Preparing for urban future Riverside development, concepts and strategies; a Case study of Khartoum–Sudan

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Preparing for urban future
River side development, concepts and strategies (Case study of Khartoum-Sudan)
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Khartoum,(the capital of Sudan since independence) is one of the cities that has witness three master plans in the past 40 years, besides some others studies that pays attention to the CBD. Despite the attention that has been paid to KHARTOUM riverside, but the city is still unable to utilize it in terms of (spatial design, urban morphology and services) due to:

• Uncompleted and unrealistic plans that has been made for the riverside.
• Absence of housing activities along the riverside.
• Missing connections between city water.
• Lack of proper development policies.

The main objective of this study is to analysis forces that shapes development along the riverside and their influences on the residential and administrative functions, public and open spaces.

The study has been carried out using the following methods:
1. Historical analysis (political and planning history) that has direct impact in shaping the riverside fabric.
2. Study and analysis of the existing situation in both cities -site level.
3. Identifying concepts, visions and strategies for urban development.
4. Giving good model for urban development through an urban design project in the selected areas.

Abstract key words:
Fast development, mobility, water spine, landscape, Incremental planning approach, ecological approach.

1. Introduction

The character of Khartoum first of all determined by its geographical location, it can be described as centre where numerous and various forces meet. Khartoum is surrounded by very large populated desert and savannah; the basic structural element in Khartoum is the river Nile that goes through the country for thousands kilometers. The land is almost flat where there is no prominent topographical feature, a part from MARKELAT Mountain in the northwest. Khartoum has a very special location at the confluence of the White Nile and the Blue Nile shaping the river Nile.

The Nile is not only a dominating structuring element but also a divider where it divides Khartoum to three different cities (Khartoum, Khartoum north and Omdurman).

But the character of the city is not only determined by geography and landscape. The differences in the character the town (the colonial, the traditional and the modern) the strong relation between these characters shapes very strong urban tie combining different building typologies, bearing in mind that Khartoum doesn’t posses any heritage of great architecture (where some other cities do).

1 DEMOCRATIC REPUBLIC OF SUDAN Ministry of local government, Department of housing and MEFFIT S.P.A consulting Engineers. Beautification programme of Khartoum-second Phase report. pp.03
1.2. Quality of place in Khartoum:
Those who visited Khartoum are immediately struck by strong quality of place. The horizontal expanse of the barren desert country, the slow movement of the great life giving Nile, the immense sky and the burning sun. Combine to create a singularly powerful environment.

A lot of element combined together to shape the quality of place in Khartoum, The confluence of the two rivers, the narrow, fast, blue Nile and the slow, wide white Nile. The interesting natural landscape, the magnificent urban agriculture, the natural forest and the vast desert. The structure of the urban environment and the character of the city.

1.3. Flooding:
Khartoum, like most of the cities in Sudan that bordering the riverside suffer from flooding, although it hardly happen that the CBD flood, But large number of neighbourhoods that are not located along the CBD Suffer from flooding each year.

Fortunately the vast open green spaces and the urban agriculture act as flood zones that reserve the water like AL-GABA forest and the area in front of the University of Khartoum. And with no exception the vast agriculture land in TUTI Island.

1.4. Khartoum CPD:

Khartoum CBD is composed of very homogeneous activities which most of them is commercial activities, surrounds by a belt of mixed activities. There are about ten different activities happening

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\[3\] In fact Khartoum in Arabic means the elephant trunk where the confluence of the rivers looks like elephant trunk.

\[4\] the only natural forest left from the old Khartoum

\[5\] the oldest settlement in the city
there, the land area of the CBD is almost about 430, 7 hectare where administrative and services activities are dominating (70%), with very low percentages of residential activities.

Khartoum is city of 4,000,000 inhabitants, most of them live in the periphery, this phenomenon of living away from the CBD make it a place that is active only during daytime, and this fact has been reflected directly to the riverside activities.

2.0 Planning history review:
Khartoum is one of the luckiest cities in AFRICA that had three master plans since independence in 1956, but unfortunately none of them has been implemented. Either because the plan is not realistic, or lack of funds and commitment to realize the plans. The study of these plans brings interesting order to look at the riverside nature.

