



06 DESIGN DEVELOPMENT

The purpose of the design development is to illustrate the design process and thinking behind major decisions as clear as possible.

The design process consisted of a vast amount of decisions and potential resolutions that were argued out throughout the course of the year. As Wittgenstein points out '[t]oday the difference between a good and a poor architect is that the poor architect succumbs to every temptation and the good one resists it' [Perkins, 1995:220]

6.1 Concept development

The design concept was driven by the site analysis, and was primarily influenced by Christian Norberg-Schulz's theories concerning the concept of dwelling. He refers to architecture as the structure within which man can dwell on earth underneath the sky.

The crater was regarded as a centre by the surrounding inhabitants. According to Norberg-Schulz, human life relates to centres where actions of primary importance take place.

The path complements the centre. The crater becomes the centrifugal meeting place of the path, of earth and sky, and of mortals and divinities [To this day, TMC has a strong spiritual community following a variety of religious beliefs].

The TMC has a rich history. The memory of the site and its related narration is fading as time passes and limited information is available. This thesis proposal suggests that the site represents a memory that can be translated into a memorial. The identified needs resulted in a programme consisting of a visitor centre or interpretation centre and viewing access to the crater. The design was developed around these ideas, focusing mainly on the interpretation centre located in the area of the historic salt and soda factory.

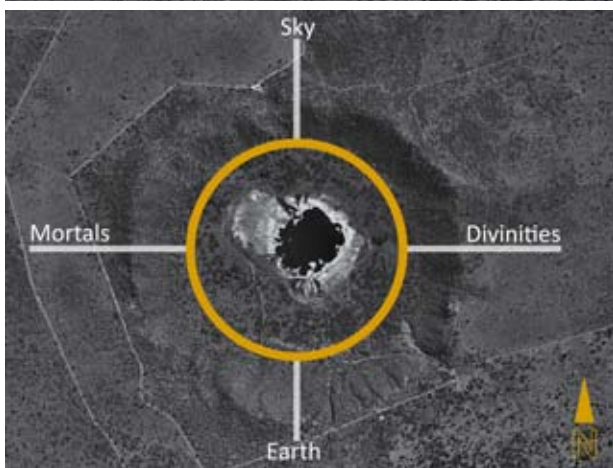
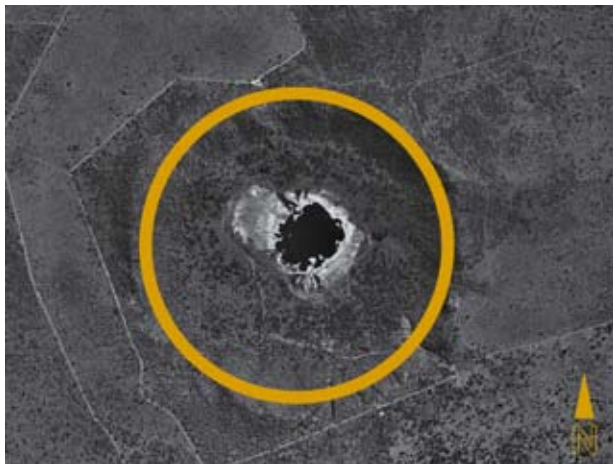


Figure 6.01 Aerial photograph of the site, taken in 2007. [Adapted from photograph, Chief Directorate: Land Surveys and Mapping]

Figure 6.02 The selected site consists of the crater and surrounding area

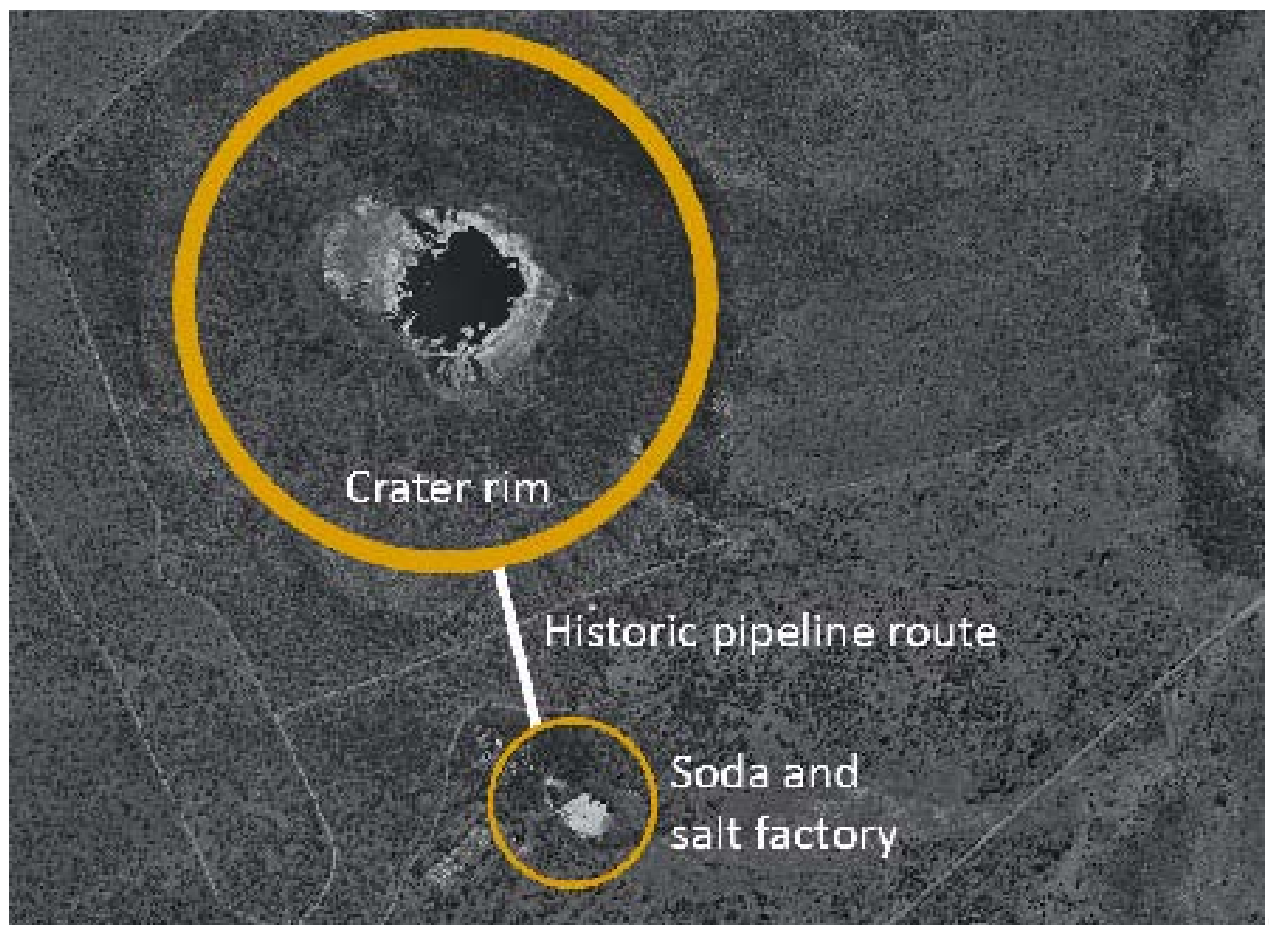
Figure 6.03 The crater as the centre with the relating abstract paths as identified by Christian Norberg-Schulz [Norberg-Schulz, 1985:23]

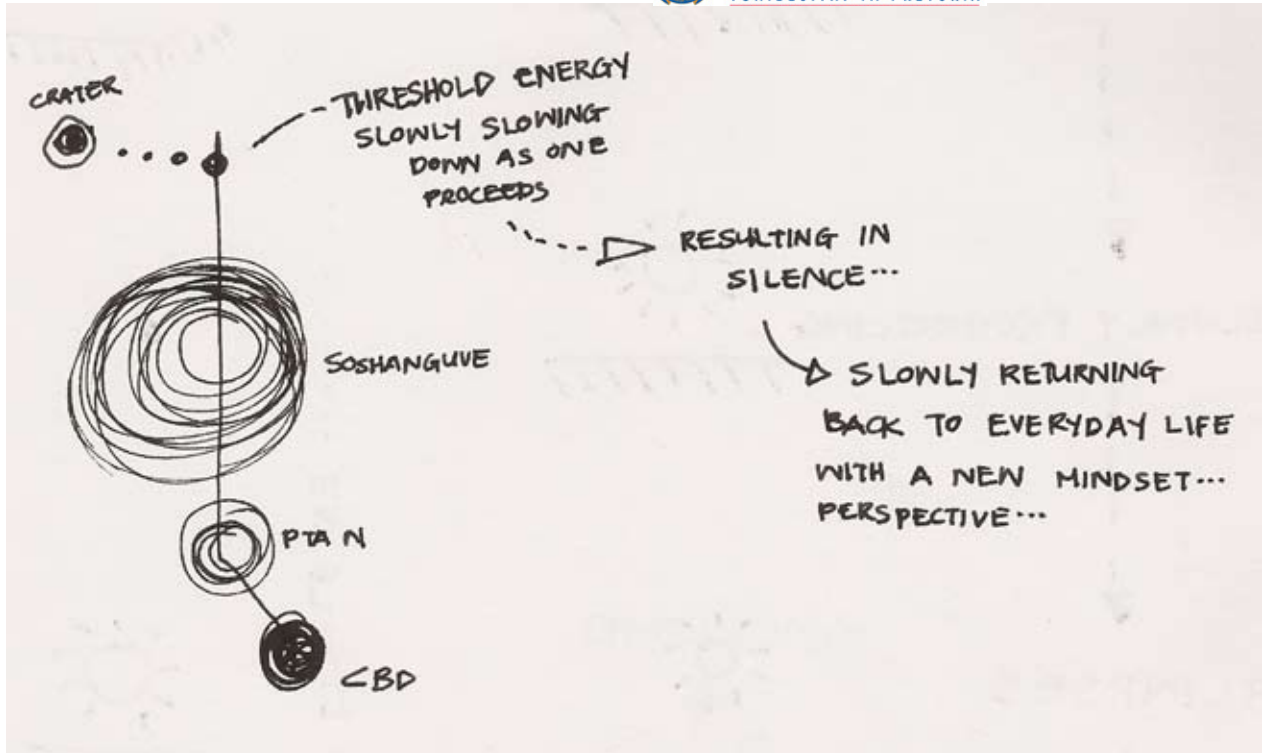
Figure 6.04 The site represents a collective memory

The general aim of the design is to facilitate the experience of the site and manifest its memory.

Figure 6.05 The collective memory can be translated into a memorial

Figure 6.06 The identified focus area of the project that is located in the historic salt and soda factory ruins





The site was initially analysed with the strengths and weaknesses in mind to identify the potential program that would be most appropriate for the selected site. The site is a nature reserve, 40km from Pretoria CBD, bordering the Soshanguve settlement. The nature of the reserve is calm and relaxed in contrast with the vibrant life in the CBD and along the M35 passing through Soshanguve on the way to TMC. The concept of a retreat was considered, but exchanged for the most desperate need of the site - an appropriate visitor centre.

