

Chapter 5:  
Series of exchanges



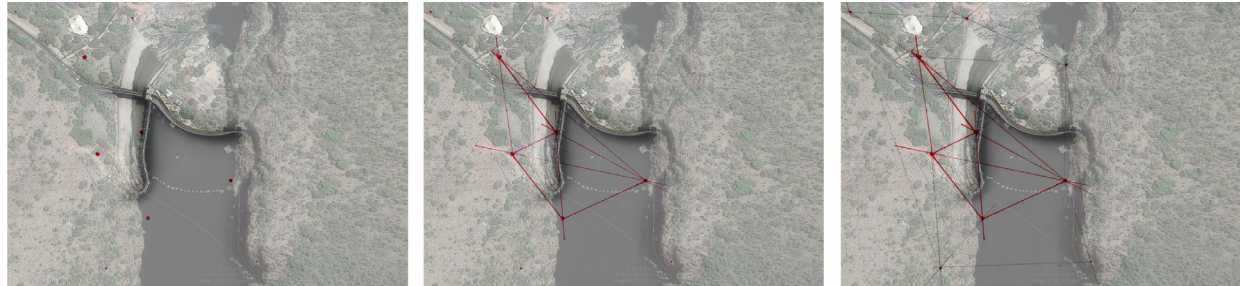


Fig 5.1 Stitching of site (Author, 2016).

Albert Einstein stated that “Energy cannot be created or destroyed; it can only be changed from one form to another” (American Institute of Physics , 2004)

Humans have upset the balance of energy on site, specifically the dam’s water, to a point where nature cannot correct itself to what it used to be. There is an over-abundance of nutrients or energy in the water because of what we have put into it and polluted it. We have removed energy from the natural landscape so far that shorelines have been diminished. The whole purpose of building the dam was to utilise the water to irrigate the crops but this water now damages the plants.

### 5.1 Summary of informants

Design informants can be broken down into five main categories with their own subcategories.

#### Historical

This is the main informant that deals with the paradigm of water and how we see ourselves as being above nature and not a part of it. The problems that this has caused are evident on site and have already been discussed. The most important point to challenge this paradigm is at infrastructural buildings, the space that deals with our natural resources the most.

#### Cultural

The next informant is how we have been disconnected from natural resources through the way that we have designed our infrastructure as a machine. This has led to us furthering this paradigm and creating a bigger disconnection between us and the natural world.

#### Theoretical

Regenerative theories gives us clues of how to align ourselves with natural processes in order to seek the self-healing attributes of natural systems and therefore start to heal our broken site.

#### Social

We have designed infrastructural buildings to have limited access to the public and therefore we are deluded about what we are doing to our natural resources and that this has repercussions. The most important way of combating this is to gain knowledge and for it to impact our daily lives.

#### Economical

The existing activities on site have real economic potential if managed correctly. Security and interaction with public are key.

## 5.2 Infrastructure as a machine

Infrastructure is designed with a specific function to perform, it is very deliberate in what role it plays in society, it is a machine. A machine has inputs and outputs and waste that are created through this process. The system works in isolation and does not interact normally with other systems, meaning that this waste has to be removed and the system has to be maintained. If something was to disturb the system it would eventually break down, if it was not corrected, which makes it vulnerable.

If we look at natural systems this is not the case, they can withstand many disturbances and assimilate waste. This is resilience. If you look at a natural system there are no inputs and outputs; there is a simple flow of energy from one smaller system into the next into a larger one which enables the system to continue working without maintenance. This flow of energy could be seen as a series of exchanges which happen in a natural system. As the energy moves it changes form and the type of energy but it is never lost or destroyed (Nesbitt, 1996: 401-402).