Planning history review includes the study of four of the previous plans and studies that has direct impact in the riverside development:

2.1. Doxiadis plan 1958:
The plan was based in the theory of the dynamic city and mobile and moving centres with the use of the gridiron as the main feature of it,

This plan recommended allowing development to happen on the centres parallel to the Nile from the south and the north and across the Nile east and west connecting the different centre by strong means of transport and bridges (the plan recommended four bridges to be erected) the plan also recommended the separation of the administrative activities from the services and commercial activities

Doxiadis expected that there would be fast development in the waterfront area so they accommodate the waterfront area as special part of the general plan.

Doxiadis project however has not implemented, mainly because of the lack of the government commitment to planning as well as to the lack of funds. Doxiadis has builds abase of changing the functions of activities in the river Nile to a kind of mixed activities. Which will activate the riverside but unfortunately the dynamic centres that the plan suggested didn’t grow as fast as the plan was expecting. Besides that the percentage of work activities in this plan was too much comparing it with other kinds of activities around the city. The plan also suggested locating recreational activities on the White Nile riverside.

2.2. Meffit plan 1977:
After the enormous growth of Khartoum which wasn’t expected by the Doxiadis plan that results on high housing demands the Italian planner MEFFIT was asked to make regional and master plan for Khartoum, and to prepare a beautification programme for Khartoum, this plan paid more attention to the nature of the colonial city of Khartoum and the traditional city of omdurman, both Doxiadis and Meffit believes in the growing and dynamic centres.

Regarding the riverside Meffit plan concerned more in determining the vertical limits of building heights along the riverside.

The Limitation of the vertical growth proposed by Meffit helps to keep the most attractive area like the river front in very low density that helps to preserve the old historical city fabric; unfortunately Meffit did not pay attention to insert housing activities along the riverside fabric.

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Meffit suggested building a viewing tower at the edge of the MOGRAN (Nile confluence)\(^9\).

2.3. **Structure plan for greater Khartoum (Doxiadis and A/Moneim Mustafa) 1990:**

This plan main concern was to deal with the problem of the fast city growth, the plan study the traffic inside the CBD in more details moreover the plan provides separate study for the riverside.

This plan suggested building of four new bridges to link the city and to relocate the governmental buildings in the waterfront, the plan concern more in defining the policy framework that the past two plans has failed on\(^{10}\).

2.4. **Waterfront study 1992 (Urban planning directives: for the waterfront):**

This study has covered only Khartoum CBD riverside, which extends from the armed forces bridge in the Far East up to the SUNNUT forest in the west

In this study the area was divided into six homogeneous divisions according to the type of activities\(^{11}\).

   2.4.1. The first division was from the natural Sunnut forest up to the Sudan national museum, occupying an area of 300 hectare, dominated with recreational activities.

   2.4.2. The second division from the Sudan National museum to HORRIYA street, planned to accommodate tourist function such as hotels cafeterias restaurant in the riverside ,for the part of this area that is facing ALGAMA street the plan suggest to accommodate investment institutions like banks institutes money exchange etc.\(^{12}\)

   2.4.3. The third division from HORRIYA street up to MIHEERA street west of the palace which include the area between the Nile avenue and GAMMAA street this is about 28 hectare the suggestion was to keep the buildings but changing the functions of it and the using of the area facing the water to for mix use of activities with high density and the part facing the GAMMAA street can be used for financial, economical institutions and keeping the same building character.

   2.4.4. The area from the republic palace up to MAKNEMIR Street, suggested to be developed for administrative functions.

   2.4.5. From MAKNEMIR street up to OSMAN Digna street suggested to be used for very dense residential activities in the part facing the Nile and commercial in the part facing the GAMAA street.

   2.4.6. Between the two bridges (blue Nile and army bridge) this area is meant to be for residential activities services and some commercial activities that links to the housing activity, the area between the Nile and the Nile avenue meant to be for recreational activities.

This plan goes directly into the waterfront fabric without trying to connect it to the rest of the city fabric, the study put too much attention into the tourist activities rather than the residential activities. While trying to keep most of the land between the water and Nile Avenue as open land.