Figure 6.08 Conceptual site analysis indicating energy levels ranging from the Pretoria CBD towards the centre of the TMC, the Crater. [March 2009]

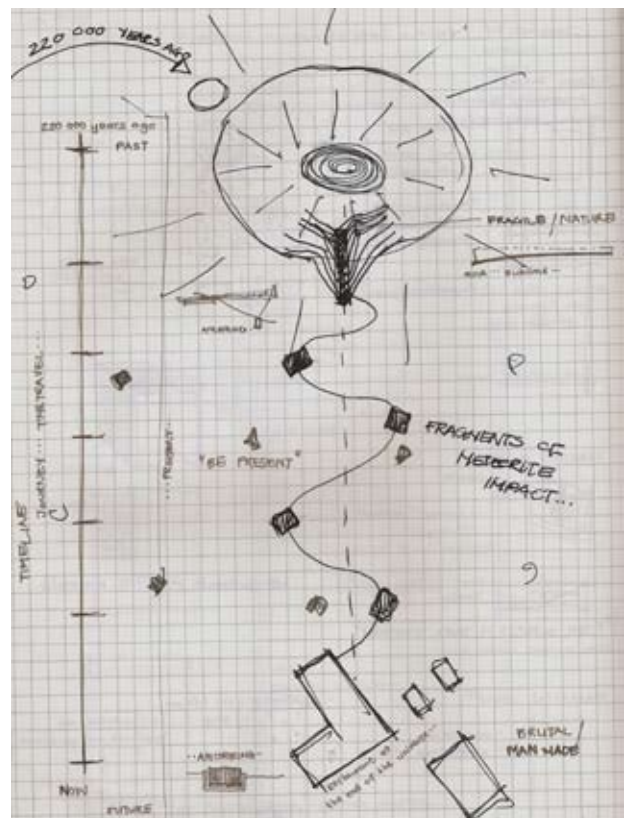
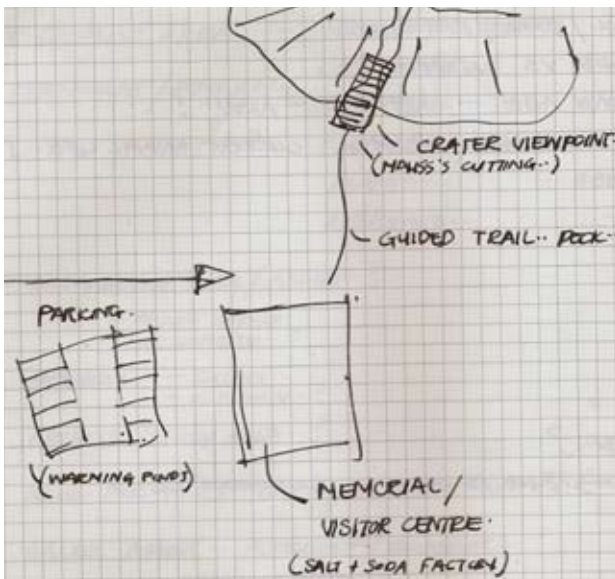
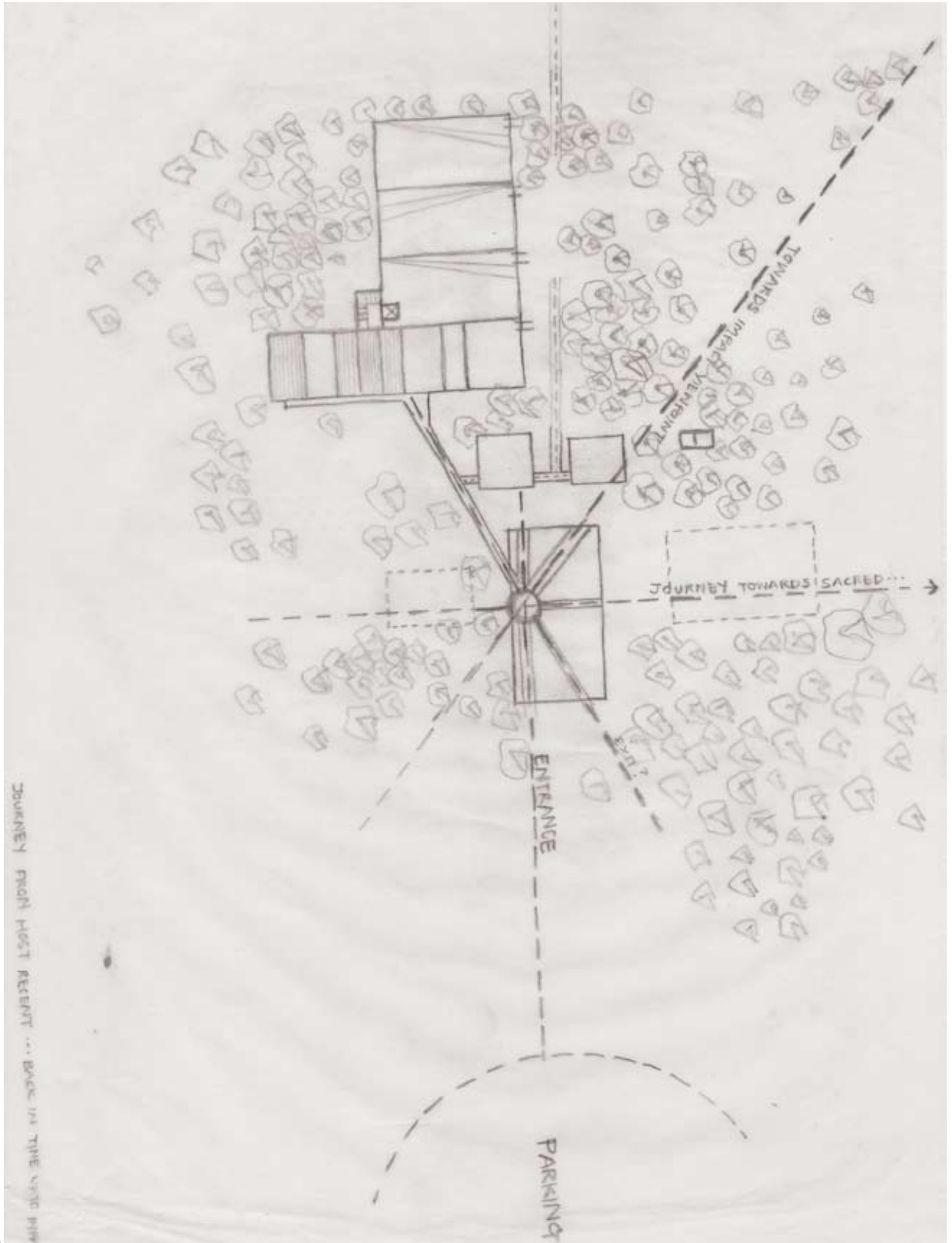


Figure 6.10 Conceptual site layout plan [June 2009]

Figure 6.09 Conceptual site layout plan [April 2009]

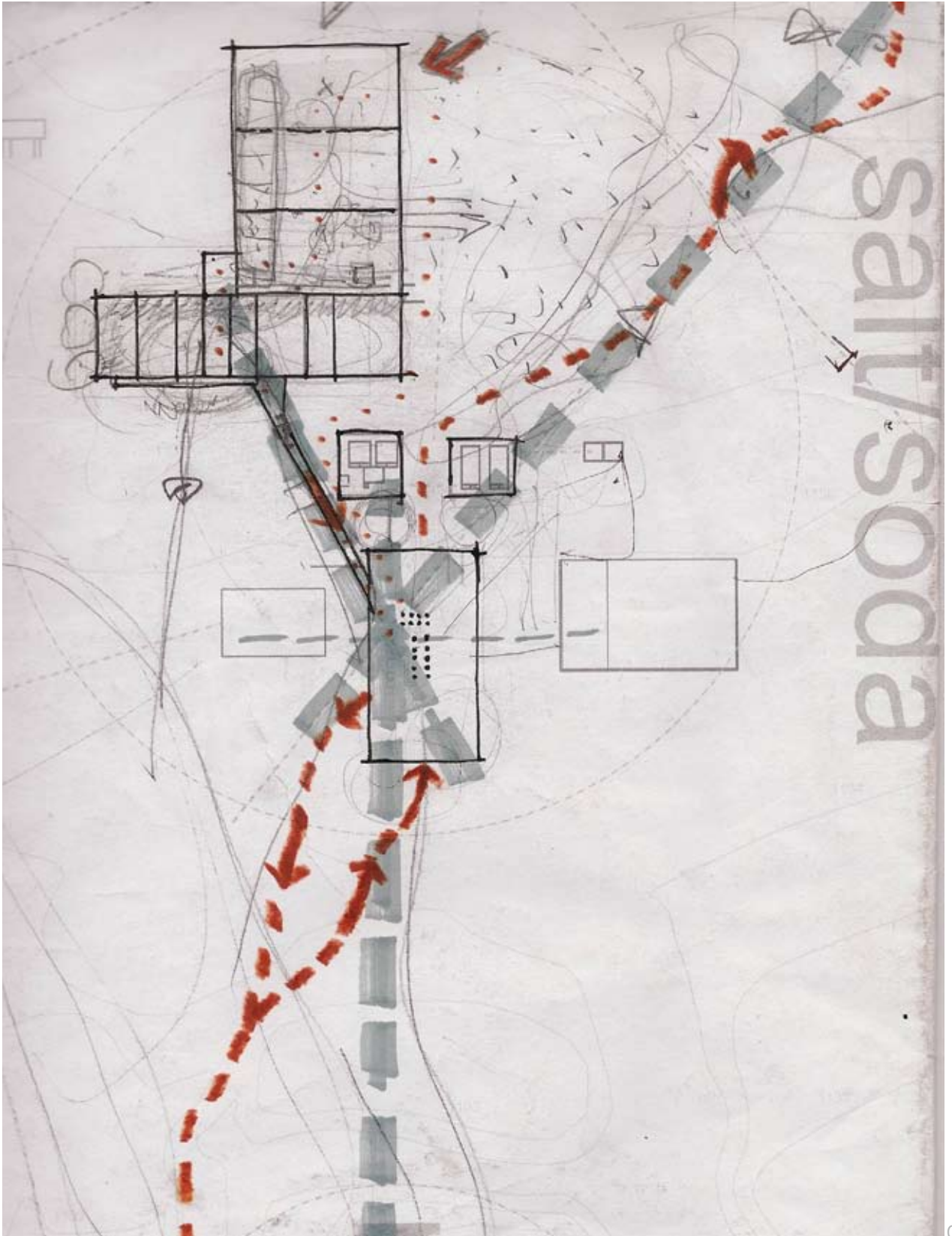
The salt and soda factory, with its enchanting ruins was selected as the site for the design proposal. The structures and surrounding routes were identified and analysed to inform an appropriate intervention.

Figure 6.11 Initial concept plan [April 2009]



The radial nature of light in conjunction with the fragmented impact of the meteorite was initial inspiration for the form and route development of the design proposal in conjunction with the existing conditions and historic layer.

