

preparing the ground

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[1.1]

## BACKGROUND

**Every two weeks** the world grows in population the size of the city of Johannesburg which is approximately 4,0 million people. The metropolis of Tshwane currently has a population of 2.5 million people. With an annual growth rate of 5%, the population will be around 4.8 million in the year 2020. This will lead to almost double the current development, demand, usage and wastage (Tshwane municipality, 2009).

**It is thus not hard to imagine that our continued survival depends on finding satisfactory and sustainable ways to house the expanding populace (something we are already struggling with), in settlements that consume fewer resources and have less destructive effects on the environment.**

Where do we find this aid for survival? There is no recipe that will guarantee us better futures. But there is a way for us to start shifting the way we think, towards attempting a less destructive path. Our path needs to become sustainable, responsible and considerate.

**“Sustainable development is not about completing a checklist of what you are ‘achieving’ or about planting shrubs and trees on every imaginable surface around us”** (Ruano 1998: 10). Sustainability is about working together as communities towards the same goals, **matching means with needs**, thinking about what we use, how much we use and what contribution we are making even on a micro scale. In order to achieve these objectives, a great deal of responsibility and consideration is required of all the parties involved.

As communities, the areas which we inhabit, become the places where we have the most direct and immense impact and are thus where we can make the biggest change. Nobody knows what a sustainable human settlement looks like or how it functions. What we do know is that **urban areas are the main culprits** in the very serious environmental woes threatening the Earth. Cities already contribute to more than 75% of global pollution and use more than 70% of the energy consumed by humankind (Ruano 1998: 7).

Buildings and their inhabitants consume 60% of the resources extracted from the earth (Ruano 1998 : 7). Therefore looking at how **existing buildings, new buildings** and their surrounds function along with their users and demand, will be a good place to **start** attempting to bring down the effects of environmental damage caused by urban settlements. This is also valid and necessary for the future of The City of Tshwane.

“There are two certainties besides death and taxes that define the ‘challenge’ of the 21st century: population growth & the continued decline of the environment”

(Durack 2004: 4).

[1.2]

## PROBLEM STATEMENT

QUESTION...

**C**an water, electricity, waste, access and movement infrastructure be **re-imagined as habitable space/place** on a localised scale (eg. a city block) to condense the cycle of resource supply, consumption and wastage within the **existing and growing urban structure?**

[1.3]

## HYPOTHESIS

IMAGINE...

**A**lthough our supply of resources are decreasing, the Tshwane Metro Municipality will, in years to come, still be able to provide services to the densely populated metropolis by dividing the city into smaller areas where **localised sustainable infrastructural systems** can be implemented.

These systems will generate and provide resources and services such as water, electricity, waste, sanitation, transport and access facilities as well as logistic, economic and social infrastructure to accommodate and sustain the current and future demands. **Smaller, more sustainable energy cycles** in the city can be achieved through the **re-imaginative design of a supplementary infrastructural building** which is placed in-between buildings in a city block and **acts as a host** of resources and space.

[1.4]

## SUB PROBLEMS

QUESTIONS WITHIN THE QUESTION...

**W**hat is **sustainable urban growth**? Why is it important?

**W**hat is **infrastructure**? Why is it necessary to re-imagine infrastructure?

**H**ow does the **current** Municipal infrastructure work? Is it sustainable?

**H**ow does one design an **appropriate language** for a sustainable building without erasing the character, identity and heritage of the city?

[1.5] AIMS AND OBJECTIVES  
THE SELF SUSTAINING CITY...

To dispel with the current wasteful infrastructural systems within our city, we can divide the city into smaller quadrants which can function with smaller systems. Thus resources can be recycled to create **'mini-Infrastructure'**. Within these divisions, areas can be grouped together to be connected to a 'host', which is either a building which has been adapted to serve as a 'Supplementary Infrastructural' building, or a new structure designed to accommodate the specific area's **current and future needs** (fig. 1\_5).

Although such a **structure** (architecturally designed or engineered) is then built in many **different areas**, the various scales of demand and other factors, such as amount of open space, would call for different ways of approaching the scenario. But in the end, the idea is to create a host structure which will serve the existing structures. This **structure** can potentially house functions and systems such as parking, communications systems, rain harvesting, purification systems and even electrical generator systems, all combined with other needs the area might have e.g. offices, housing parks, clinics etc.



[Figure 1\_5.] 'The Infrastructure' inspired by 'Plug in City' by Archigram.

Though there are many possible outcomes, the aim is to challenge the following concepts:

- Re-imagining** green infrastructure as a means to create space/ place.
- Addressing** the sustainability of **existing** structures in the urban landscape.
- Experimentation** with the idea of creating a structure which is **woven into the urban fabric** which can generate and supply resources and services on a local scale.
- Research** the ability of contemporary sustainable technology and techniques to sustain **large quantities**.
- Attempt to lessen** the current demand, usage and wastage of non-renewable resources supplied by infrastructure.

[1.6]

In ten years time the municipality will still be responsible for providing the citizens of Tshwane with infrastructural services, but to what extent **will they be able to do so?** Will there be enough water coming from the Vaal dam? Will there be petrol/diesel for the trucks to remove waste from each building and transport it to landfill sites outside the city? Will the current sewerage system have the capacity to carry the load of an almost doubled population? Will there be enough coal left to generate electricity?

