which connect temples creating a temple walk through the park providing healing effect, alleyways are the perpendicular connectors between the river and the city to supporting community accessibility, cycling trails connect different areas along the river and goes beyond the site itself connecting the site itself to other parts of the city, secondary paths are mostly pedestrian paths provide a riverfront parallel promenade meandering along river stream. Inner trails of parks and gardens are suitable for barefoot walking. A floating walkway provides the visitor to interact more with the river, supports the accessibility. The existence of a river paralleled-dual surface walkway for walking and cycling activities. Boardwalk <b>promenade</b> that intersects the river shoreline to interact more with water</p>	<p><b><u>Riverfront Trails&amp; promenades</u></b> Pedestrian-based connected <b>promenade</b> with dense plantation masses to provide framed views for water feature. There are separate seating areas along the promenade. Improved cycling and walking trails connected with the wide network of the city to support accessibility and provide opportunities for movement and exercise within urban context. Blue-way system is distributed in a dense urban context therefore, there are more safety elements regarding pedestrian-vehicle movement such as different paving materials help in slowing down vehicles' movement and crossings that are on axis with the connection paths and the community when the access sites to water are separated from the community by a vehicle road. Connecting perpendicular paths. Floating connected <b>promenade</b> that intersects the river shoreline to interact more with water.</p>
	<p><b><u>Riverfront spaces</u></b> provide different spaces for different physical activities, riverfront provides framed views through the planting masses with an abundance of flora and fauna. there are some mimicry elements of nature such as wooden towers with vine plants to create the feeling of hiking a mountain</p>	<p><b><u>Riverfront spaces</u></b> to achieve urban greening of the river corridor this means that existing green <b>pockets</b> will be used and combined with greening the areas connecting those existing pockets to generate a green membrane of densified volume of trees. Provide water basins. Dig canals to connect urban context with river</p>	<p><b><u>Riverfront spaces</u></b> Take benefit from undeveloped pocket parks and brownfields to be entertainment areas with or without water access points. Provide water basins Focal elements in landscape mimic natural forms.</p>



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	within nature.		
Findings	The choice of focal points reflects the natural character of the city. Urban interventions respect the ecological formation of the riverfront corridor. Focal points reflect different design attributes for healing landscape	Urban interventions respect the ecological formation of riverfront corridors. focal points reflect the character of the city by transforming a brownfield zone with a historical building into a landscape focal point adding sense of belonging connecting people with their origins.	Urban interventions within the riverfront corridor through the redevelopment of some brownfields and pocket parks to provide more access sites to water with picnic areas for more social interaction.

Source: (EDSA planning and landscape architecture,2014; Blue-ways Ireland, 2019; Frelin, 2016).

The comparison between the three case studies according to the achieved attributes of the healing land-based experience of a blue-ways shown in Table (5). Researchers set an initial evaluation of previously mentioned design attributes,

when the attribute is achieved in the three cases then it is strong, when it is achieved in two cases it is medium and when it is achieved in only one case then it is a weak attribute.

Table 5. Case studies' comparison according to achieved attributes of healing blue-way in terms of land-based experience

Attribute code	Ireland	Baghmati	Miami	Weight
H1	√	√	√	Strong
H2	√	√	√	Strong
H3	√	√	√	Strong
H4	√	√	√	Strong
H5	√	√		Medium
H6	√	√	√	Strong
H7	√		√	Medium
H8	√	√		Medium
H9	√	√		Medium
H10	√	√	√	Strong
H11	√	√		Medium
H12	√	√		Medium
H13		√		Weak
H14	√	√	√	Strong
H15	√	√		Medium
H16	√	√	√	Strong
H17	√	√		Medium
B1	√	√	√	Strong
B2	√			Weak
B3	√		√	Medium
B4	√		√	Medium
B5	√		√	Medium
B6	√			Weak
B7	√	√	√	Strong

Source: (Researcher after EDSA planning and landscape architecture,2014;Blue-waysIreland, 2019; Frelin, 2016).