Figure 6.12 Conceptual site layout plan [May 2009]



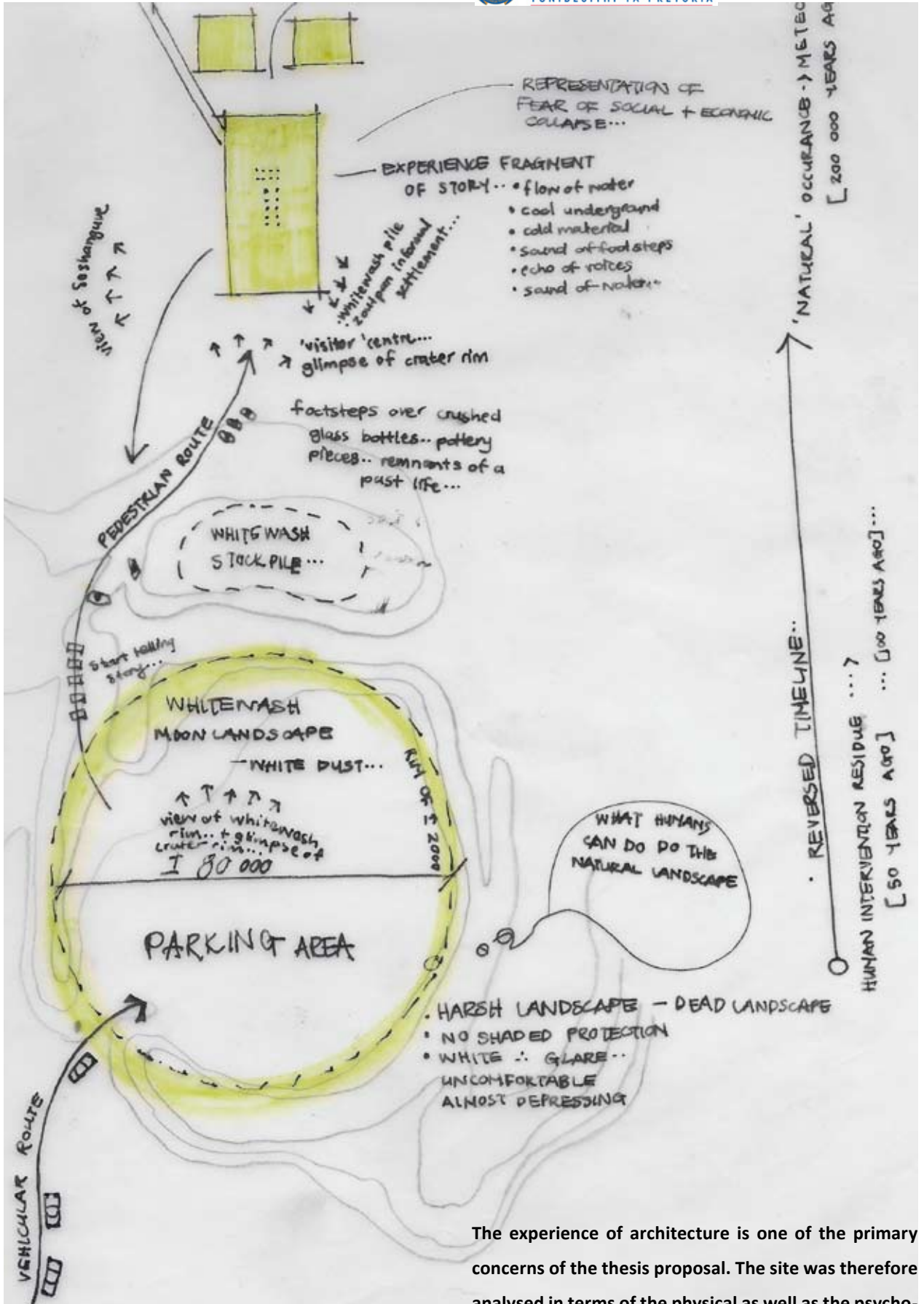


Figure 6.13 Conceptual site layout plan [August 2009]

The experience of architecture is one of the primary concerns of the thesis proposal. The site was therefore analysed in terms of the physical as well as the psychological elements.

6.2 On seeing and being seen

In the article, To see and be seen [1995:114-117] Kengo Kuma states specifically in relation to the architecture of observatories, that ‘it is the sight line rather than the function, which truly controls modern society and life’. The sight line has a tremendous influence on space as it transcends, surpasses and dominates all functions of place. The renovation is therefore proposed to redirect the sight line. In general it is accepted that a building is perceived as an object, and is therefore seen as an independent form. As Kuma states, ‘by reversing the sight line, we can seize the moment and escape the spell of the object’. Kuma highlights the fact that although observatories are facilities to enable observation, they often tend to become something to be seen.

The aim of the project is therefore to incorporate the architecture into the site where the structure consists of moments of either resisting or merging with the ground, becoming part of the site, and seemingly being invisible to the sight line of the approaching visitor. Rather than making a statement as a building, the building merely becomes a facilitator for the observer to take part in the act of viewing and observing the site.



Figure 6.14 Underground structure with opening for natural sunlight [March 2009]

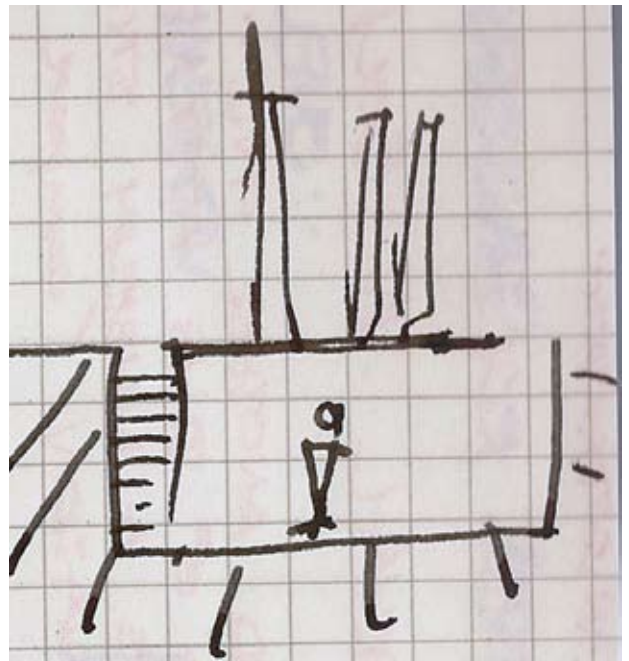


Figure 6.15 Underground exhibition area within existing salt and soda mine ruins [April 2009]

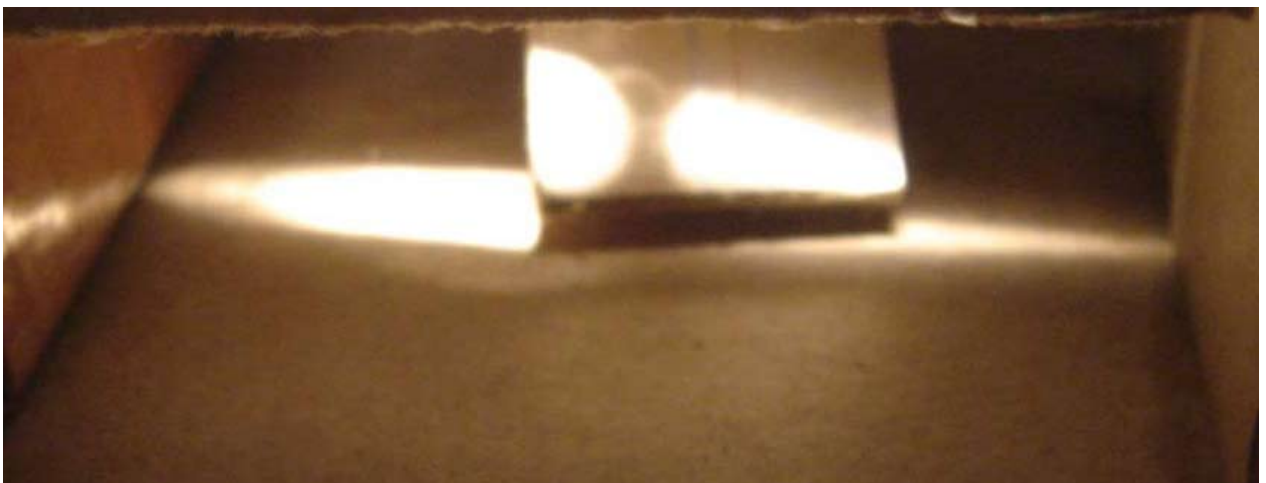


Figure 6.16 An experiment with the effect of light and atmosphere in submerged structures [July 2009]

6.3 Defining space

The design is semi-submerged within the surrounding landscape, ranging between various depths as levels change throughout the design. The depressed planes are designed in conjunction with the existing submerged levels of the historic factory.

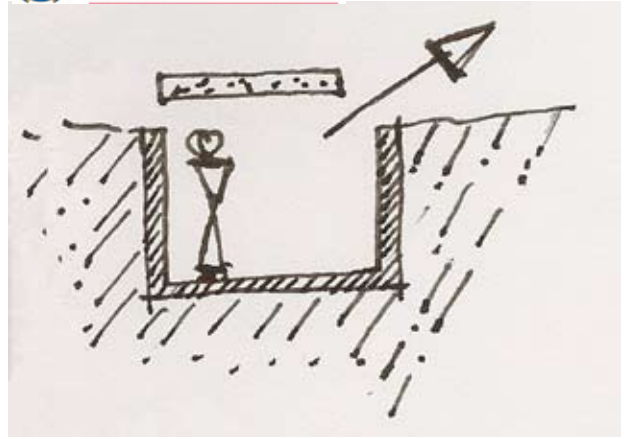


Figure 6.17 Underground structure [March 2009]

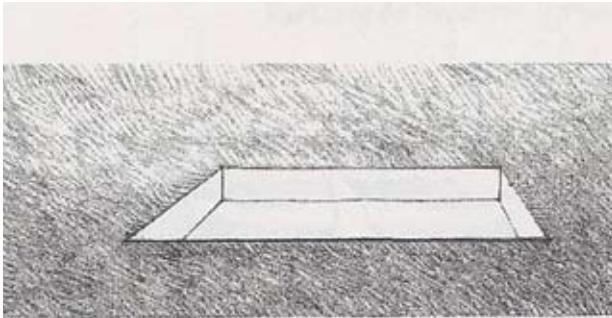


Figure 6.18 Depressed base plane [Ching, :99]

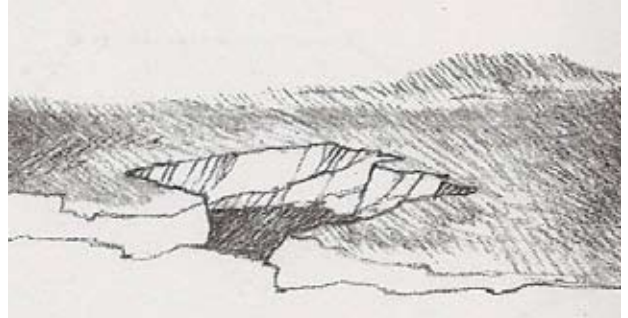


Figure 6.19 Depressed base plane in the landscape [Ching, 1996:99]

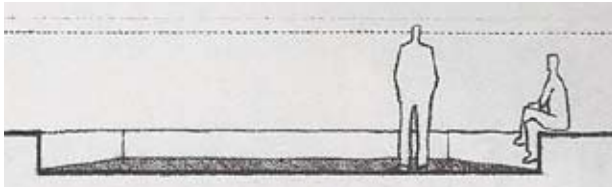


Figure 6.20 Depressed base plane, direct contact with surrounding landscape remain [Ching, 1996:109]

