

04

CHAPTER FOUR

CONTEXT: SECOND READING

INFRASTRUCTURE AT THE SCALE OF THE APIES RIVER

Introduction

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Theory for the Apies River Vision

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Vision for the Apies River

4.1

Introduction

The water cycle is one of the most critical processes to supporting life on this planet, and fresh waters are central to all aspects of our lives. Historically, urbanisation has led to the loss and degradation of wetlands, rivers and groundwater resources through pollution, resource depletion and construction within natural flood plains.

Woods-Ballard in

(Armitage, Vice, Fisher-Jeffes, Winter, Spiegel & Dunstan 2012:1)

The Apies River Corridor has undergone a series of transformations, creating tension between the urban fabric and its natural, historical and cultural significance, revealed in the subsequent deterioration of the site and landscape, and the severe contamination of the river (Dippenaar, 2013). Through various infrastructural expansions, deteriorating social conditions and increased urban development, the present anonymity of the Apies River Corridor is the result of its transformation from a significant source that initiated the establishment of Pretoria as well as being an important natural landscape and recreational precinct within the city and surrounding suburbs, to an artificial, underutilised, fragmented island.

Figure 4.2 illustrates the isolated linear network of water supply from the Fountains Springs and separate water removal system to the Daspoort Wastewater Treatment plant. The fragmented urban condition created by the implementation of major transportation networks throughout the city becomes visible as exaggerated in the graphic illustration. (Author 2015)" on page 36 illustrates the Apies River in its present condition of being removed from any public activities by the isolated infrastructural expansion of Nelson Mandela Drive, constructed without any consideration for the barrier it creates. Situated in this existing fragmented urban condition, the one-way water network of supply from the springs to the city, and a separated stormwater and sewage system of wastewater removal, renders the river's identity a large concrete drainage channel, dissecting the city and completely unintegrated with its ecological, social or potential engineering infrastructural opportunities. Sections A-A and B-B illustrate the topographical condition and position of the Apies River Corridor within the city.

We have constructed large motorways with no consideration to the absolute barrier to access they create. The Apies River, once a significant contributor to the biophilic potential within the town establishment as original source of life to the towns development; is now cut off from the city by the and infrastructural expansion of the Nelson Mandela Boulevard and the cannalisation of the river itself.