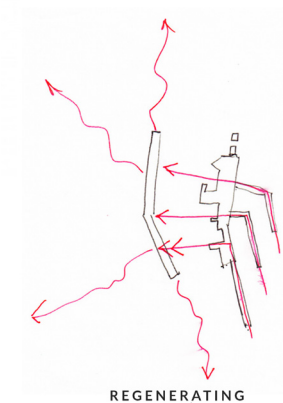
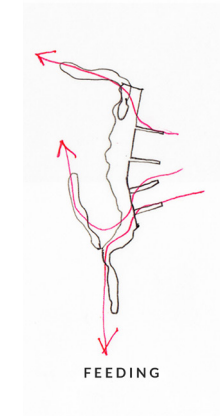
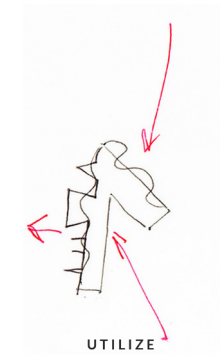


Fig 5.2 Site diagram and intentions (Author, 2016).

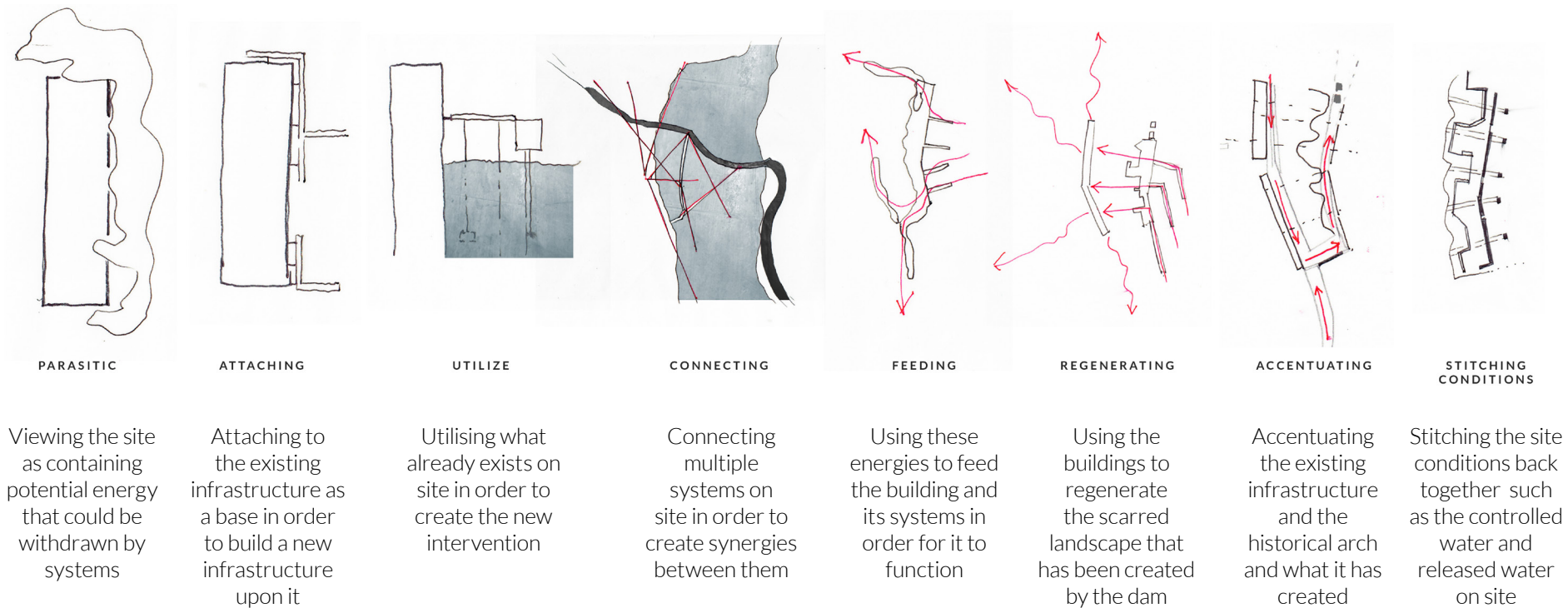


Fig 5.3 Site Intentions (Author, 2016).