√ achieved

■ Not achieved

From the analysis of the case studies, different design attributes have been added to the open list of healing landscape environment design attributes and blue-way

system design attributes, in Table (6) the researchers presented the updated list providing those added attributes.

Table 6. The updated proposed open list of design attributes for healing land-based experience of landscaped blue-way.

Attribute code	Proposed design Attributes	related environment
H1	Create a variety of spaces.	Healing landscape environment in a blue-way system
H2	Function spaces and Anchor points.	
H3	Allow possibility of napping or laying on grass.	
H4	Spaces respect different involvement preferences.	
H5	Preserve natural elements of landscape.	
H6	Preserve original heritage features of the space.	
H7	Symbolism and Mimicry of natural forms.	
H8	Create variety of habitats.	
H9	Abundance of flora and fauna.	
H10	Prevalence of green materials.	
H11	Wild nature plants, rich in species to encourage wildlife.	
H12	Creating non-plant features that attract wildlife.	
H13	Provide necessary water elements.	
H14	Provide land-based trails that allow movement and exercise.	
H15	Provide natural and subnatural and urban healing trails.	
H16	Provide meandering paths avoiding dead ends.	
H17	Natural paths are suitable for barefoot walking.	
H18	Edible and organic small gardens.	
H19	Provide network of land-based trails (connect trails as possible).	
H20	Provide dual-surface trails for pedestrians and bikers as well.	
H21	Provide framed views through the planting masses.	
H22	Preserve the ecological formation of riverfront corridor.	
H23	Providing different functions paths.	
B1	Focal point should have distinguished features (landscape or heritage)	Blue-way system (Land-based experience)
B2	Provide Interpretive Signage at focal points.	
B3	Providing multifunctional paths such as cycling and walking.	
B4	Provide light structure and mobile service facilities.	
B5	Provide signage system throughout the system.	
B6	Provide accessible camping areas.	
B7	Provide community to water connecting paths.	
B8	Provide Picnic areas with water access sites with water visual connection.	
B9	Create land-based trails that provide different visual and sensory experience.	
B10	Development of brownfields and pocket parks if exists in the riverfront corridor	
B11	Provide a simpleconnected promenade integrated with the landscape and defined by the vegetation.	
B12	Pedestrian-based connecting promenade.	
B13	Provide wide connecting promenade.	
B14	Provide densely vegetated promenade and defined with landscape features.	

Source: Researchers after (Mullins, 2015; Kirkaldie, 2017; Olowu *et al.*, 2014; ElBarmelgy, 2013; EDSA planning and landscape architecture, 2014; Blue-ways Ireland, 2019; Frelin, 2016).

Added 

### Design attributes for a land-based experience of healing -landscaped blue-way system

Each parameter of healing blue-way design parameters can be obtained by a set of design attributes of healing landscape and blue-way systems so the following table showseach healing blue-way design

parameter of land-based experience and their corresponding obtaining design attributes.

Table 7. Framework of healing blue-way design parameters and coressponding design attributes in land-based experience.