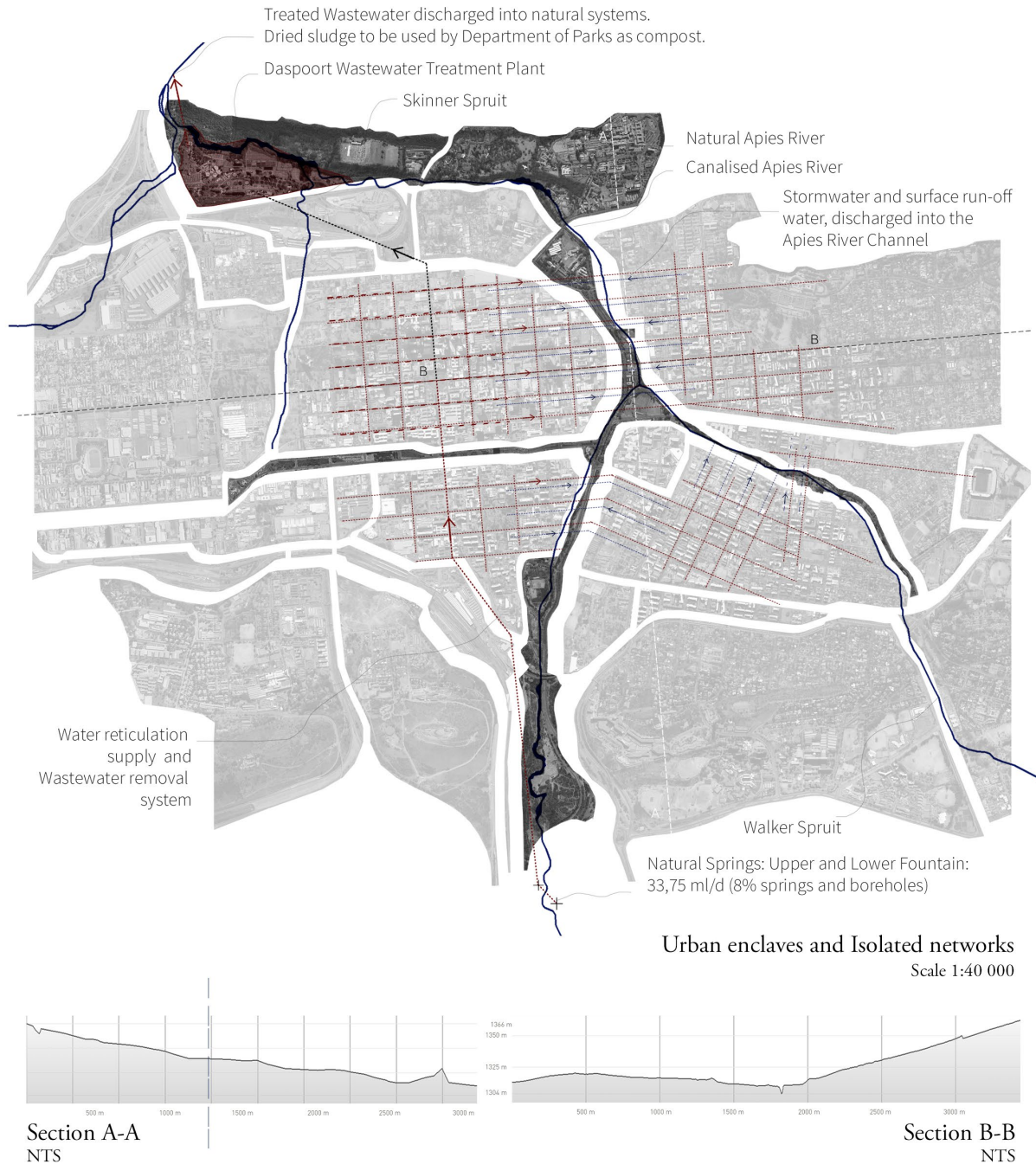