The idea is that the municipality as client will start funding small pilot projects in different areas either individually or in collaboration with other companies to experiment and attempt to make areas self sustaining and to lessen the demand on the overall demand on the overall supply and service system. If this initiative can then ideally be **implemented in more and more areas**, one could argue that eventually a **self sustaining city could be achieved**.



[Figure 1\_6.] 'Field of dreams' the memory project 1921.

[1.7] OUTLINE BRIEF

DELIMITATIONS AND IDEALS

A site is selected by looking at an area in the **CBD** which is **diverse, dense and built up** (see discussion p. 59) with buildings which are **not sustainable and older than ten years**. A site with specific parameters defined as a 'block' is chosen to be the focus area. Although this is only a method to choose a site for this specific intervention, the initiative should be able to be implemented on any site.

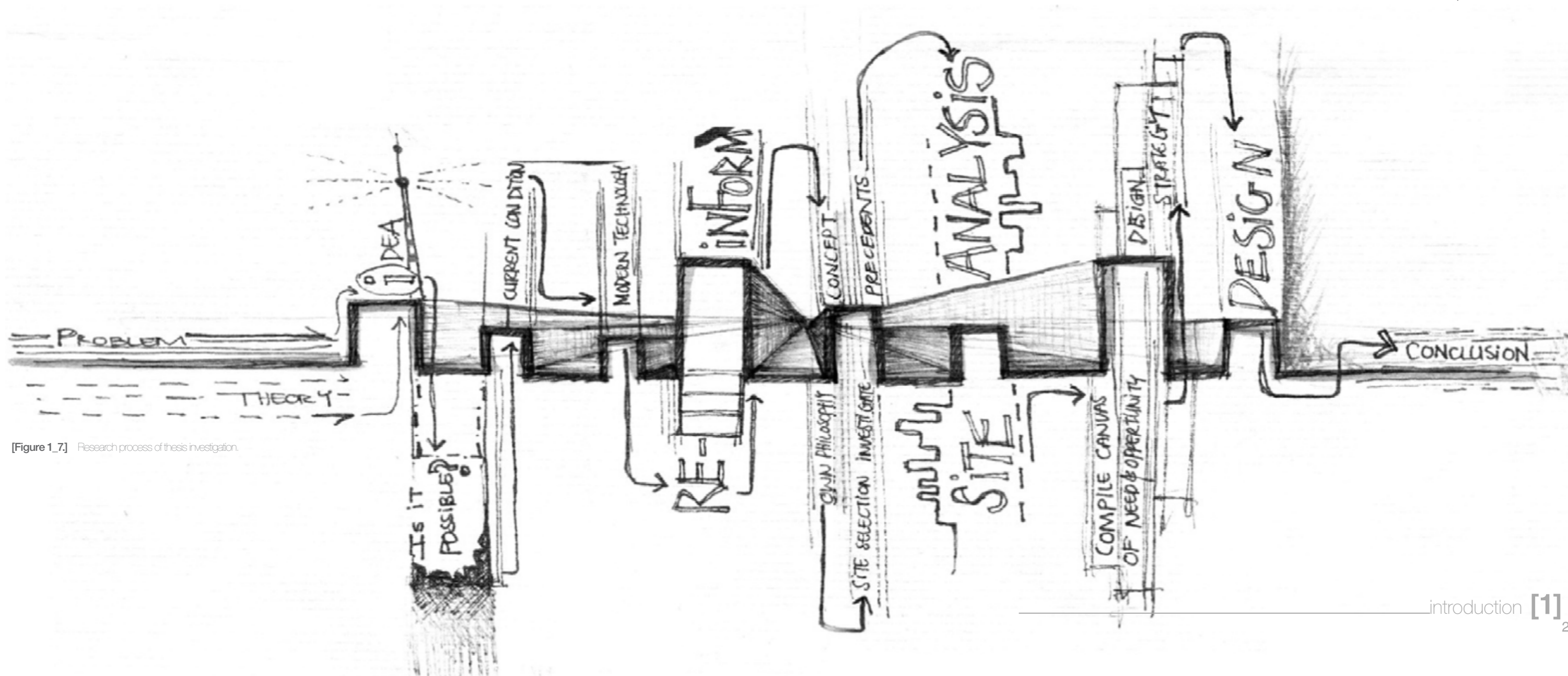
The **site as a whole is regarded as the problem area** and will be integrated with the intervention. The intention is to design a structure with a programme dependent on site specific needs (in this case need of a servitude system combined with transport facilitation and access facilities) and in essence is designed to house and generate sustainable infrastructural services and not only sustain itself, but also the buildings around it to whichever extent it is possible.

The intervention is **linked** to the surrounding buildings and can also be attached to another host which is an existing building. The systems and generation of resources, as well as harvesting and processing thereof, is not limited to the confines of the intervention and can also use the surfaces, facades, areas and spaces of the surrounding buildings for these purposes.

In order to understand the problem and to design an appropriate solution, theories concerning urban growth, systems, infrastructure and sustainability are to be studied and utilised. Three specific theories are investigated; **Eco Urbanism, Infrastructure Architecture and Hi-Tech architecture**.

All these theories look at system design at different scales and scopes and are appropriate as they address the realities of working within an existing structure of different layers and systems in the most economic, sufficient and sustainable ways.

The design and analysis process will be based on a 'Grounded' theory approach. Site information and context will be major influences. The **available technologies** will also be a main factor on the project's scale and abilities. See figure 1\_7 below as an indication of research process.



[Figure 1\_7] Research process of thesis investigation.