Parameter code	Attribute code	Attribute
HBP1	H3	Allow possibility of napping or laying on grass.
	H5	Preserve natural elements of landscape.
	H7	Symbolism and Mimicry of natural forms.
	H8	Create variety of habitats.
	H9	Abundance of flora and fauna.
	H10	Prevalence of green materials.
	H11	Wild nature plants, rich in species to encourage wildlife.
	H12	Creating non-plant features that attract wildlife.
	H13	Provide necessary water elements.
	H15	Provide natural and subnatural and urban healing trails.
	H17	Natural paths are suitable for barefoot walking.
	H18	Edible and organic small gardens.
	H21	Provide framed views through the planting masses.
	H22	Preserve the ecological formation of riverfront corridor.
	B1	Focal point should have distinguished features (landscape or heritage)
	B8	Provide Picnic areas with water access sites with water visual connection.
HBP2	B11	Provide a simpleconnected promenade integrated with the landscape and defined by the vegetation.
	B14	Provide densely vegetated promenade and defined with landscape features.
	H5	Preserve natural elements of landscape.
	H9	Abundance of flora and fauna.
	H10	Prevalence of green materials.
HBP3	H11	Wild nature plants, rich in species to encourage wildlife.
	H18	Edible and organic small gardens.
	H1	Create variety of spaces.
	H3	Allow possibility of napping or laying on grass.
	H4	Spaces respect different involvement preferences.
	H15	Provide natural and sub natural and urban healing trails.
	H16	Provide meandering paths avoiding dead ends.
	H20	Provide dual-surface trails for pedestrians and bikers as well.
	H23	Providing different functions paths.
	B1	Focal point should have distinguished features (landscape or heritage).
	B3	Providing multifunctional paths such as cycling and walking.
HBP4	B6	Provide accessible camping areas.
	B8	Provide Picnic areas with water access sites with water visual connection.
	B9	Create land-based trails that provide different visual and sensory experience.
	H4	Spaces respect different involvement preferences.
HBP5	H18	Edible and organic small gardens.
	B6	Provide accessible camping areas.
	B8	Provide Picnic areas with water access sites with water visual connection.
HBP5	H4	Spaces respect different involvement preferences.

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	H14	Provide land-based trails that allow movement and exercise.
	H15	Provide natural and sub natural and urban healing trails.
	H16	Provide meandering paths avoiding dead ends.
	H17	Natural paths are suitable for barefoot walking.
	H19	Provide network of land-based trails (connect trails as possible).
	H20	Provide dual-surface trails for pedestrians and bikers as well.
	H23	Providing different functions paths.
	B3	Providing multifunctional paths such as cycling and walking.
	B12	Pedestrian based connecting promenade.
HBP6	H2	Function spaces and Anchor points.
	H15	Provide natural, subnatural and urban healing trails.
	H16	Provide meandering paths avoiding dead ends.
	H19	Provide network of land-based trails (connect trails as possible with the larger network of the city).
	B2	Provide Interpretive Signage at focal points.
	B7	Provide community to water connecting paths.
HBP7	H1	Create a variety of spaces.
	H4	Spaces respect different involvement preferences.
	H18	Edible and organic small gardens.
	B8	Provide Picnic areas with water access sites with water visual connection.
HBP8	H5	Preserve natural elements of landscape.
	H6	Preserve original heritage features of the space.
	H15	Provide natural and sub natural and urban healing trails.
	B1	Focal point should have distinguished features (landscape or heritage).
	B9	Create land-based trails that provide different visual and sensory experience.
HBP9	H6	Preserve original heritage features of the space.
	B1	Focal point should have distinguished features (landscape or heritage).
HBP10	H3	Allow possibility of napping or laying on grass.
	H8	Create variety of habitats.
	H9	Abundance of flora and fauna.
	H11	Wild nature plants, rich in species to encourage wildlife.
	H13	Provide necessary water elements.
	H17	Natural paths are suitable for barefoot walking.
	H18	Edible and organic small gardens.
	B8	Provide Picnic areas with water access sites with water visual connection.
	B9	Create land-based trails that provide different visual and sensory experience.
HBP11	H1	Create a variety of spaces.
	H4	Spaces respect different involvement preferences.
	H18	Edible and organic small gardens.
HBP12	H15	Provide meandering paths avoiding dead ends.
	B2	Provide Interpretive Signage at focal points.
	B5	Provide signage system throughout the system.
HBP13	H6	Preserve original heritage features of the space.
	H15	Provide natural and subnatural and urban healing trails.
	B1	Focal points should have distinguished features (landscape or heritage).
HBP14	H5	Preserve natural elements of landscape.
	H22	Preserve the ecological formation of riverfront corridor.
	B4	Provide light structure and mobile service facilities.
	B10	Development of brownfields and pocket parks if exists in the riverfront corridor.
HBP15	H20	Provide dual-surface trails for pedestrians and bikers as well.
	H23	Providing different functions paths.
	B3	Providing multifunctional paths such as cycling and walking.
	B9	Create land-based trails that provide different visual and sensory experience.