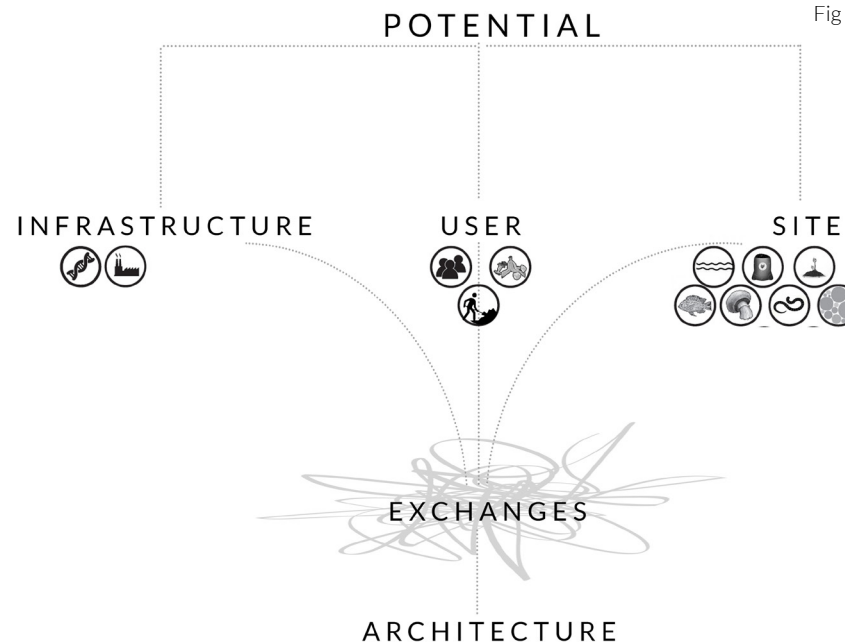


Fig 5.4 Role players diagram (Author, 2016).

### 5.3 Intentions

This dissertation will attempt to look at infrastructure in three ways:

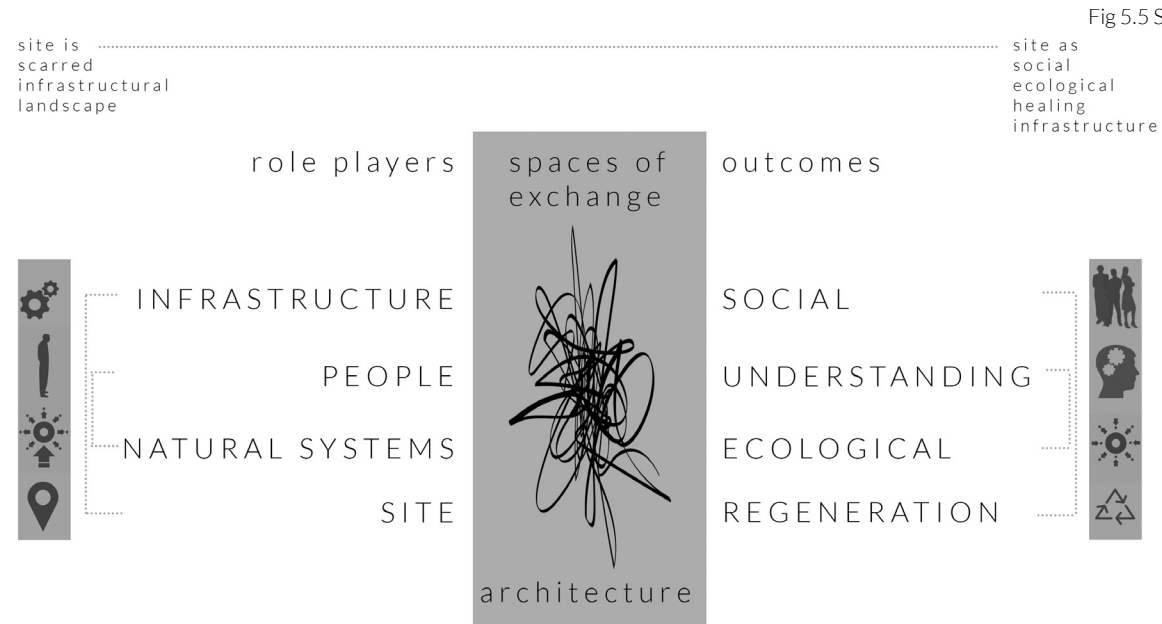
- To celebrate our water heritage and its importance.
- To redesign the single use spaces as multifunctional spaces.
- To re-acquaint man and nature by adapting primarily inaccessible buildings, with secondary functions to be better publically connected.