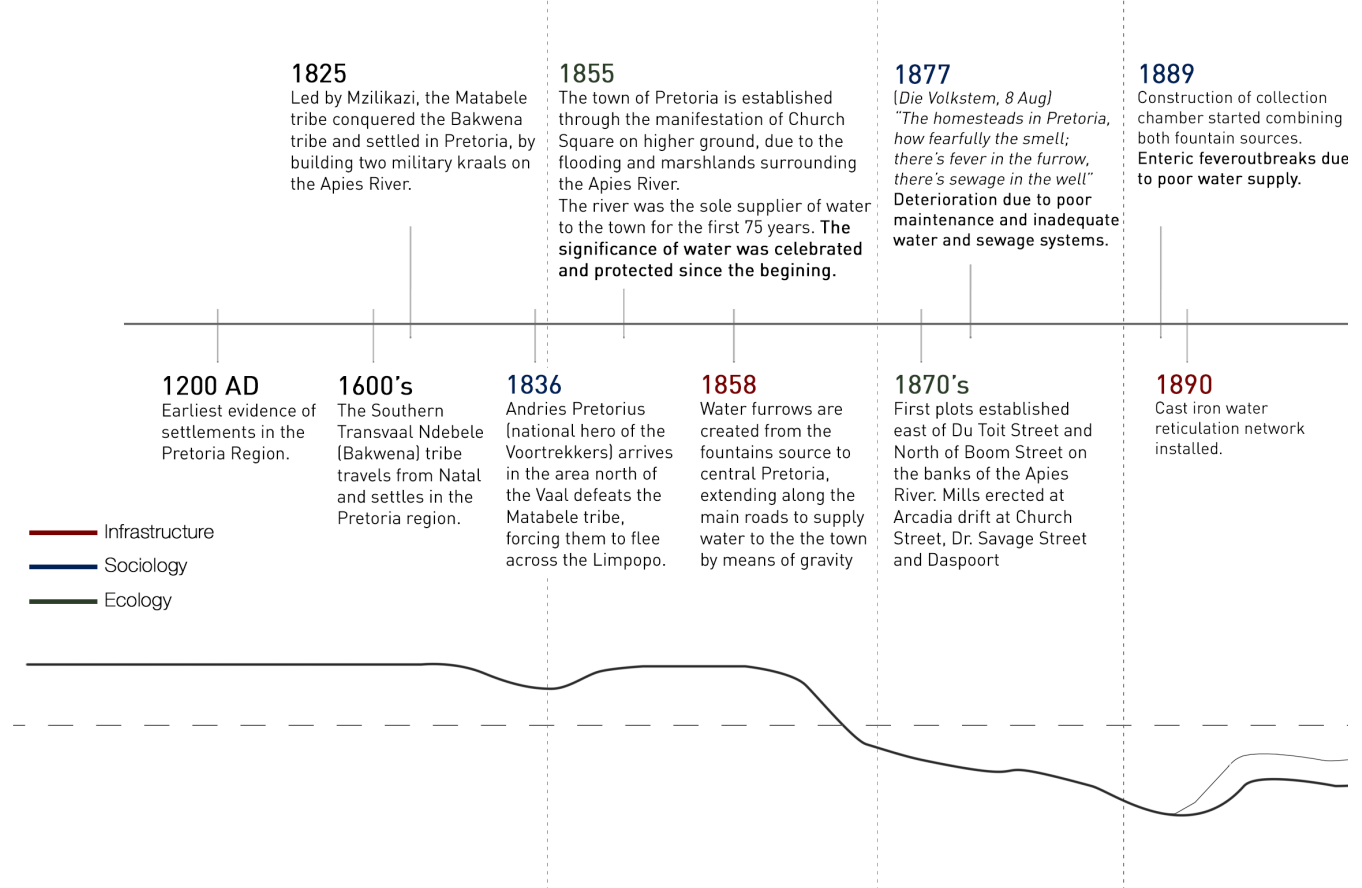