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HBP16	H5	Preserve natural elements of landscape.
	H22	Preserve the ecological formation of riverfront corridor.
HBP17	H1	Create a variety of spaces.
	H2	Function spaces and Anchor points.
	H3	Allow possibility of napping or laying on grass.
	H4	Spaces respect different involvement preferences.
	H8	Create variety of habitats.
	H9	Abundance of flora and fauna.
	H15	Provide natural and subnatural and urban healing trails.
	H17	Natural paths are suitable for barefoot walking.
	H18	Edible and organic small gardens.
	H21	Provide framed views through planting masses.
	H23	Providing different functions paths.
	B1	Focal points should have distinguished features (landscape or heritage).
	B3	Providing multifunctional paths such as cycling and walking.
	B8	Provide Picnic areas with water access sites and water visual connection.
	B9	Create land-based trails that provide different visual and sensory experience.
B11	Provide a simpleconnected promenade integrated with the landscape and defined by the vegetation.	

Source: (Researcher after Mullins, 2015; Kirkaldie, 2017; Olowu *et al.*, 2014;elBarmelgy, 2013; EDSA planning and landscape architecture,2014; Blue-ways Ireland, 2019; Darius, 2012)

#### 5. Results of questionnaire analysis:

Parallel to the case study analysis to understand the concept of a healing blue-way; a questionnaire was made to measure the importance of healing blue-way attributes demonstrating the applied framework of the land-based experience of healing blue-way system. The participants of this questionnaire were experts in the field of landscape architecture and urban design and their total number were thirty. The questionnaire was shared through WhatsApp messages, email, and other social media. The design of the questionnaire was based on the finding of the literature review and the case study analysis. As perceived before each parameter can be achieved by a set of design attributes in terms of both healing landscape and blue-way system, therefore the questionnaire focused on exploring the weight of essentiality and existence for each parameter's attributes. The overall perception of the healing land-based experience among experts concluded both healing landscape focal points and healing riverfront corridor. Some focus on focal points, the majority of participants perceived

them from their urban context. Despite this, when asking about the urban context of healing trails most of them preferred natural and urban meandering walking trails with framed views of river bodies through dense plantation. For safety, experts added some design attributes regarding signage systems for paths and trails with start and endpoints with landmarks, they also proposed different practices for brownfield development. The following charts represent the results of the questionnaire showing a collective weight of each design parameter concerning its obtaining set of design attributes.

The current study aims at identifying the parameters contributing to the design of a successful Land-based journey healing landscaped blue-way system. A theoretical background was gathered to show the blue-way design criteria under the umbrella of healing landscape covers the healing landscape design and blue-ways design parameters regarding the land-based journey encompass design attributes of each subsystem then an analytical study for three chosen case studies were conducted to collect more attributes and finally a

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questionnaire, was conducted to confirm these design attributes and merge them to introduce the applied framework of the land-based healing journey of landscaped blue-way system.

The land-based healing journey of landscaped blue-way system is composed of two subsystems which are landscape focal point and riverfront activities ranging from land-based trails to public landscape and spaces, both require healing landscape design interventions and blue-way design interventions, therefore when presenting the framework to experts they indicated that

some attributes should be removed as it is not suitable for the Egyptian application such as providing different function paths within a network of land-based trails as the infrastructure in Egypt is not qualified for such interventions paths. Experts also added some attributes regarding brownfield development as the spatial pattern of riverfronts in Egypt is dense and may not be qualified to provide water access sites so it will be better to provide an entertainment zone for social interaction without access sites (Table 8).