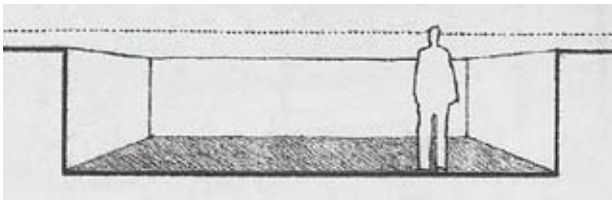


Figure 6.21 Depressed base plane: the structure is semi-submerged in the ground, the degree of exposure to the surrounding landscape becomes limited [Ching, 1996:109]

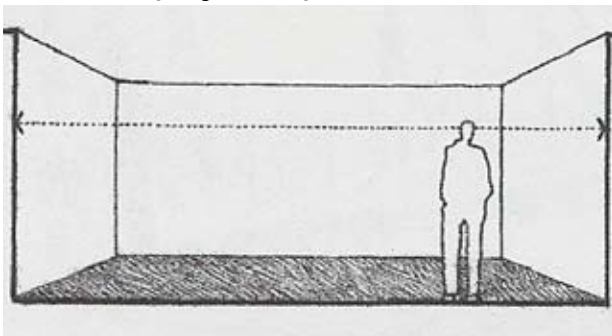


Figure 6.22 Depressed base plane: the structure is fully submerged in the ground, isolating the interior from the surrounding landscape [Ching, 1996:109]



Figure 6.23 Existing storage tank with a depth of approximately 3m [August 2009]

6.4 Atmosphere

History is experienced through atmosphere. The experience of time is exaggerated in the design as the existing ruins are left to decay over time. Weather and natural elements are received rather than resisted by structures old and new. The character of the design allows rain, wind and sunshine to permeate the architecture. The abstract experience of architecture is emphasised as part of the landscape when shafts of light enter the space and shifting shadows animate the volumes, while water marks on the concrete surface planes draw attention to nature's permanent effect on the structure as it becomes merely a layer blending into the landscape as time passes.



Figure 6.25 Experiment with light and atmosphere [July 2009]

Figure 6.26 Ruins decaying over time

Figure 6.27 Texture of decaying structures

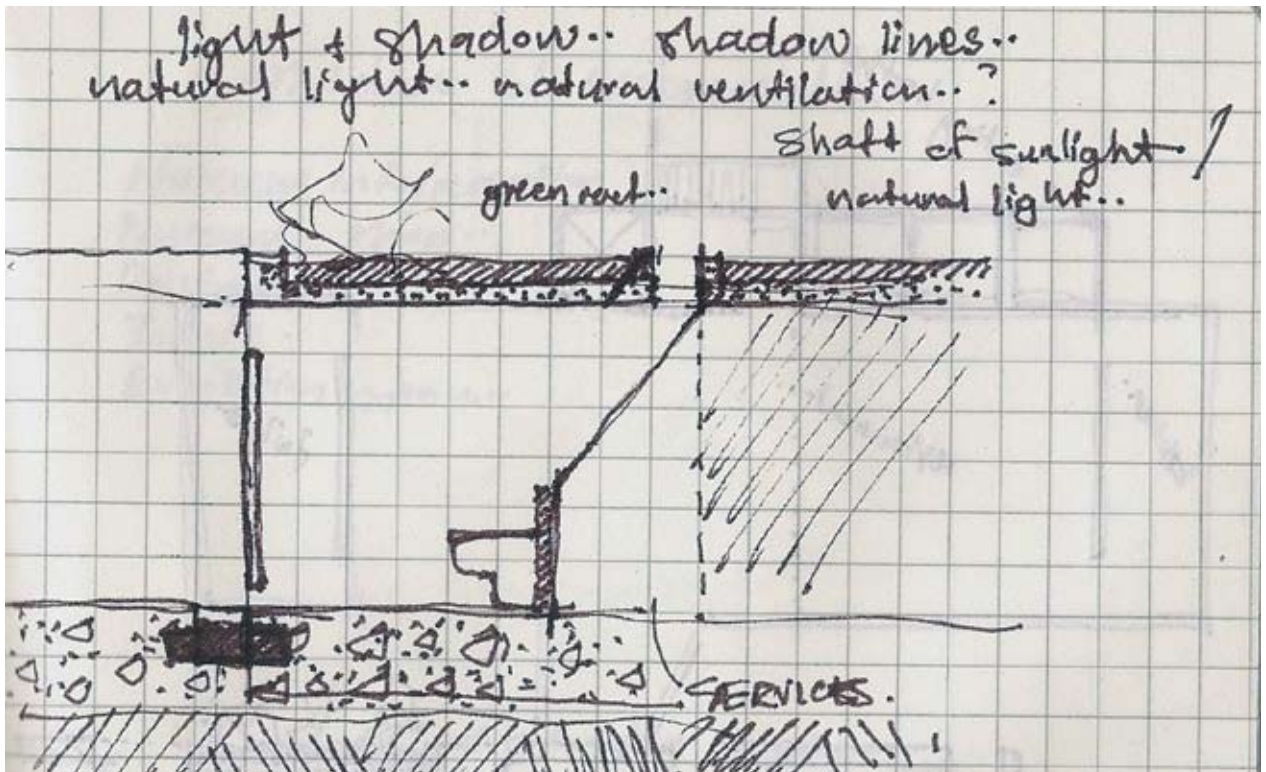


Figure 6.24 Concept sketch, indicating opening for natural light and ventilation, service shaft and green roof [June 2009]

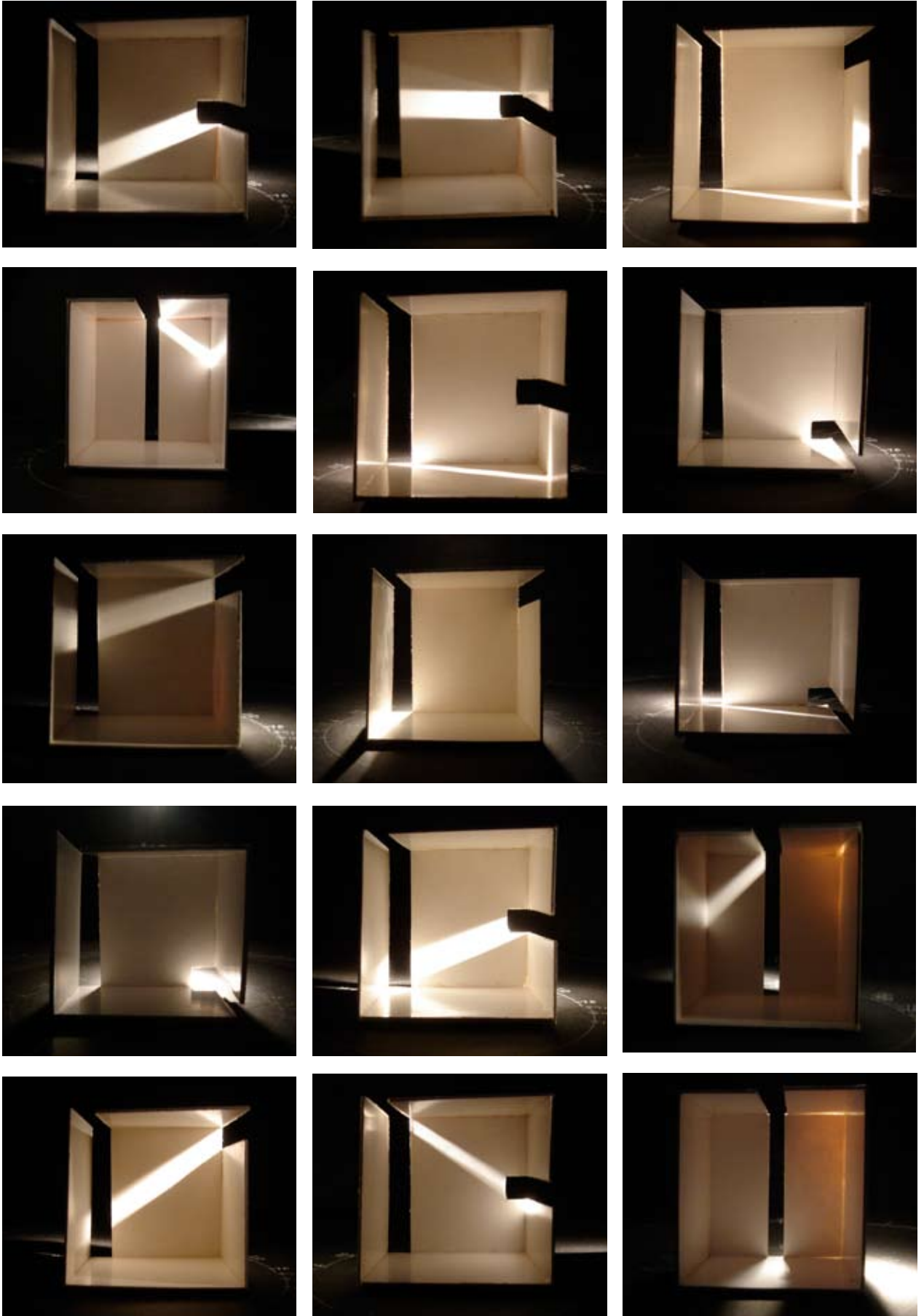


Figure 6.28 Experiments with light [March 2009]

6.5 Natural light

Louis Kahn says the following about light:

'Inspiration is the feeling of beginning at the threshold where Silence and Light meet. Silence, the unmeasurable, desire to be, desire to express, the source of new need, meets Light, the measurable, giver of all presence, by will, by law, the measure of things already made, at a threshold which is inspiration, the sanctuary of art, the Treasury of Shadow.' [Lobell, 2000]

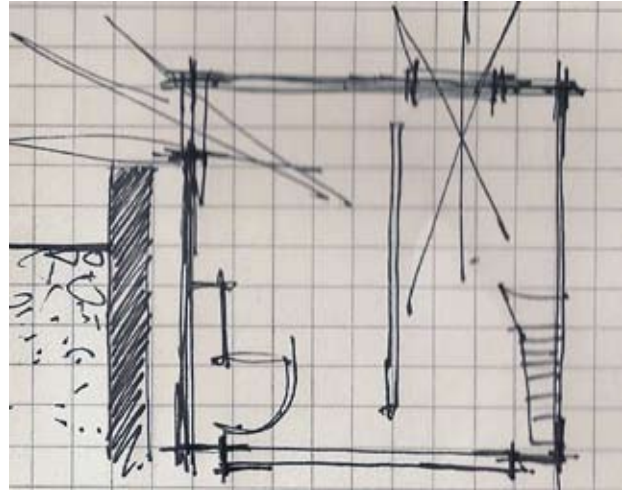


Figure 6.29 Natural light as design element [July 2009]

The physical mediation between nature and architecture is achieved by vertical and horizontal openings through which the light penetrates. As employed by Aalto, openings are used primarily to let light in rather than frame views of the outside [Groak, 1992:217].

In some areas, the physical erosion of the existing structure is used to let light in. The dynamic behaviour of sunlight animates space and materials by bringing life from nature outside into the interior of the structure during the course of the day. Openings and incisions in the structure guide the effects of light, sight and spatial experience.

The development of the design was influenced by the following statements by Peter Zumthor:

[The] sensation of ...having the landscape flow into or through the rooms inside - the landscape with all its light and shadows [Zumthor, 2006:92].