This calls for a re-appropriation of infrastructure through an architectural interface that fulfils cultural, social and economic functions. This will create a positive recreational space that celebrates water and its part in our heritage, reminding us of its importance - a productive infrastructure that creates a better connection between man and nature that heals scarred landscapes.

If humans are to continue their existence on earth we need to become more resilient. This means humans need to learn to coexist with natural and living systems. To do this we need to align human activities with natural processes in order to continue it positively

to the functioning and evolving of ecosystems. This will allow us to utilise the self-healing capacity of nature to rehabilitate the earth.

The best places to implement these changes are on existing infrastructure. The structures already contain embodied energy in the materials they are constructed from, as well as the energy used to construct them. This makes it a cost effective and sustainable development strategy that continues the uses of our historical infrastructural buildings.



## 5.4 Concept

All the informants and intents have resulted in a holistic concept through which the site is viewed as containing potential energy that needs to be released. This can only be released through understanding and utilising these energies, by means of exchanges. By understanding we can see how we affect this delicate system. These exchanges range from intangible to tangible exchanges. From the sun hitting the solar panels and creating electricity, to the hyacinth being decomposed through vermiculture into compost. The architecture needs to facilitate exchanges between the site, infrastructure and the user.

Definition of an exchange is a transaction between two entities each getting something in return.

To do this the architecture has to become the mediator between the different role players and the existing potential energy on site.

Four major role players have been identified on site; infrastructure, user, site and natural systems. Each of these role players contains a different kind of energy.

Infrastructure contains embodied energy in the structure and its form. It also has potential energy

because of the function that it is performing by holding back the water and the ability to release this which would then be kinetic energy.

The site contains potential energy which is inbodied in the water and the landscape. This energy is also skewed in favour of the water on site.

The user brings energy with them, in their ability to perform labour and the ability to change the way that they interact with this water which then brings knowledge or understanding back in to play.

Natural systems have potential energy that could be utilised to create equilibrium between the other role players.