Figure 4.1 illustrates the isolated linear network of water supply from the Fountains Springs and separate water removal system to the Daspoort Wastewater Treatment plant. The fragmented urban condition created by the implementation of major transportation networks throughout the city becomes visible as exaggerated in the graphic illustration. (Author 2015)

4.2

Timeline: Transformation of the Identity of the Apies River

A timeline of the Apies River above illustrates the transformations of the river landscape in three different categories, namely infrastructural, sociological and ecological developments. The graph below the timeline indicates the positive and negative influence these developments have had on the presence of the river as natural entity within an urban context, the ecological benefits to the public realm, and finally the aims for the reintegration of these separated infrastructural networks with its potential benefits.



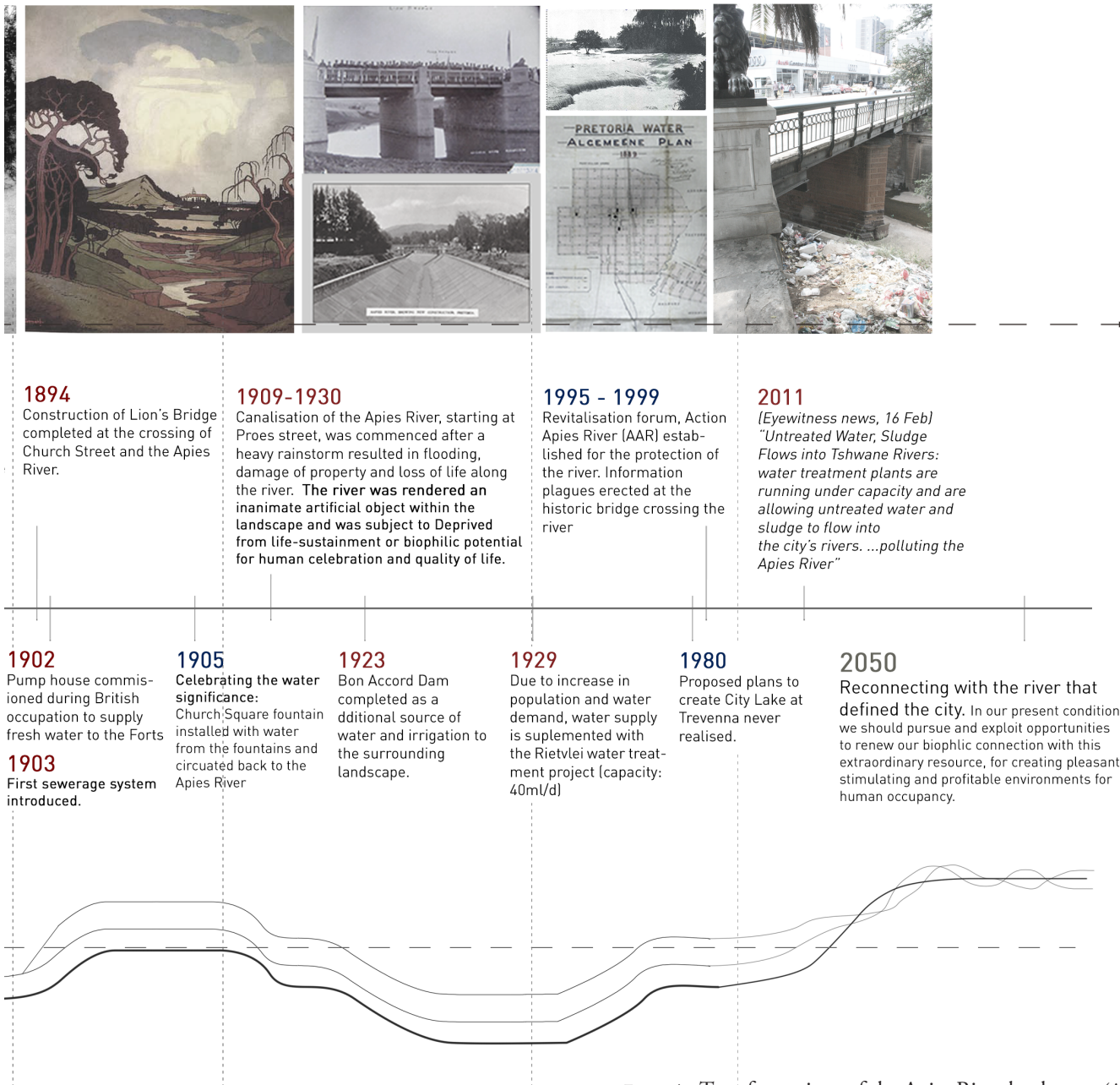


Figure 4.2 Transformations of the Apies River landscape. (Author 2015)

4.3

Theory for the Apies River Vision

4.3.1

Biophilia and Water in the Urban Context

Biophilia, a term invented by Harvard biologist Edward O. Wilson, is defined as the genetic basis for the human predilection towards the natural world (Stairs 2010:339). According to David Stairs, and although it was an unproved theory at the time, the term's development was encouraged by the intellectual community as a return to an instinctive and integrated approach to human development in the debate around climate change. According to landscape architect John Ornsbee Simonds, we still seem to share with our ancestors their instinctive understanding of working in symbiosis with the natural realm, instead of it being exhausted as resource through the control, convenience and exploitation through industrial development and modernisation by humans (Mador 2008:44).

The Apies River, as source of life for more than 160 years, defines the historical margins with which the city, its service infrastructures, and public life have developed.

Essential as source of life and well-being, water's ubiquitous presence supplements human life through basins, boreholes, mines, wells, sewage networks, stormwater drains, ground water tables, aquifers, reservoirs and many more. The identity of this important element – water – holds an extraordinary range of characteristics.

It is perceived as a colourless entity that has the ability to reflect its surroundings, powerfully animating its context through movement, light, control and sound; a liquid that holds no shape of its own, but is shaped by its contained surroundings while in return moulding the natural environment; a liquid that has the power and resistance of concrete when moving at high speed, but at the same time has the ability to submit to touch. However, its presence and significance in human existence are taken for granted and we are fearful of its power and not aware enough of it to serve us (Mador 2008:45).

We seem to associate our genetically driven need for a connection with the natural world (biophilia) with the dramatic landscapes of a red sunset in the bushveld, and excitement over the characteristics of wild animals or a mouldy smelling forest hike with an abundance of bird and insect sounds.

The transformation of the Apies River from natural course to engineered lines in a canalised concrete entombment, is flushing our most essential resource away at great speeds, not allowing it to contribute significance to its context. The canalised Apies River in its present deteriorated condition presents a lifeless inanimate object, deprived of any biophilic potential or opportunities to sustain life.

Since the availability and distribution of water is under our control, especially in developed urban areas such as the city of Pretoria, it enjoys little appreciation for its utilitarian value and no recognition of its symbolic, aesthetic or spiritual values. The potential of these qualities, especially in the case of the Apies River that was transformed from natural landscape to a concrete stormwater channel, needs to be exploited beyond its functional significance through a range of principles, as classified by Stephen Kellert (Mador 2008:44), that reflect understanding of the significance of our various associations with water's potential. These are illustrated in the adapted diagram 1, and range on a scale from the utilitarian to the symbolic. (See Figure 4.3)

We are slowly realising the reality of water scarcity and the economic value thereof, as there are limited places with an abundance of potable water to sustain the current and projected demands of urbanisation and population growth. Embracing sustainable and regenerative principles through the development of our cities allows for an opportunity to find a renewed, integrated and biophilic approach towards a symbiotic relationship with this extraordinary resource. The challenge before us now is to mediate an integrative approach between our strong utilitarian connections with water in the built environment and one that celebrates our aesthetic, symbolic, naturalistic and humanistic attachments (Mador 2008:49).