[The] light that meets the earth from afar, the untold numbers of bodies, structures, materials, liquids, surfaces, colours and shapes that radiate in the light. The light that comes from outside the earth makes the air visible, I can see it [Zumthor, 2006:89 - 90].

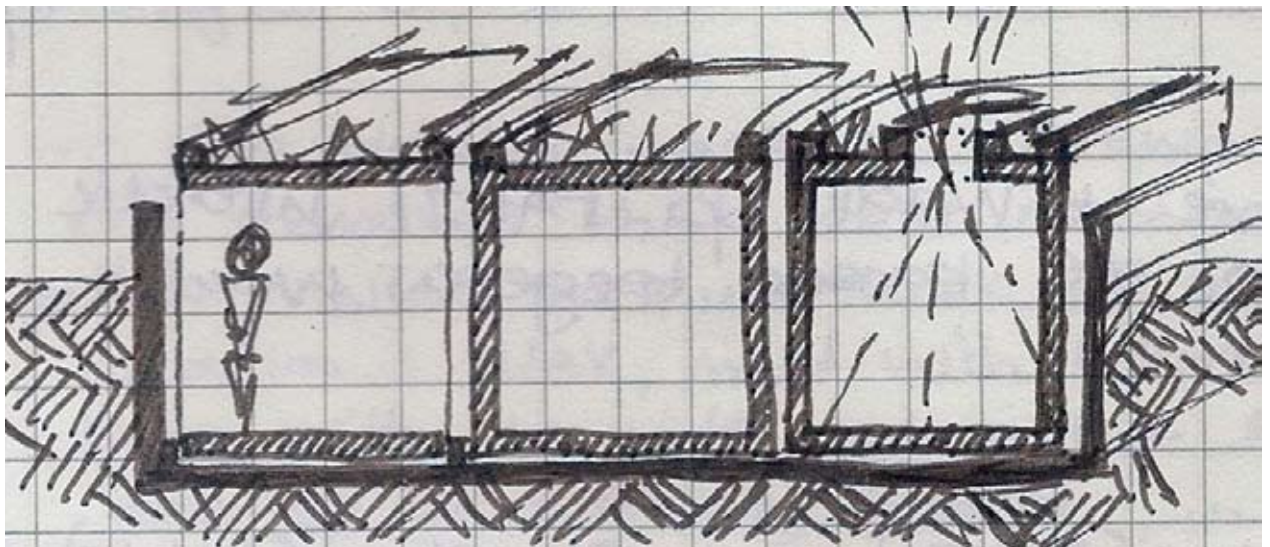


Figure 6.30 New structures within existing structure; green roofs; natural light as design element [August 2009]

6.6 Route

Peter Zumthor believes that '[a]rchitecture is the art of space and it is the art of time as well - between order and freedom, between following a path and discovering a path of our own, wandering, strolling, being seduced' [Zumthor, 2006:86-87].

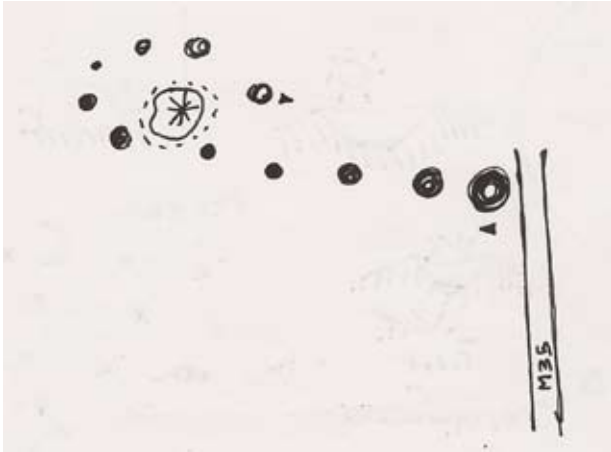


Figure 6.31 Conceptual layout of the route through the site, representing a succession of wanderings through which the visitor experiences the site. [March 2009]

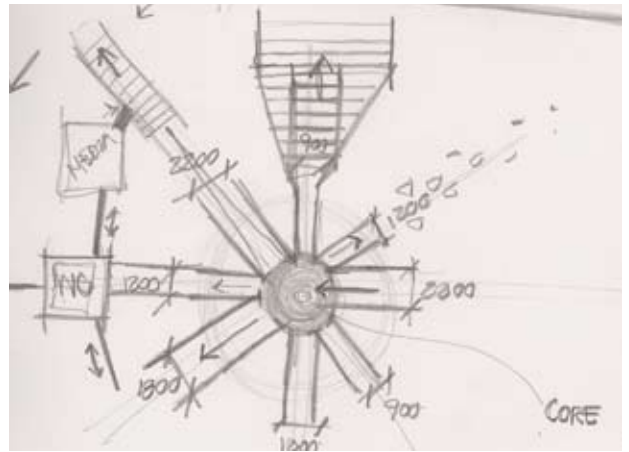


Figure 6.32 Initial concept plan with the existing structures as core of concept with radial routes dispersing in different directions with different exhibitions representing the radial effect of the meteor impact [March 2009]

According to Groak [1992:212] Alvar Aalto stated the following:

In modern architecture, where the rationality of the structural frame and the building masses threaten to dominate, there is often an architectural vacuum in the left-over portions of the site. It would be good if instead of filling this vacuum with decorative gardens the organic movement of people could be incorporated in the shaping of the site in order to create an intimate relationship between Man and Architecture.

The initial approach to the design inherently started with the site, and the journey of the observer. Orientation, the landscape, existing structures and memory were the main conceptual elements and design drivers.



Figure 6.33 Conceptual planning of the route with the horizontal axis as path [March 2009]

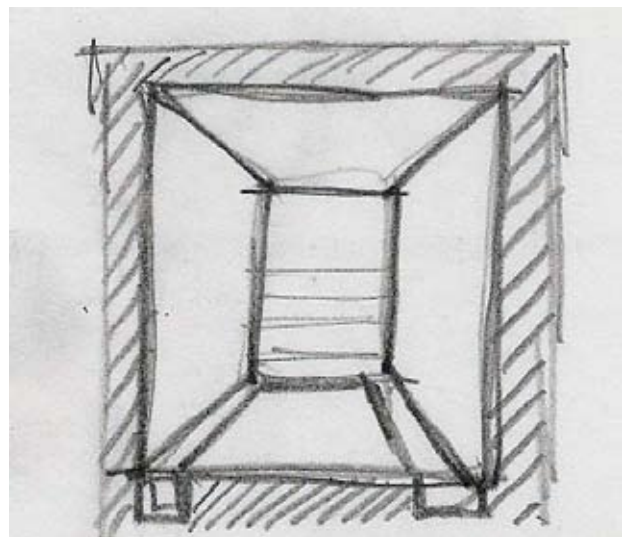


Figure 6.34 Enclosed route [March 2009]

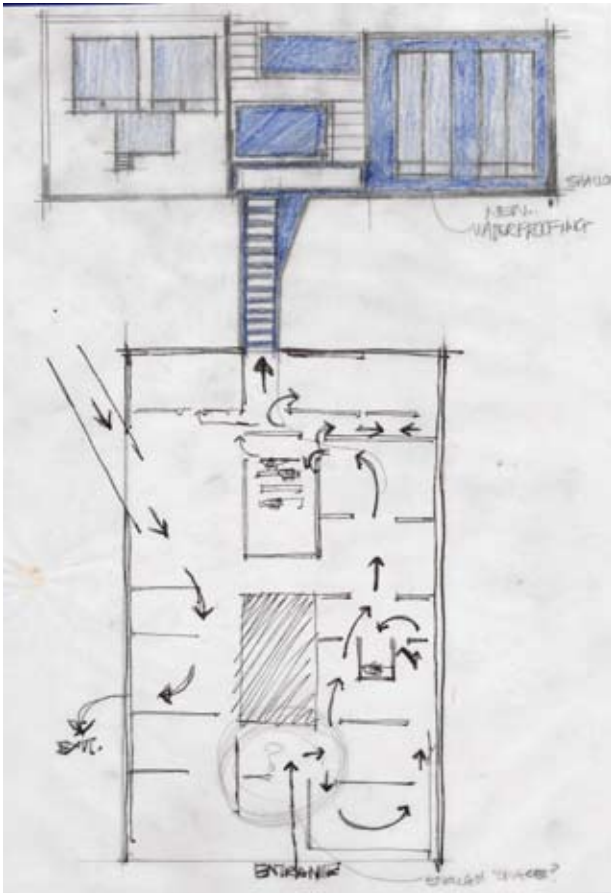


Figure 6.38 Concept plan [July 2009]

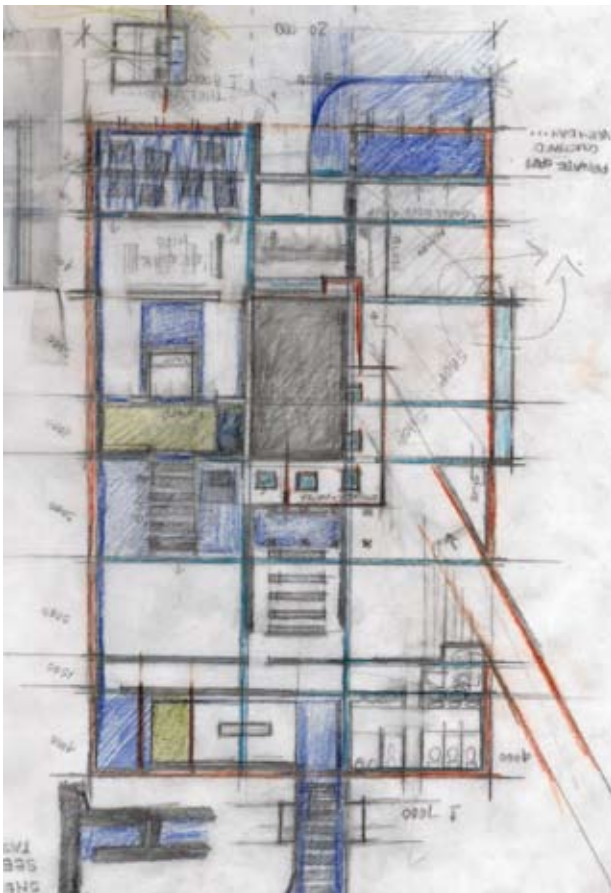


Figure 6.39 Concept plan [July 2009]

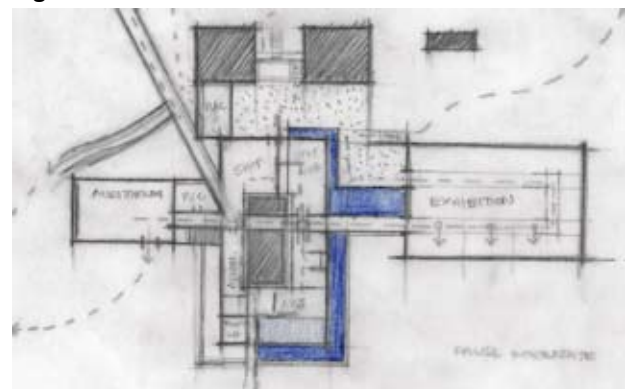


Figure 6.40 Concept plan [August 2009]

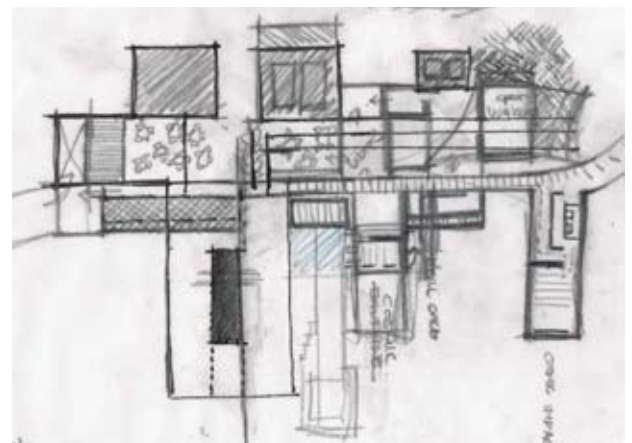


Figure 6.41 Concept plan [August 2009]

The concept in July focused on a sensory stimulating route accompanied by a limited exhibition. The concept also proposed to fill the remaining existing structures with water. The problem with the concept was however that the surrounding trees and open nature of the structures would create a vast amount of problems with the volume of water that was proposed. The exhibition was also too small and too intense to portray a viable image of the site and its related history.