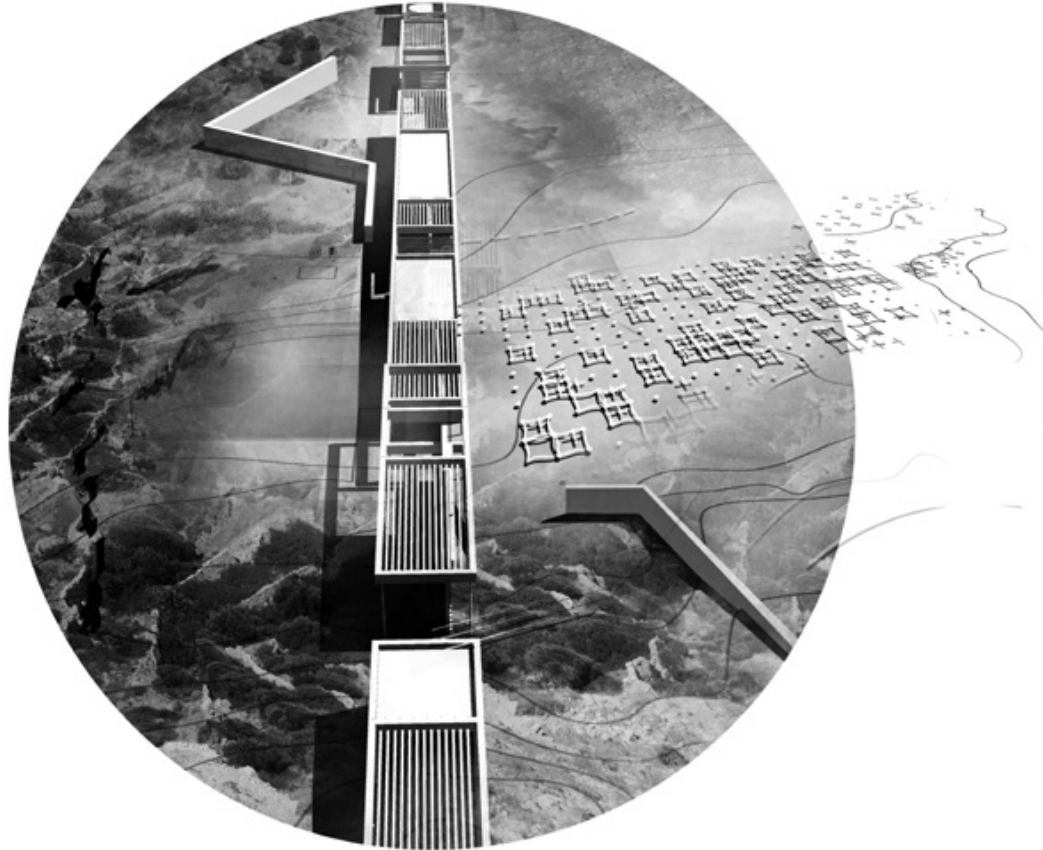


Fig 5.6 The image shows a building that creates a public space as well as being a dam wall, producing a better public connection to water through contact and sight (Alexandra Vougia, a et al., 2014).

Fig 5.6 System bridge (Alexandra Vougia, a et al., 2014).

The series of exchanges are hierarchal; the most important being that the site is regenerated and healed. The second is the distribution of knowledge or understanding to the user, of what is happening on site and how they take part in it. Lastly that infrastructure is fulfilling a multi-functional role rather than the singular use that it performed in the past.

The diagram in fig 5.6 shows the historical spine and the infrastructural memory elements and how a new productive element can be placed between them in order to regenerate the ecologies of the scarred landscape