3. **City of Khartoum**

3.1. **The Existing spatial structure.**

The city existing spatial structure results from both natural and man made physical components, these combination of components results in an interesting unique spatial order, recently this order

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\(^9\) Arabic word means the Nile confluence (the place where white Nile meets the blue Nile)


\(^{11}\) B.T.Babike . the best use of governments lands and buildings project’ Centre for urban and rural development, ministry of engineering affairs-Khartoum state ’r 1999.

\(^{12}\) B.T.Babike . the best use of governments lands and buildings project’ Centre for urban and rural development, ministry of engineering affairs-Khartoum state ’r 1999.
has been problematic because of the fast unexpected development that happen in the city in the last fifteen years but even though this spatial order is still interesting because of the existence of the river as central core of it. Besides it is historical unique value.

3.1.1 Economic structure:

Khartoum as the capital of Sudan claims the right of getting most of the money and business of the country, in fact it is the main connector between the north and the south, west and east of the country this prime location together with the river Nile shaped what we can name as TRIPLE Capital, the city can be considered as combination of three cities, (Khartoum, Khartoum north and Omdurman)\(^{13}\) this strong relation between the three cities was result on strong economic dependency between them.

3.1.2 Settlement structure:

Obviously Settlements in Khartoum are developing parallel to the river. That is the case in most of the desert land in Sudan where the river acts as longitudinal oasis. This phenomenon of living next to the river comes from the fact that most of the people used the river as the source of living either by using the water for irrigation or as fishermen where these two activities are dominating the rural riverside and part of the urban areas.

3.1.3 Mobility structure:

The mobility structure of the city of Khartoum is the most problematic structure due to the mix of the local level networks with the national level ones, which make the roads very congested, moreover all the bridge that cross the Nile are located in or at the edge of the CBD, that results in increasing number of passing by traffic inside the CBD area, the Nile avenue as one of the main connector has to accommodate most of this traffic.

Although the river connects all the three cities together but unfortunately it is not used as a transportation system a part from the ferry connection to Tuti Island (the only connection to the island at the moment).

Unfortunately the river is not used extensively for water-based transport, a part from very few rural areas around Khartoum and the attractive active tourist Nile cruises.

3.2 Spatial structure of the KHARTOUM CBD

Khartoum CBD spatial structure can simply be summarized on the following points.

- The main shopping street (GAMHOREEIA Street) goes parallel to the river, where great opportunity of activating the water is missing by bringing the shopping activities next to it\(^{14}\).
- Housing activities don’t have proper connection to water.
- The city has very strong urban barriers that hinder the development. These are the vacant train station to the south of CBD, the military land next to the airport and the airport itself, where these vacant land play major role in fragmenting the city.
- There is an important ferry line that connects the city to the interesting indigenous TUTI Island that expresses the past and the origin of the city.

\(^{13}\) different provinces but one state

\(^{14}\) in fact the old fish market used to be in the ferry stop next to where the friendship hall now located
Khartoum CBD can be divided into four main divisions using two axes:

- **North south axis** which is defined by GASR Street, this axis starts from south of the train station and goes up ending with the republic palace.

- **East west axis** which is defined by the GAMMA street and goes from the university residents and further east and goes west up to the NILE confluence (MOGRAN family park).

Interestingly, along these axes, the character of the place itself changes gradually in both directions, for instance in north south axis the character in the further south is housing activities with very low building profile (1-3) stories high, then the fabric starts changing into a colonial kind of fabric (the hospital and the faculty of medicine) with low profile as well and the further north into modern fabric with a concrete building (about 5-7 stories high), this axis represents even the historical order of the city development from traditional into colonial and to modern at the end. Also this axis represents the transition from the housing activities in the south to more mixed housing activities, office up north, then office activities and ends up with the administration activities in the further north where the republic palace is located. Important to mention this axis end up with the historical symbol the republic palace which stops all the historical transition that this axis has.

The other axis runs from east to west starts from a green medium height housing activities where the green is dominating. This green character starts dissolving the more we go to the west when colonial buildings start appearing with green coverage.