In August, extension to the left was proposed to alleviate the design of the previous mentioned concerns.

Circulation however seemed unresolved as the route of movement was complex and awkward.

The next concept included a restaurant, research facilities and a large exhibition area. The design was however rough and the existing structures were not integrated properly. The large exhibition area dominated the scale and proportion of the design and did not seem appropriate for the site and nature of the existing structures.

Another significant concept was to enable visitors to observe the activated research component of the site. The plan was consequently divided into sections to accommodate the different functions and their relations with each other. The plan was simplified, and a range of parti diagrams determined the design development.

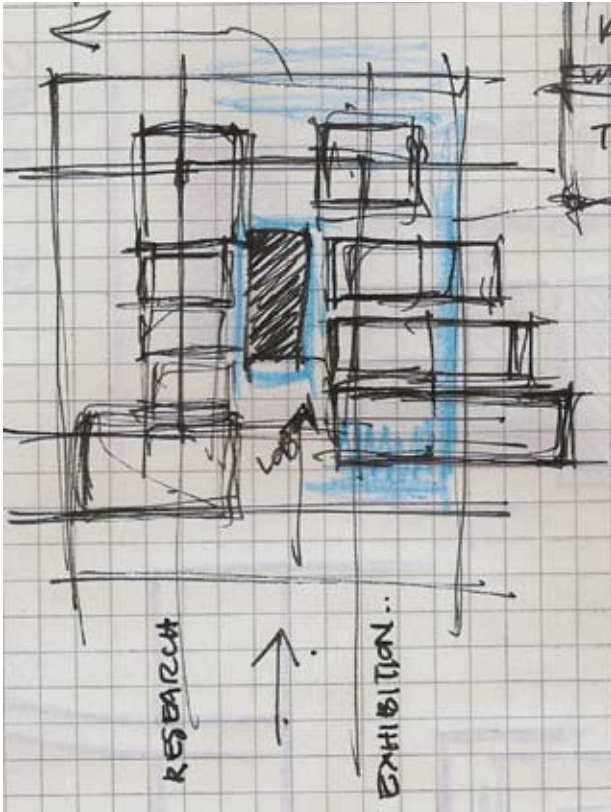


Figure 6.42 Design development plan [August 2009]

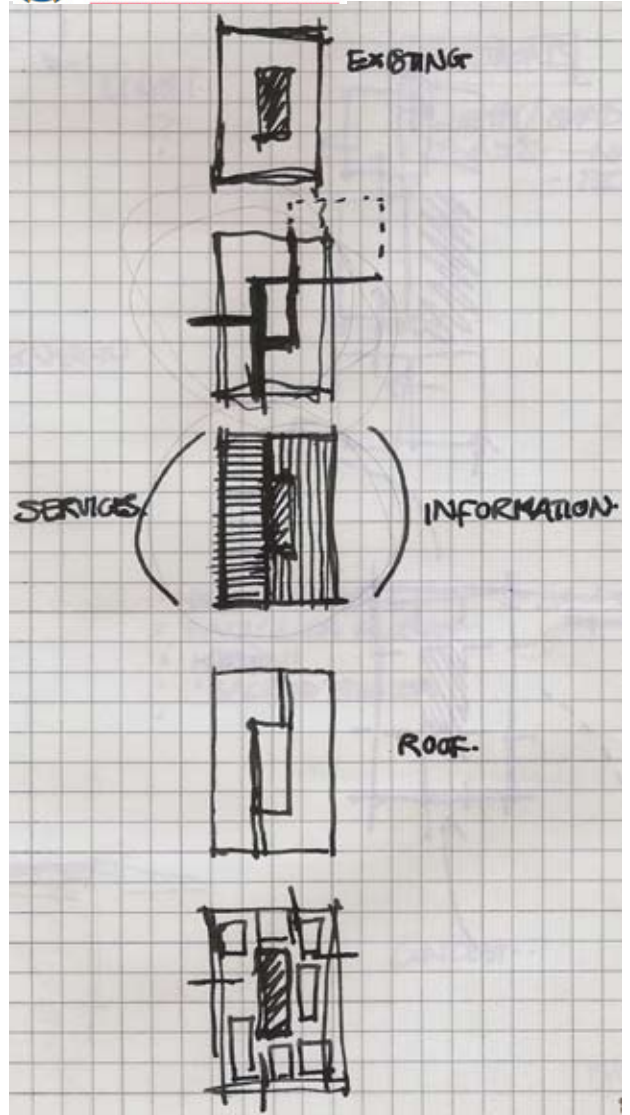


Figure 6.43 Design development Parti Diagrams [August 2009]

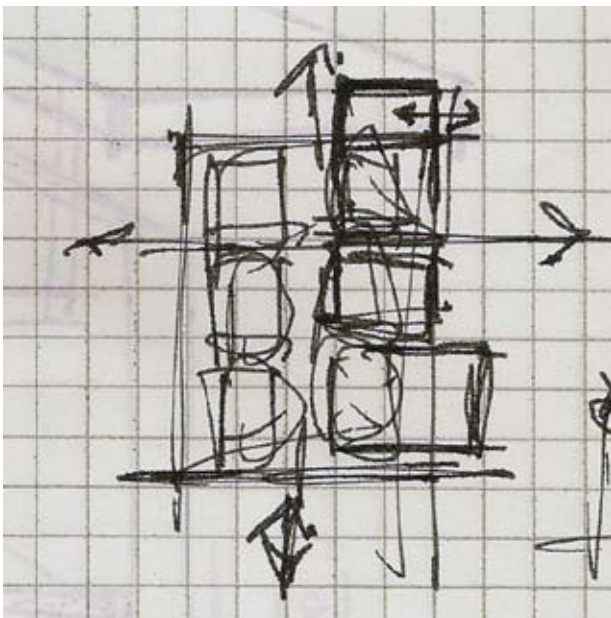


Figure 6.44 Design development plan [August 2009]

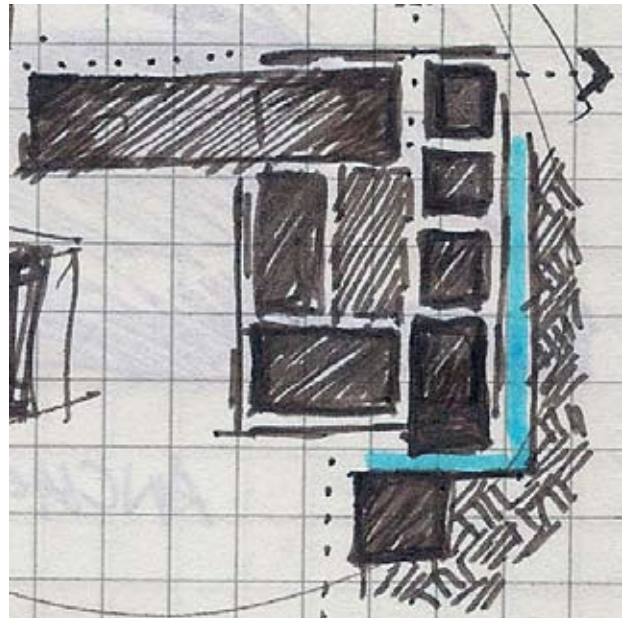


Figure 6.45 Design development plan [August 2009]

A series of interlocking spaces are created by the various configurations of wall elements in Mies van der Rohe's Country House in Brick. The linear elements disappear into the landscape.

The architecture manifests itself as a layer integrated with the landscape. The route becomes a continuation of the ground as the proposed structure reveals itself as part of the journey through the site, informing the visitor along the way and enabling the observer to interpret the site through movement.

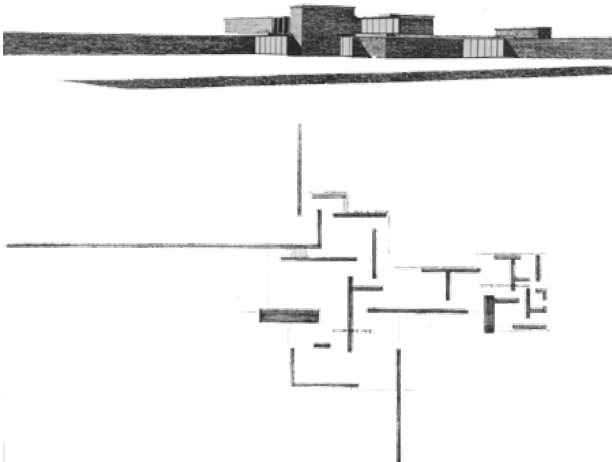


Figure 6.46 Mies van der Rohe's Country House in Brick, 1923 [www.aainter3.net/kevin/ accessed 01.09.2009]

The structure is defined in space and time as the path of the sun is integrated in the spatial experience by means of sunlight penetrating the orchestrated openings. The visitor is guided along the physical route as spaces unfold that are modulated by means of openings, platforms, elements of water and slits of natural light. The relationship between man and nature is revealed by the juxtaposition of open courtyards and enclosed spaces, where the observer is exposed to the different elements of the environment such as sunlight contrasting with shade, and echoed sounds within the concrete structures versus sounds fading into the landscape.