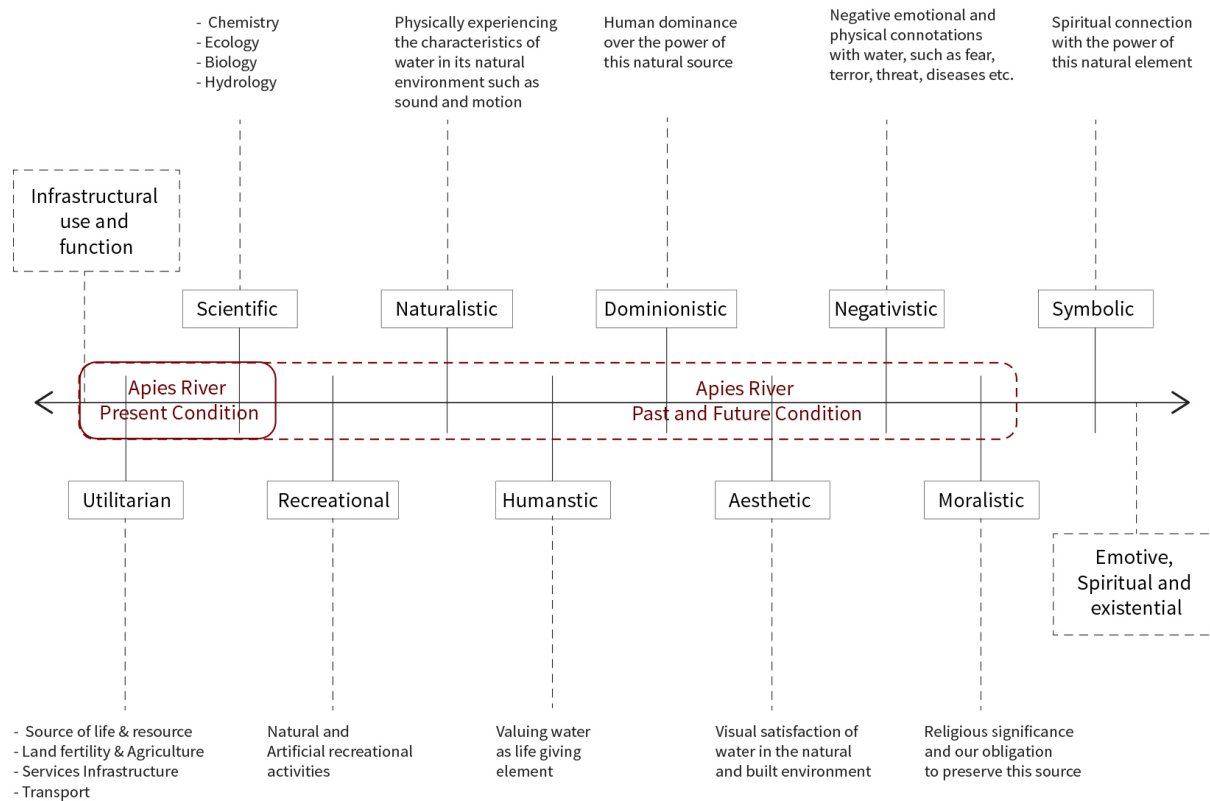


Figure 4.3 illustrates the range of principles, as classified by Stephen Kellert (Mador 2008:44), that reflect understanding of the significance of our various associations with water's potential. (Author 2015)

4.3.2

Reinventing Urban Stormwater Infrastructure: From a conveyance approach to an integrated retention approach

According to the American Society of Landscape Architects, as published in the The South African Guidelines for Sustainable Drainage Systems (Armitage et al. 2012:6), ‘ecosystem services’ are defined as “all possible goods and services that benefit human livelihoods, which are produced by ecosystem processes involving the interaction of living environmental elements”.

The canalisation of the Apies River transformed a recreational natural landscape into a concrete stormwater channel that predominantly collects runoff and channels it away from the urban realm. As with most of the stormwater management systems in the urban areas of South Africa, the preservation of its environmental potential is therefore neglected.

The design and management of urban stormwater infrastructure necessitate a shift from the isolated provision of conveyance to an ecosystemic approach. Instead of channelling water rapidly through concrete channels, stormwater design should emphasise opportunities for the harvesting, retention, re-use and infiltration of surface water to increase its ecological possibilities.

Such a paradigm shift towards an alternative approach, as discussed previously, aims to incorporate stormwater management as a component of an integrated urban water cycle, that would provide localised quantity management and quality treatment of water, enhanced amenity through socio-cultural integration, and the preservation of biodiversity, in an attempt to mitigate negative environmental impacts and exploit positive opportunities (Armitage et al. 2012:7).