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4. Types of riverside spaces in Khartoum:
Four types of riverside spaces can be identified in greater Khartoum, each one of those spaces has its own character in terms of accessibility and contact to water, and these four types are:

4.1. Water edge: In this case the buildings rise straight right at the edge of the water, this typology exists in the traditional ‘TABIA building’ the open recreational area and restaurants in the MOGRAN area and further up to white Nile in KALAKLA where it change to be more kind of house to water relation.

4.2. Perforated water Edge: A typology that favoured with strong contact with water through a perforated passage way, or terraces that act as access, some examples are in the AMEERY restaurants, KAFOORY housing area, where you find a passage way along the edge or underneath the building.

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16 Defence wall built during Mahadi regime in OMDURMAN
4.3. **Set back building:** This typology is the most common water-building relation in KHARTOUM CBD, where the space between the building vary from narrow passage to a wide fast road (NILE avenue in OMDURMAN)

4.4. **Bank / or Beach:** this typology is also very common in KHARTOUM, normally this typology shows that the water edge wasn’t used extensively, or the development hasn’t yet showed it is bad face to it, this typology is mostly existing in the white Nile riverside that has a wider beach comparing with blue Nile (which is faster and deeper), Important to mention that the last two typologies are dominating KHARTOUM riverside

**Legend**

1. Water edge spaces
2. Perforated water edge,
3. Set back building,
4. Bank/beach relation

*Fig: (06) Perforated water edge typology*

*Fig: (07) Set back building typology*

*Fig: (08) Bank/Beach waterside typology*

*Fig: (09) Types of riverside spaces along Khartoum city*
5. City structure:

Building typology in Khartoum CBD changes from a kind of longitudinal straight lines in the far east (east of university of Khartoum and the students residents (the former British army barracks)) into a kind of (U) shape or (L) shape or court block structure at the university and the palace and it ends up with a kind of large objects placed into the vast green in the friendship hall and the museum extending with the same typology to the white Nile where the (Golden valley) project will be implemented.

6. Riverside development, concepts and strategies

6.1. Principles:

The vision for Khartoum riverside development has based on five main principles which are

6.1.1. Creating vibrant waterfront districts and neighbourhood (connecting river to neighbourhood) this will happen by:

- Strengthen the centre of the city by focusing in the provision of active connection between the centre and riverside.
- Creation of new residential and commercial areas along the river, connecting the water to the rest of the city and bringing more active programme to water space such as housing.
- Establishing prominent GREENWAYS with public spaces and natural places, orienting new development towards the river.

6.1.2. Looking at the riverside as an active, liveable public place

- Enhancing the recreation functions by providing new facilities and improving the existing ones.
- Programming new functions on the riverside that can enhance the nature of activities happening there.
- Bridging between the old traditional settlements (Tuti Island) to Khartoum riverside by active water based mobility system.
6.1.3. Connecting the waterfront to the rest of the city and to the two other cities.(waterfront as city front yard)

- Looking to city as typical Sudanese house, with active front yard. The riverside act as typical Sudanese front yard where most of the activities happen there.
- Encouraging water based mobility system that could be combined with the existing mobility system.

6.1.4. Clean, accessible river (*ECO-Vision*)

- Protect the *SUNNUT* forest the only natural forest that remains from the old natural features.
- Reducing the water pollution, providing sustainable solutions for flooding.
- Encourage environmentally friendly buildings techniques and designs.

6.1.5. Hybridism

Keeping the existing hybrid buildings typologies (traditional, colonial and the modern), that defines the character of Khartoum riverside

6.2. **General development strategies:**

The general development strategies are

- River as spine (mobility strategy)
- Open and public spaces strategy.
- Landscape strategy

6.2.1. **River as spine (mobility strategy):**

The strategy based on seeing The River as longitudinal spine that connects the whole city using active water based mobility system that connects all important water nodes to land nodes.

Each on of theses nodes (*on the water side*) has strong connection to the important existing land nodes (*public transport, mainly bus stops*) through and urban park.

The size of these nodes differs according to the nature, the function and the activity of the place where the node is located.