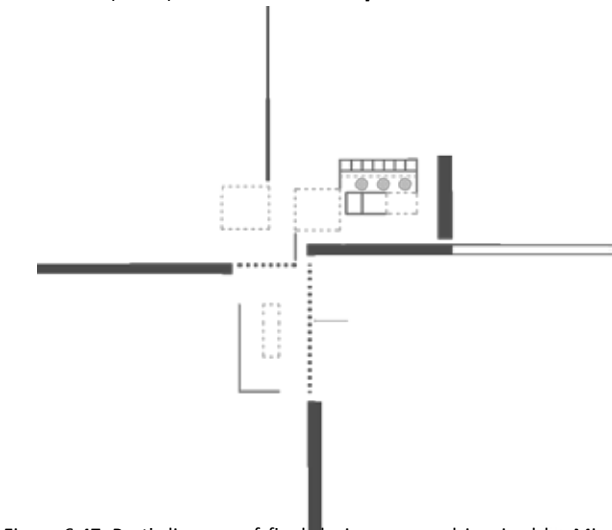
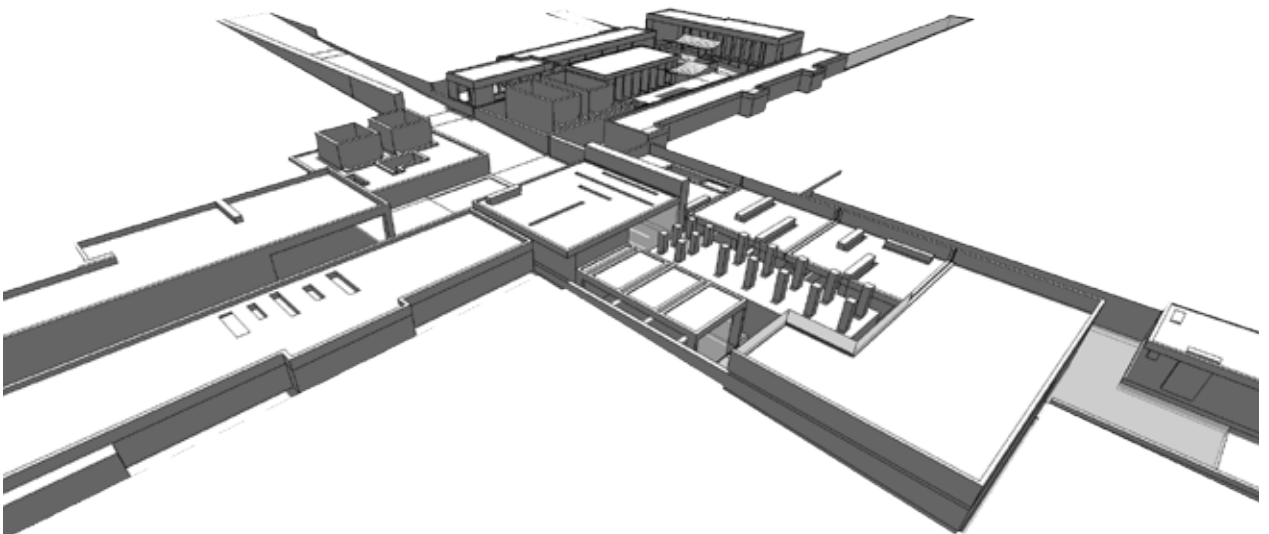


Figure 6.47 Parti diagram of final design proposal inspired by Mies van der Rohe's Country House in Brick [September 2009]

All activities, such as those taking place in the research workshops, are revealed to the visitor along the route to enable a deeper understanding of the site.

Figure 6.48 View towards North over the interpretation centre



6.7 Accommodation Schedule

Reception

Toilet Facilities	55 m ²
Reception office	42 m ²
Reception platform	63 m ²

Administration

Reception	32 m ²
Kitchenette	9 m ²
Toilet	5 m ²
Boardroom	45 m ²
Office	50 m ²

Exhibition

Media room	32 m ²
Exhibition walk	202 m ²
Drill core exhibition	178 m ²

Research

Workshop	65 m ²
Offices	66 m ²
Store room	20 m ²
Kitchenette	35 m ²
Library	54 m ²
Lecture Hall	61 m ²
Toilets	39 m ²

Commercial

Restaurant	148 m ²
Kitchen	83 m ²
Kitchen yard	55 m ²
Staff facilities	51 m ²
Shop	86 m ²
Line shops	39 m ²
Collective storage [shops]	22 m ²
Coffee shop	98 m ²
Toilets	45 m ²

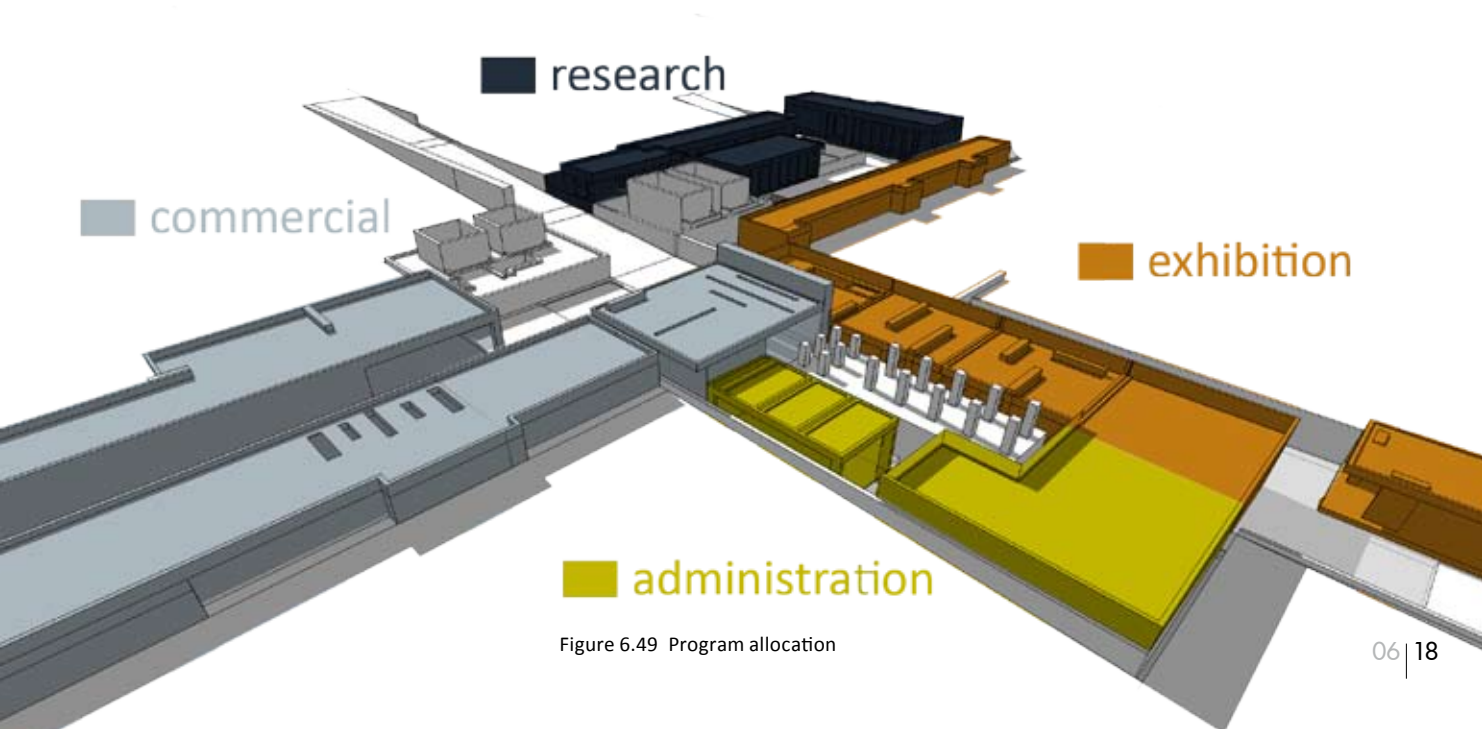


Figure 6.49 Program allocation

6.8 Circulation: Movement through space

The path of our movement can be conceived as the perceptual thread that links the spaces of a building, or any series of interior or exterior spaces [Ching, 1996: 228].

The structure is gradually revealed as the visitor moves along the path through the trees and past scenes of dumped soda ash that scar the landscape.

The route consists of a series of ramps, acting as a continuation of the surfaces of the landscape, and smoothly unfolding into the architecture, semi-submerged in the ground. The reception area located on this route is initially tucked into the landscape and is revealed as the visitor progresses towards the building where a covered platform opens up onto the building and a pond of water.

The new reinforced-concrete green roof and the concrete structure frame the entrance opening to the building in conjunction with part of the existing wall that acts as a containing element for the new intervention.

Once the visitor enters the building, cu-

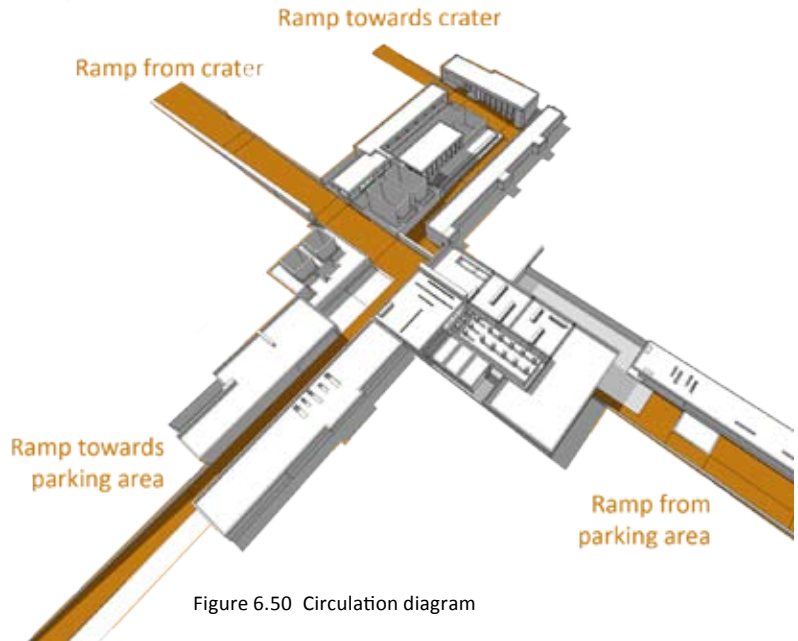


Figure 6.50 Circulation diagram

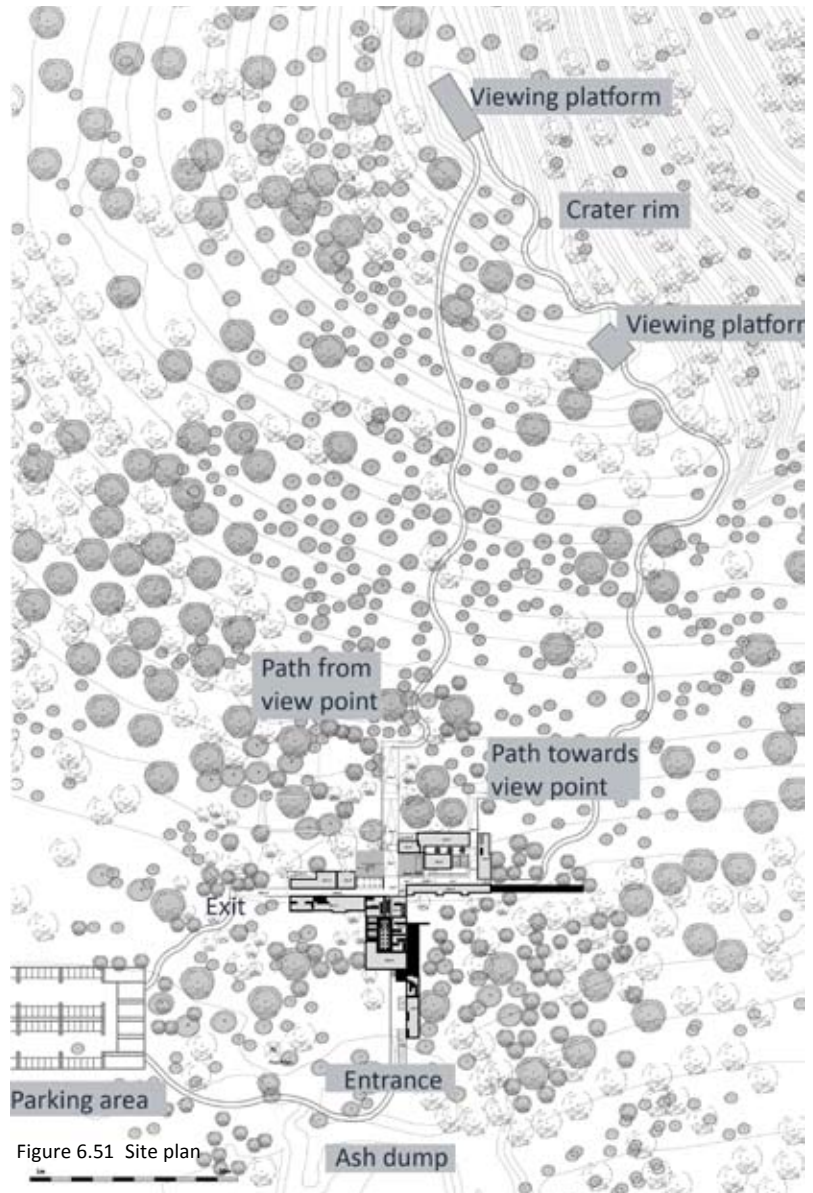


Figure 6.51 Site plan

riosity and light become the guiding elements. Water elements act as barriers where the viewer can see, but not access, the existing structures. Natural light penetrating the roof lights guides the visitor through the different spaces.