Such a shift requires the understanding and implementation of natural dynamics in with our engineered systems in order to create an integrated, holistic approach that collaborates with nature, merging all aspects into a holistic perspective, instead of imposing control over natural dynamics (Armitage et al. 2012:8).

Figure 5.4 illustrates a proposed decentralised treatment network that starts harvesting and re-use on-site, while still replenishing the water system through a detention and treatment strategy towards infiltration back into either ground water or natural systems – as adapted from (Armitage et al. 2012:5).



Figure 4.4 Alte Emscher River with its biodiversity in Duisberg, Germany (Wuppertal 2013) Image edited by author.

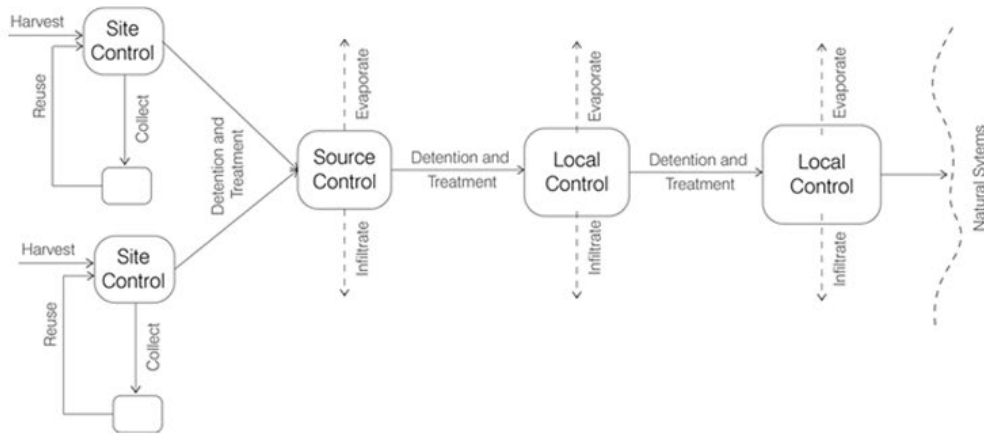


Figure 4.5 Proposed decentralised treatment network as adapted from (Armitage et al. 2012:5)

Figure 4.5 illustrates the four main considerations as well as potential sub-strategies towards exploiting the potential of water bodies as part of sustainable urban stormwater strategies, as adapted from Armitage et al. (2012:3).



Figure 4.7: Summary of the potential to the precinct when implementing an integrated stormwater approach

Figure 4.6 briefly illustrates a summary of potential opportunities through the integration of water in the urban environment with existing ecological and social-cultural conditions, as adapted from Armitage et al. (2012:4).



Figure 4.6: The four primary components of integrating urban stormwater strategies

4.4

Precedents for the Apies River Vision

4.4.1

Cheonggyecheon Restoration Project, Seoul

Project Information:

Ecologically-friendly urban waterway and park

Completion date: September 2005

Client: Seoul Development Institute
with Seoul Metropolitan
Government

Project team:

Lead Designer: Mikyoung Kim Design

Landscape architect: SeoAhn Total Landscape

Civil Engineer: KECC Engineering

Structural Engineer: CheongSuk Engineering

(Cheonggyecheon Restoration Project,
Seoul, South Korea 2011)

Background:

Originally constructed as a large drainage system for the city of Seoul, the Cheonggyecheon channel soon became a sanitation and flood risk during the 1940s when most refugees from the Korean war moved into Seoul and established informal communities along the channel banks. (See Figure 4.7) During 1958 the stream was covered, with an elevated, four-lane overpass following in 1971. By the end of the 20th century the deterioration of the surrounding fabric and public spaces desperately called for reconstruction of the stream and adjacent precincts (Meinhold 2010). (See Figure 4.8)

The restoration project removed the former highway and revitalised the 5,8 km ecological corridor consisting of three different responsive zones, creating a transition from the urban landscape to its final termination into a natural conservation area bordering the city (Cheonggyecheon Restoration Project, Seoul, South Korea 2011). (See Figure 4.9)



Figure 4.8: The Cheonggyecheon channel before the implementation restoration project, showing the implemented overpass in 1958.

Source: "Seoul under Japanese rule(1910-1945)" published by Seoul Metropolitan City History Committee.



Figure 4.9: The Cheonggyecheon channel before the implementation restoration project, showing the implemented overpass in 1958.