Table 8. Applied framework of healing land-based experience of the landscaped blue-way system

Attribute code	Proposed design Attributes	status	related environment
H1	Create a variety of spaces.	Base-case	Healing landscape environment in a blue-way system
H2	Function spaces and Anchor points.		
H3	Allow possibility of napping or laying on grass.		
H4	Spaces respect different involvement preferences.		
H5	Preserve natural elements of landscape.		
H6	Preserve original heritage features of the space.		
H7	Symbolism and Mimicry of natural forms.		
H8	Create variety of habitats.		
H9	Abundance of flora and fauna.		
H10	Prevalence of green materials.		
H11	Wild nature plants, rich in species to encourage wildlife.		
H12	Creating non-plant features that attract wildlife.		
H13	Provide necessary water elements.		
H14	Provide land-based trails that allow movement and exercise.		
H15	Provide natural and subnatural and urban healing trails.		
H16	Provide meandering paths avoiding dead ends.		
H17	Natural paths are suitable for barefoot walking.		
H18	Edible and organic small gardens.	Added	
H20	Provide dual-surface trails for pedestrians and bikers as well.		
H21	Provide framed views through the planting masses.		
H22	Preserve the ecological formation of riverfront corridor.		
H24	Wayfinding paths with signage system and attractive points.		
H25	Walking trail has a start and endpoint with different features within the community.	Removed	
H19	Provide network of land-based trails (connect trails as possible).		
H23	Providing different functions paths.	Base-case	
B1	Focal point should have distinguished features (landscape or heritage)		

**Design attributes for a land-based experience of healing -landscaped blue-way system**

B2	Provide Interpretive Signage at focal points.	Added	Blue-way system (Land-based experience)
B3	Providing multifunctional paths such as cycling and walking.		
B4	Provide light structure and mobile service facilities.		
B5	Provide signage system throughout the system.		
B6	Provide accessible camping areas.		
B7	Provide community to water connecting paths.		
B8	Provide Picnic areas with water access sites with water visual connection.		
B9	Create land-based trails that provide different visual and sensory experience.		
B10	Development of brownfields and pocket parks if exists in the riverfront corridor		
B11	Provide a simpleconnected promenade integrated with the landscape and defined by the vegetation.		
B12	Pedestrian-based connecting promenade.		
B13	Provide wide connecting promenade.		
B14	Provide densely vegetated promenade and defined with landscape features.		
B15	Provide land-based entertainment zone without water access sites with water visual connection		

Source: Researcher after Mullins, 2015; Kirkaldie, 2017; Olowu *et al.*, 2014; ElBarmelgy, 2013; EDSA planning and landscape architecture,2014; Blue-ways Ireland, 2019; Ferlin, 2016 and questionnaire results)

The results of the Questionnaire are shown in Figure (3).