![Fig: (11) The River as Water spine that connect the city](image)

**Mobility strategy:**

- The strategy is based on improving the existing tourist kind of water based transport into concrete system that connect all the city through gate to water, this system is not an
individual system but its system that is complimentary to the existing land transportation system, where they work as one system.

- Each nodes of this water transport system has its own characters and this character will reflect in the way that this area could be developed in away to strengths the quality of place by enhancing its character by developing the existing functions.

Fig: (12) Mobility Development strategy (River as city spine)
The size of the circle shows the importance of that node (the bigger the circle the important the node) the dotted line is the proposed water base transport system, while the black one is the connection in s to the existing transport network

6.2. Open and public spaces strategy:

- The open and public spaces strategy based on the use these spaces as connecter between the proposed water mobility system and the existing mobility structure.

- So the public spaces development direction is determined by the direction of movement from the water bus stop to the normal existing bus stops and vis-versa, along these public spaces new functions has been added according to the nature of place.

- This open and public spaces works together with the landscape strategy forming up directions

Of people movement and defining spaces in between

Fig: (13) Open and public space Development strategy
6.2.3. **Landscape strategy:**

This strategy based on looking to Planting as

- 6.2.3.1. Space definer
- 6.2.3.2. As filter
- 6.2.3.3. Typological connector

Planting as space definer include the use of plant to define the edge of the existing and the new programmed spaces, moreover using plant as filter include it’s visual use where it bring a visual space penetration beside it’s use as dust blocker and temperature cooling down source in the hot climate of Khartoum. Planting as A typo-connector means the use of these trees to connect the three different buildings typologies exists along the river side.

![Fig: (14) Landscape Development strategy (Planting as Space definer)](image)

7. **Schematic proposals:**

According to the proposed water based mobility structure schematic proposals has been developed in some of these nodes based on the character and the importance of the activity that is dominating, three nodes has been selected accordingly as an example of development these nodes are:

- University of Khartoum node
- Republic palace node
- Friendship hall node.

The general development strategy has been applied to all of these nodes according to their special characters resulting in three different development programmes

![Fig: (15) Location of the selected nodes for Development on the riverside](image)
7.1 **The First node:**
Proposed new development concept in the university area:
The Development strategy for this area is to enhance the kind of openness activities that is dominating there by enhancing the following characters:
- Amphitheatre.
- Play field (*During flooding the amphitheatre and the play field turns to swimming pools*)
- Planting as space definer.
- The Main pedestrian passage follow site topography, this will insure the accessibility of the park throughout the year.

![Fig: (16) University of Khartoum node development scheme.](image)

7.2 **The Second node:**
Proposed new development concept in front of republic palace:
The main development strategy for this area is to make it more open, accessible and liveable by enhancing the following characters:
- To change the water city relation from water balcony to water stepped relation to make the water accessible.
- Widening the pedestrian areas around
- Adding green landscape in front of the palace.

![Fig: (17) Republic palace node development scheme.](image)

7.3 **The Third node:**
Proposed new development concept in friendship hall:
The Development strategy for this area is to develop the character of the existing cafeterias and to develop the existing ferry line to *TUTI* island by enhancing the following characters:
- Provide a new floating passageway for pedestrians
- Re-orienting the access direction to the existing activities to happen from the waterside rather than from the back side.
8. **Implementation strategy:**

Implementation strategy is based on work breakdown, where the whole area can be developed as three separate programmes. Within each of these programmes there are either two or three projects. (Transportation nodes) depending on the nature and character of each of these programmes. Those programmes are:

- Development programme for university area.
- Development programme for the republic palace area.
- Development programme for the friendship hall area.

The implementation strategy based on an incremental approach carried on by public-private funding, the strategy developed as followed

- The first step is to develop the connection between the proposed water mobility system and the existing mobility structure; this connection will activate the area by enhancing the activities that are dominating in each node.
- The place will become active to attract developers and investors to develop the area; this step is mostly carried out by private investors with public administration.
- After the investors starts to develop the area the money will be available to finance the rest of the project incrementally, including the parks and the rest of the activities.
- Other programmes will be implemented accordingly in all riverside transportation nodes according to the special development strategies.
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