Source:<http://landscapeperformance.org/case-study-briefs/cheonggyecheon-stream-restoration>



Figure 4.10: The Cheonggyecheon channel after the implementation of the restoration project.

Source:<http://landscapeperformance.org/case-study-briefs/cheonggyecheon-stream-restoration>

Zone 1: Historical significance

Despite the redirection of concealed watercourses through the exposed landscape, the focus in the first zone is on the re-use of significant historical fabric, such as foundations and materials of historic bridges, as part of the regenerated landscape and public spaces.

Zone 2: Culture in the urban landscape

The integration of culture in an urban landscape becomes the emphasis of the second zone through the strategic revitalisation and addition of recreational and swimming areas in the adjacent precincts.

Zone 3: A natural landscape

The final zone emphasises the termination of the artificial corridor in a natural setting, through the overgrown remnants of the overhead and pier structures preserved on site as part of the layering of the channel history, as well as the constructed wetlands classified as ecological conservation areas.

Successful focus areas of the project:

The transportation and ecological concerns of removing the freeway was mitigated by the provision of additional public transportation and the reduction of sewage, drainage and flooding problems. Biodiversity has flourished, attracting a significant number of insect species, and has been contributing significantly to the ecological value of the urban landscape.

The economic sustainability of the project has been proven to be successful by the estimated 18,1 million visitors by the end of 2008. A diverse range of additional public facilities was established on the channel banks shortly after the restoration, which includes the Cheonggyecheon Museum holding temporary and permanent exhibitions on the history and reconstruction of the project (Cheonggyecheon Restoration Project, Seoul, South Korea 2011).

Critique:

In critically evaluating the project it becomes clear that the channel, constructed below street level, provides pedestrian access to partially enclosed and covered areas within the 200-year flood line, without clear or easily accessible escape routes. This oversight could potentially pose a flood risk to any pedestrian or recreational activities occurring within these confined spaces.



Figure 4.11: The Cheonggyecheon channel activities at night underneath a transportation overpass

Source: <http://inhabitat.com/how-the-cheonggyecheon-river-urban-design-restored-the-green-heart-of-seoul/cheonggyecheon-river-19/>



Figure 4.12: Photograph illustrating public recreational activity along the reconstructed Cheonggyecheon channel

Source: <http://inhabitat.com/how-the-cheonggyecheon-river-urban-design-restored-the-green-heart-of-seoul/cheonggyecheon-river-19/>



Figure 4.13: The termination of the constructed channel into a natural reserve.

Source: <http://inhabitat.com/how-the-cheonggyecheon-river-urban-design-restored-the-green-heart-of-seoul/cheonggyecheon-river-19/>

4.4.2

Los Angeles River Revitalization Master Plan, Los Angeles, CA

Project information:

Los Angeles River Revitalization Master Plan,
Los Angeles, CA
Completion date: 25-50 year blueprint for
implementing comprehensive
improvements
Client: City of Los Angeles, Bureau
of Engineering
Project team:
Landscape Architecture: Mia Lehrer + Associates
Team Project Manager: Tetra Tech, Inc.
Urban Design: Civitas, Inc.
Urban Design: HNTB Architecture, Inc.
River Corridor Planning: Wenk Associates

(Los Angeles River Revitalization Master Plan,
Los Angeles, CA 2009)

Background:

The Los Angeles River Revitalization project represents a successful cross-disciplinary approach to a dedicated 10 years of active participation. Its relevance to the author’s dissertation proposal is based on the project’s intentions of providing a new amenity, a source of socio-economic revitalisation, and a critical intervention for mitigating uncontrolled urban sprawl. These objectives would be achieved through the transformation of a 32 mile concrete lined conveyance channel into a significant ecological corridor within the urban realm (Los Angeles River Revitalization Master Plan 2009).

Project Development:

The project proposal, as an integrated approach to flood control, governance, natural systems and public open space that maximises the potential benefits, was the result of an extensive analysis of various existing infrastructural and ecological conditions of the corridor.

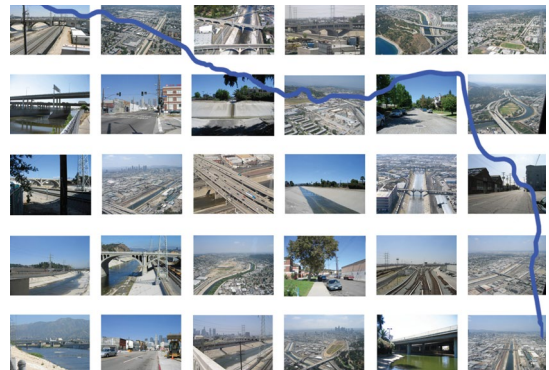


Figure 4.14: Infrastructure to be investigated in the LA Revitalisation project

Source: <http://www.asla.org/2009awards/064.html>



Figure 4.15: Community participation in the project proposal.