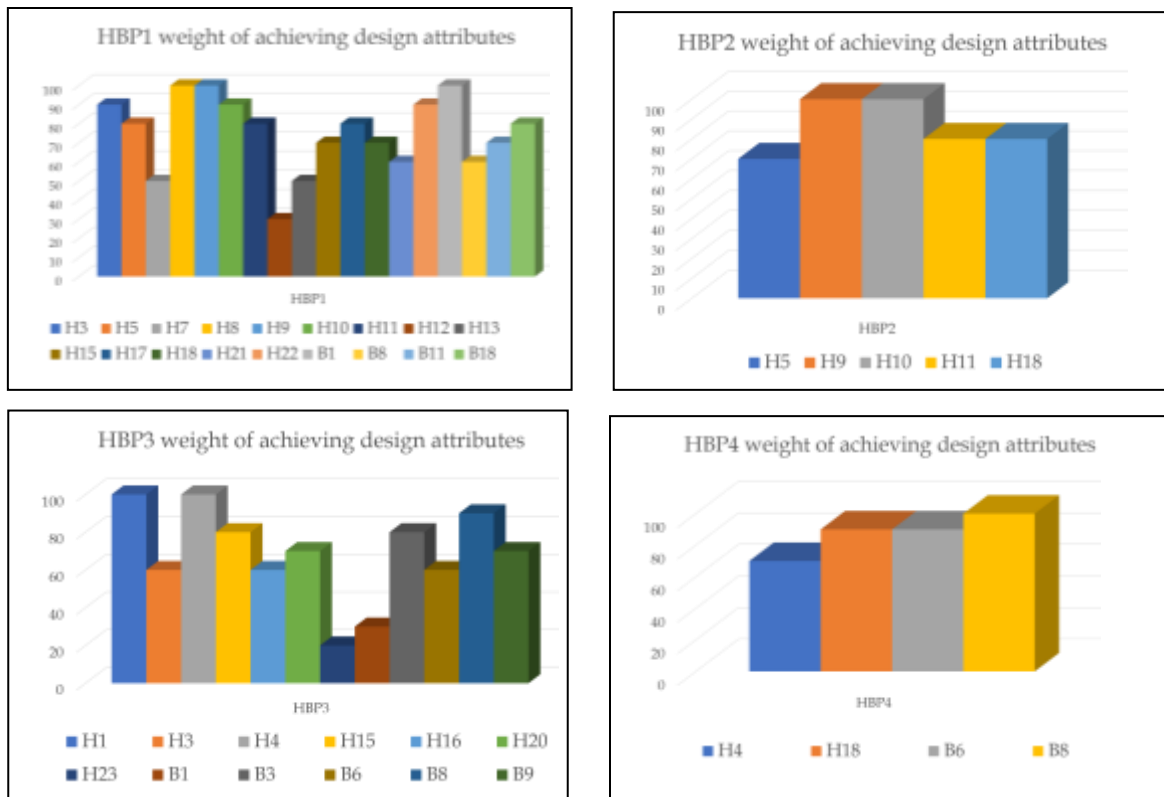


Fig.3 Questionnaire Results. Source resracher

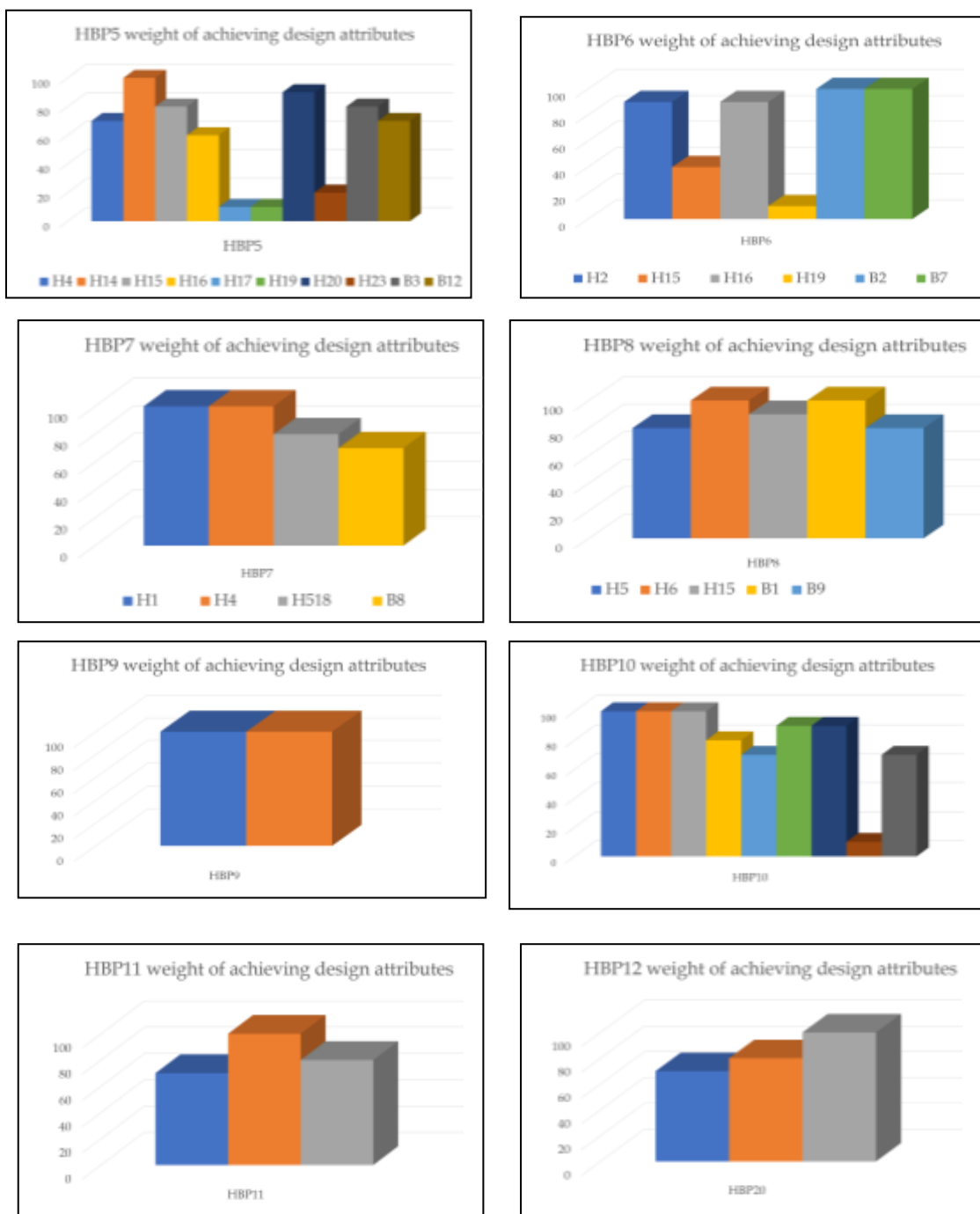


Fig.3. Questionnaire Results (Cont.). Source resracher



## Design attributes for a land-based experience of healing -landscaped blue-way system

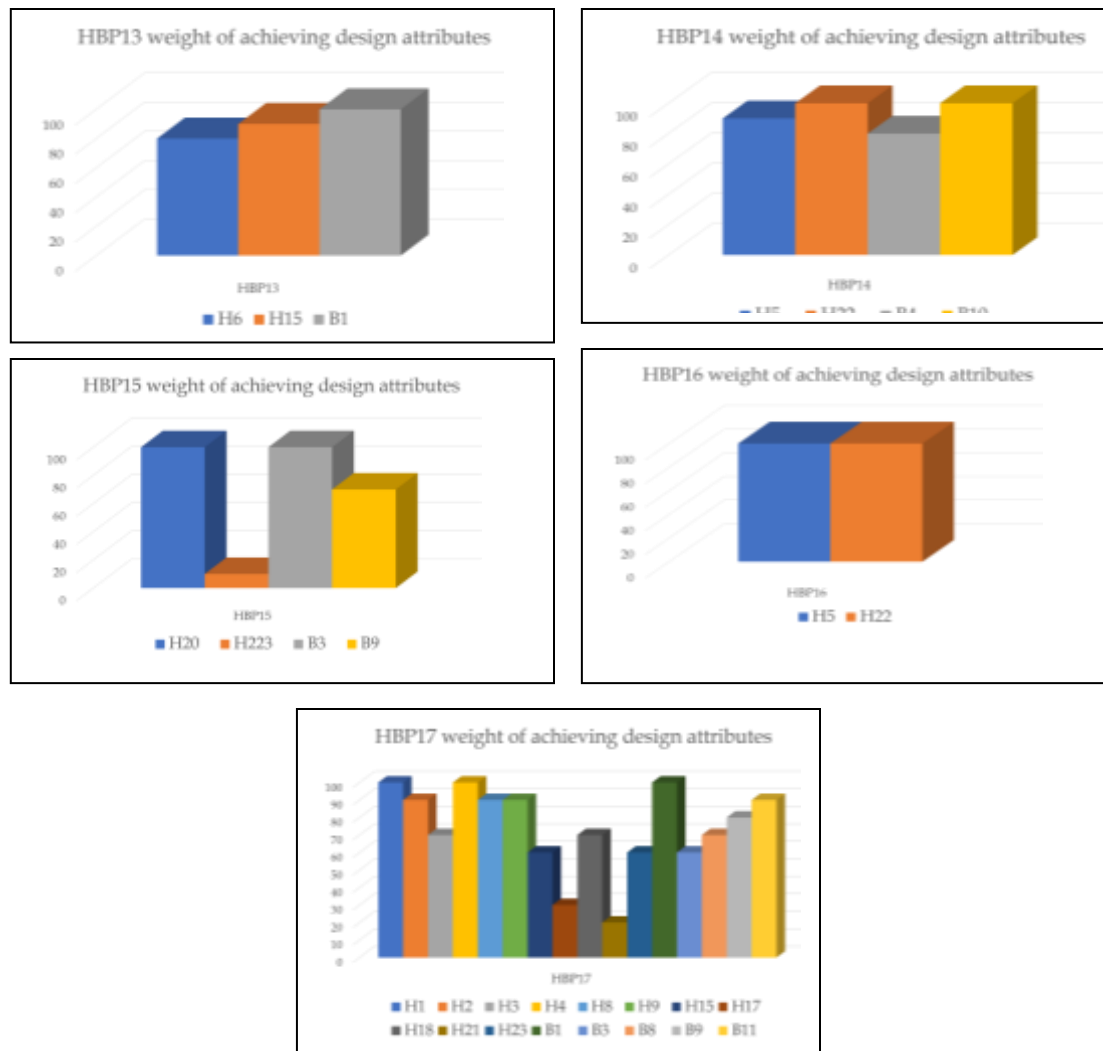


Fig.3. Questionnaire Results (Cont.). Source resracher

### Recommendations;

To create a successful healing blue-way the urban designer should take into consideration the following points;

- 1- To think firstly if the location is suitable for a healing blue-way system in terms of water trails type and its distinguished features.
- 2- Determining the focal points, and to what extent does the water trail is distinguished and reflecting the character of the city.
- 3- Determining the focal points of the blue-way system and their types to identify the type of intervention.