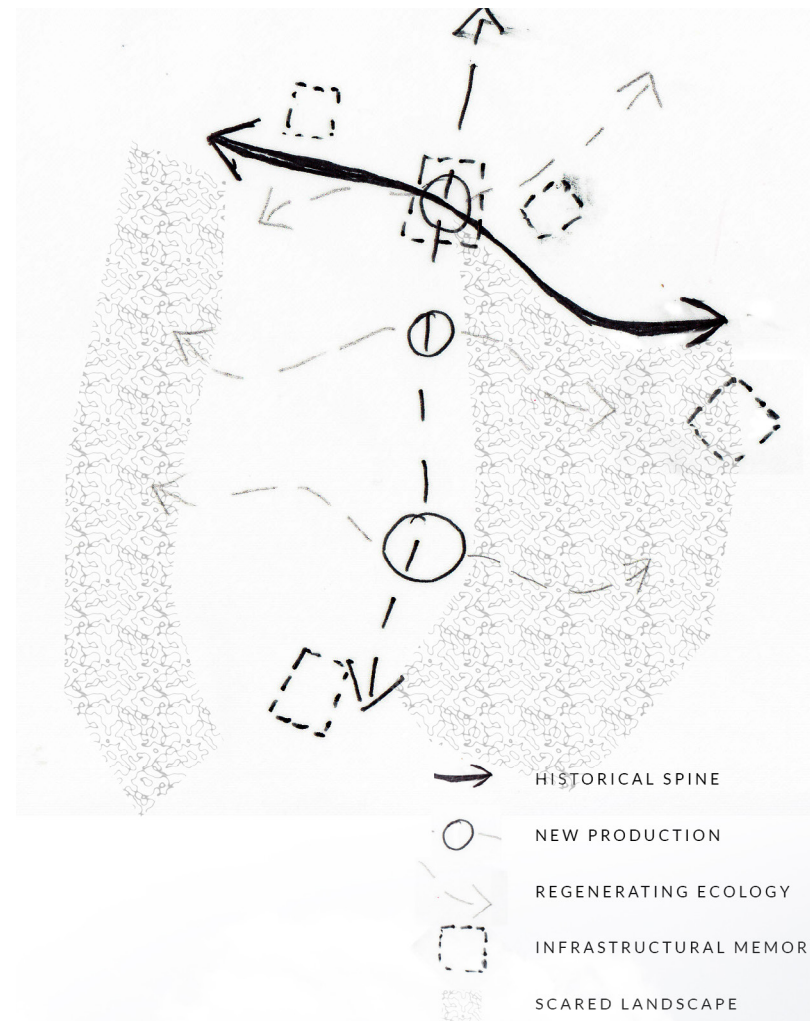


Fig 5.7 Conceptual Diagram (Author, 2016).



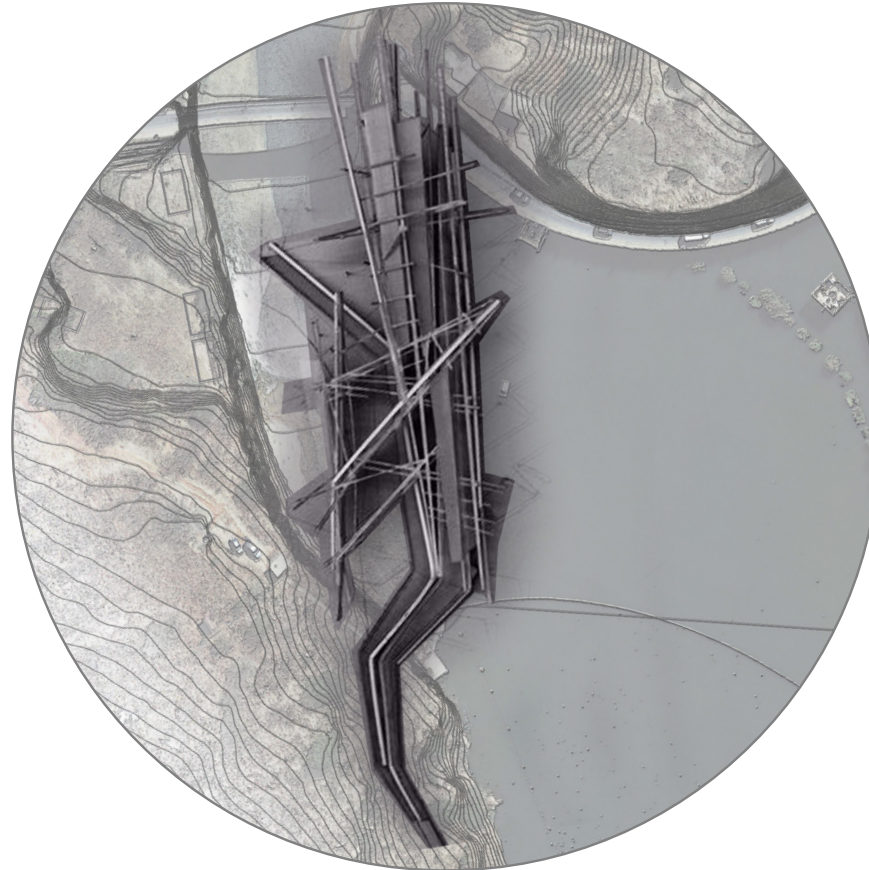


Fig 5.8 is a conceptual model that stretches across a water body, which feeds off it and gives back to the surrounding landscape.

The model aimed at creates a public space above the crest gates, producing a better public connection to water through contact and sight. (Author. April 2016).

Fig 5.8 Conceptual vision (Author, April 2016).

## 5.5 Exchanges Precedent

Project title: KMC corporate office

Designer: RMA architects

Location: Cyber city, Hyderabad, India

Year: 2012

This project aimed to bridge the gap between the poor working class and the well-off business men and women. In India there is a large gap between classes and very little interaction between different casts. This is a real problem as there is a segregation of the people. The way that this building does it is to create exchanges between the different classes as well as the skins of the building (archdaily, 2012).