Source: <http://www.asla.org/2009awards/064.html>

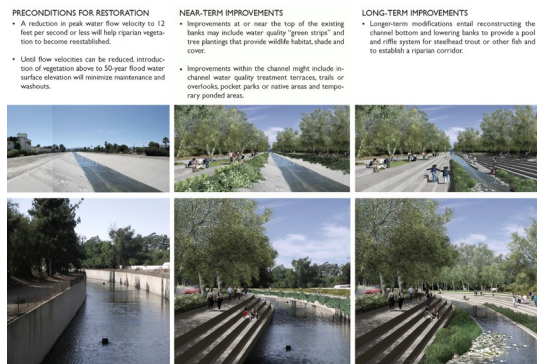


Figure 4.16: Proposals for the revitalised river areas.
Source: <http://www.asla.org/2009awards/064.html>



Figure 4.17: The networks and extent of the revitalisation project.
Source: <http://www.asla.org/2009awards/064.html>

As one of the few entities within the city that cross geographical, economic and social boundaries, the relationship between the river and its bordering communities offered the opportunity for public participation in developing the masterplans of 20 potential sites identified along the corridor.

Five basic principles as well as individual identified masterplans were emphasised during the conceptualisation of the river as ecological corridor. The five principles were outlined as the revitalization of the river, the ecological potential of integrating landscaped public spaces with the existing neighbourhoods, the exploitation of socio-economic opportunities of different communities, the addition of and emphasis on existing and significant values of the sites, the development of Community Planning Frameworks in order to better coordinate land-use development along the river, and finally creating a River Management Framework related to the river improvements, economic development and public space management of identified community sites (Los Angeles River Revitalization Master Plan 2009).



Figure 4.18: Vision for the Apies River Corridor. (Author 2015)

Between the city and the landscape:

Establishing a productive relationship within the **natural landscape and agricultural potential**.

Opportunities for diversifying multi-functional programmes with the **Educational facilities** within the precinct

Decentralised water treatment of the precinct to be naturally filtered before reusing or discharging into the river

Cultural Arena_

Social and ecological filtration point along the river corridor as most stimulated active node between the city centre and surrounding suburbs

Decentralised Grey and Stormwater harvesting and filtration to be reused on site. Buildings in the precinct or bordering the river channel should be integrated in the infrastructural reinvention.

Significant **recreational and historical** node to the river corridor.

Extension of the landscape into the city

The **natural landscape and water infrastructure** extends into the city through the Southern gateway of Pretoria

Naturalisation of the channel in Berea Park to enhance the recreational and pedestrian facilities within the residential community.

The recreational facilities should aim to establish a relationship beyond the residential community, to the **Unisa Sports facilities and the Transportation network** within the precinct.

Decentralised storm- and greywater treatment strategies to be implemented

4.5

Vision for the Apies River

Reinventing infrastructure towards a vision for the future Apies River Corridor would recognise the criticality of emphasising the biophilic qualities that the river offers, as well as employ strategies that exploit enjoyable, satisfying, inspiring and profitable environments for the public realm of the city. The emphasis on biophilic design should recognise the following three critical components: the urban and natural surroundings, the infrastructures that facilitate processes of the urban and natural realm, and the relationship between the two.

This project proposes a reinvention of the conveyance orientated, mono-functional infrastructure into a retention orientated approach of multi-functional systems that are rooted in the existing ecological and contextually relevant socio-cultural systems at proposed nodes along the corridor, as illustrated in Figure 4.17

The various decentralised nodes as proposed, aim to create a synthesis of new spatial compositions that brings together service infrastructure, the urban social landscape and the natural environment, towards reinscribing an identity onto the largely underutilised corridor that bisects the city of Pretoria. Hence the reimagined corridor becomes a network of a complimentary spectrum of events that operate within this urban caesura. Activated by an unpredictable assembly of everyday performances and natural systems, the dynamic nature of the various interventions should allow for maximum exploitation of its location, significance and infrastructure, generating multifunctional and multi-scale territorial networks that support the development of inclusive socio-cultural relationships.

The integration of architectural strategies with service infrastructure would allow the project's sphere of influence to extend beyond the precinct to an effective urban scale. By reimagining existing service infrastructure, instead of expanding on its capacity, the proposals