- 4- Thinking of each journey separately down to each component of the journey then provide design interventions for each component to transform it from its baseline case into a design that can provide to provide a healing impact on user mental health.

- 5- Thinking of the whole experience of the blue-way system starting with access sites moving to the user's visual and sensory experience ending with focal points representing the destination of the healing blue-way journey.

### FUTURE RESEARCH SCOPES

From this study and previous literature, it is shown the comprehensive definition of healing blue-way system which reflects both land-based and water-based healing journeys. In this study, the researcher presented only the design criteria of the land-based one but there is still the water-based one which needed to be studied. It is also shown that focal points of any healing blue-way system have different types such as landscaped ones, natural protectorates, and historical sites one, in this work the researcher presented in detail the healing landscape type and there is a great need to study the other types of focal points and their relation with healing design.

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### تحديد السمات التصميمية للتجربة البرية للممرات المائية باستخدام الاندسكيب الاستشفائي

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#### المستخلص

يعالج هذا البحث فجوة بحثية تتعامل مع الممرات المائية والاندسكيب الاستشفائي و نظرا لأن الصحة العقلية هي نقطة التحكم في السلوكيات البشرية ، فهناك حاجة كبيرة لجذب عملية التصميم لتحسين الصحة العقلية و من خلال دراسة عميقة للحصول على عناصر تصميم الاندسكيب الجديدة التي تهدف لتحسين الصحة العقلية تظهر للضوء فكرة الممرات المائية الاستشفائية تحت مظلة الاندسكيب الاستشفائي حيث يناقش هذا البحث كيفية استخدام الممرات المائية والمناطق العمرانية المحيطة بها كأداة لتحسين الصحة العقلية للإنسان باستخدام تلك السمات التصميمية الخاصة بالاندسكيب الاستشفائي لتلك المناطق كما يقدم إطارًا تطبيقيًا للتجربة البرية للممرات المائية الاستشفائية باستخدام تلك السمات.