The skin of the building is made up of plants to create a solar screen. These screens of plants have to be maintained which brings in the lower class labour force to perform this role. There is a small walkway in between the outer skin of the building and the inner layer where the labour force works and directly behind this is the cubicle and conference rooms of the office where the business men and women sit. This creates an exchange between these two people but yet it is limited to mostly visual (archdaily, 2012).

The way that the plants can grow on the skin of the building is that it has a custom cast aluminium trellis with hydroponic trays that contain the growing medium allowing various plant species. A similar system can be looked at for this project to filter out nutrients in the water to create potable water (archdaily, 2012).

This building creates exchanges between the two kinds of uses, the environment and the building. The screen is used to shade the building as well as bring the two users together. These exchanges are transparent and inform the user.



Fig 5.9 exchange of users (Archdaily, 2016).



Fig 5.10 Plant screen being maintained (Archdaily, 2016).

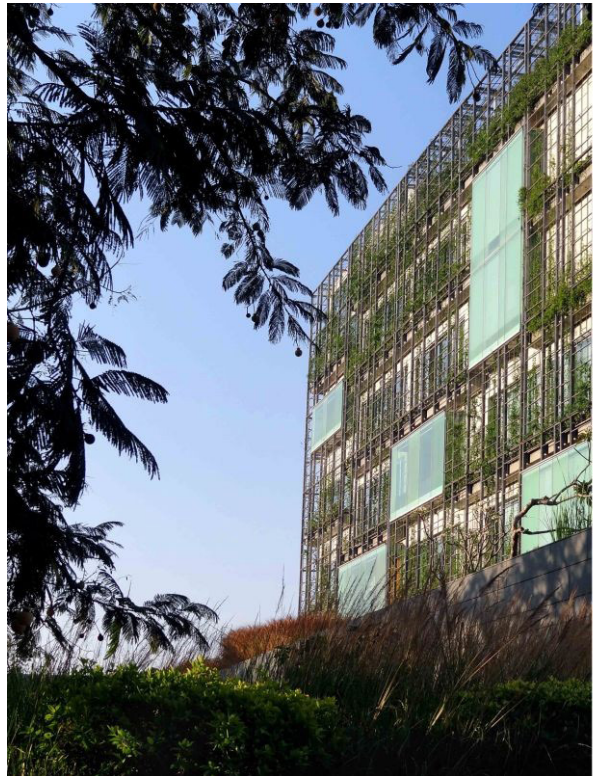


Fig 5.11 Solar screen (Archdaily, 2016).



Fig 5.12 Plant screen being irrigated (Archdaily, 2016).

## 5.6 Form Precedent

Project title: Centre Georges Pompidou

Designer: Richard Roger and Renzo Piano

Location: Pairs, France

Year: 1977

The centre was constructed from 1969 to 1974 to fulfil a need as a cultural centre in Paris that would attract visitors to the city. The building is one of the best examples of high tech architecture. The building exposes the entire infrastructure on the outside of the building as if the skeleton of the body was reversed. It shows all the different mechanics and structural systems not only to maximise interior space but also to be understood by visitors. Each system is painted a different colour so that they can be distinguished for their different roles, such as plumbing pipes are painted green (archdaily, 2012).

One of the most well-known features about this building is the zigzagging escalator that runs up the side of the building, again staying true to that idea of internal free space and allowing circulation spaces on the outside of the building. Structure is exposed and revealed throughout the building so that visitors can understand the structure of the building (archdaily, 2012).

This dissertation does not necessarily need free interior space but the way that structure and systems are dealt with in this building is a good precedent. Similar principles could be used to express the different systems or exchanges in the building as they too are vital to be understood by the public so as gain knowledge.



Fig 5.13 free social space (Archdaily, 2016).



Fig 5.14 expression of services (Archdaily, 2016).



Fig 5.15 Services and circulation of the facade of the building (Archdaily, 2016).