Along the first phase of the route, the visitor is continuously confronted with either planes upon which information is exhibited or planes of the existing structures representing memory.



Figure 6.53 View from entrance ramp, with the reception platform on the left towards the exhibition area

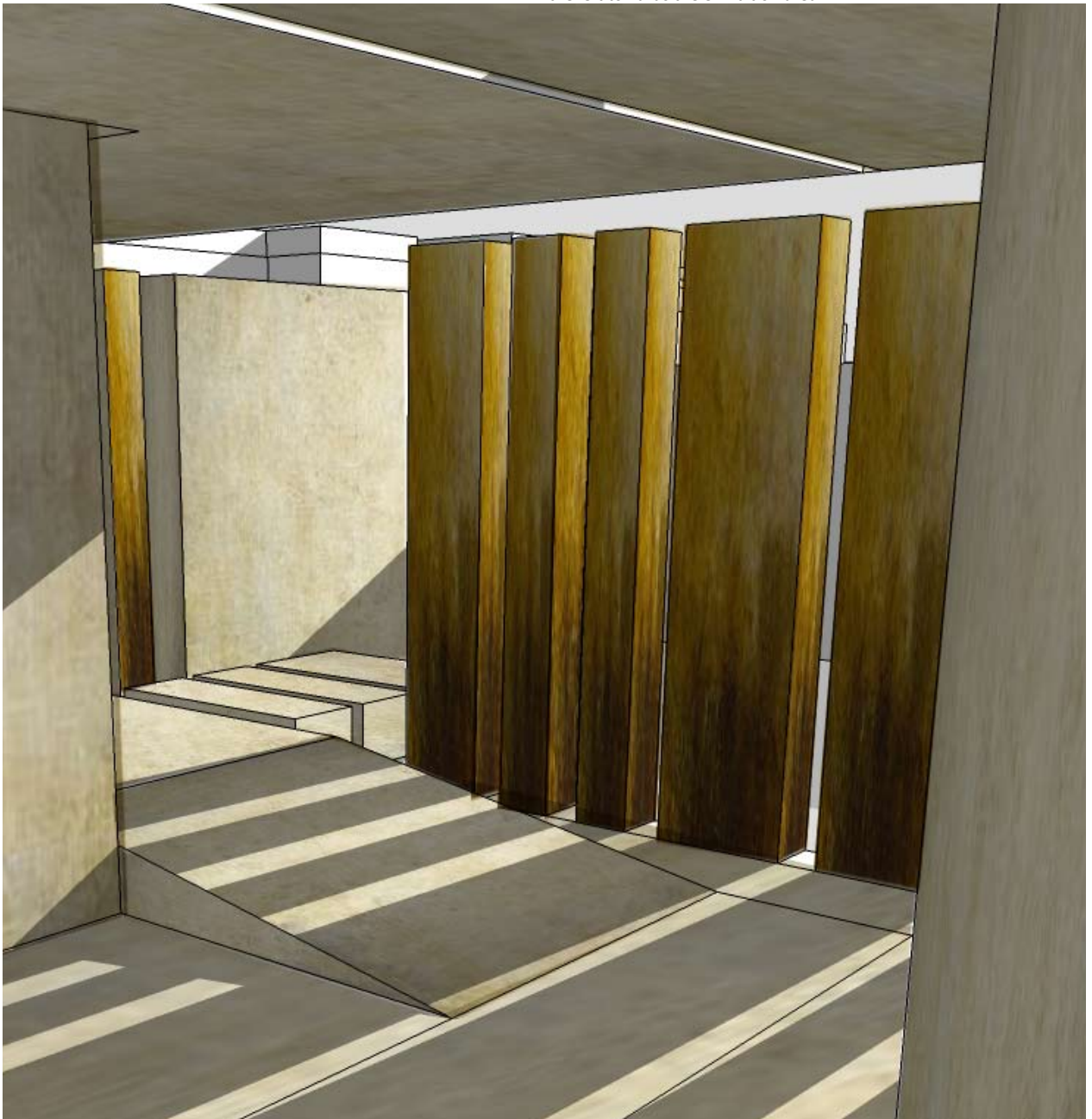


Figure 6.52 Interior view of exhibition walk.

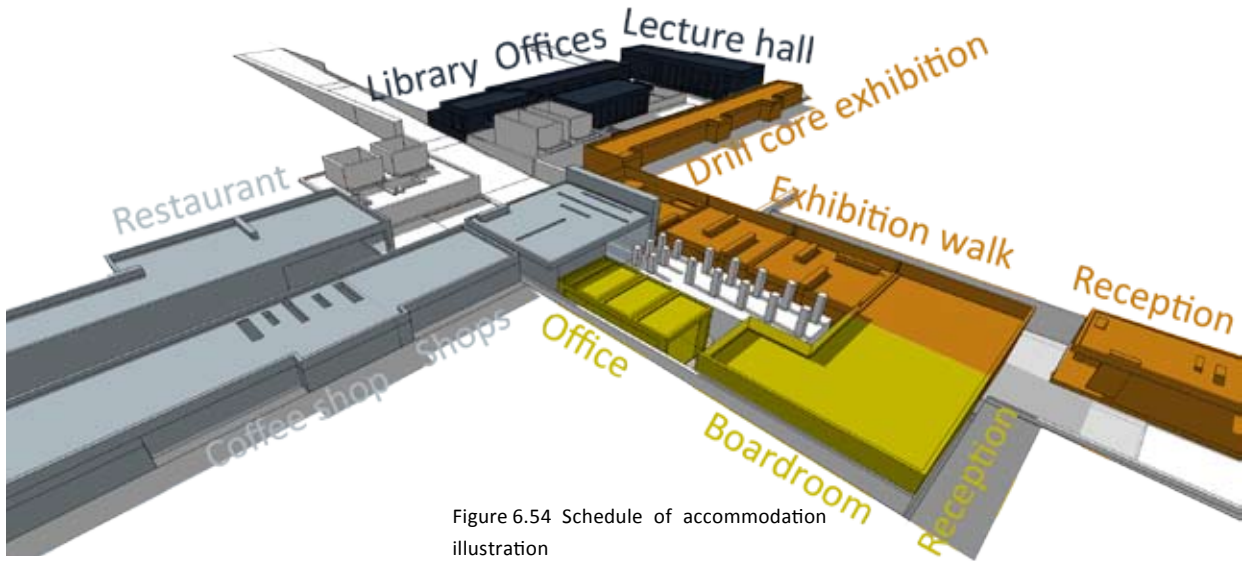


Figure 6.54 Schedule of accommodation illustration

Once the observer emerges from the first phase, the path widens and the visitor is presented with a decision. The workshop where research regarding the site and archaeological diggings takes place is located on the left, while the drill core exhibition is located on the right.

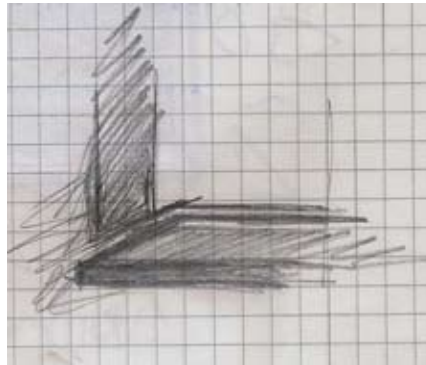


Figure 6.55 Threshold concept

The rhythmic articulation of the different routes is achieved by employing different paving patterns and sized elements representing the surface along which movement takes place. Thresholds and moments for pause are facilitated by means of emphasised surface elements. The scale and proportion of the different elements represent the various tempos at which the visitor travels.

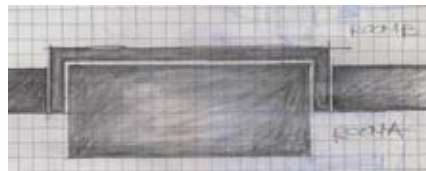


Figure 6.56 Threshold concept emphasising movement from one room to the next



Figure 6.57 Independent floor surfaces with shadow lines, creating a floating effect

The 'joining' of spaces, routes and larger elements is emphasised by means of threshold elements, attracting attention through material use, detailing or size. These thresholds become a 'celebration of necessity' as Kahn would call them [Murphy, 1999:16].

The floor surfaces are often independent from the wall structures to suggest floating platforms, drawing attention to them as individual elements emphasising the movement route through the different spaces and the separating void between the new and the existing.

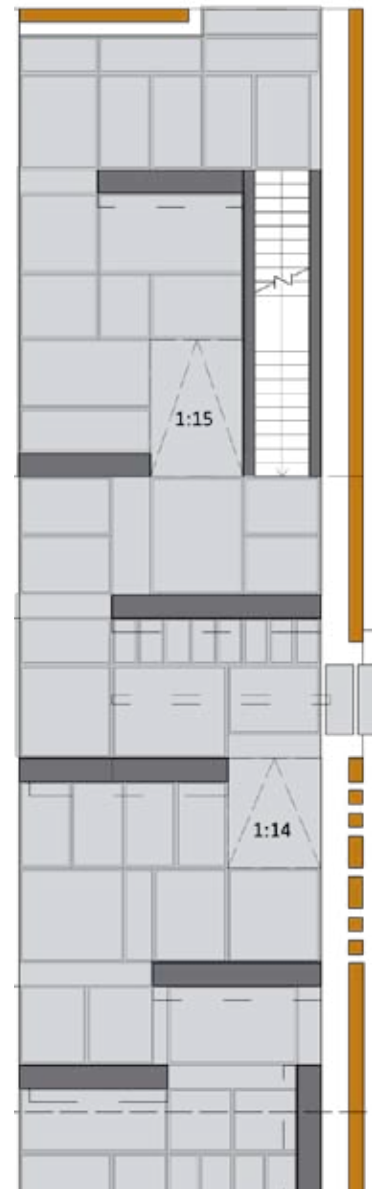


Figure 6.58 Selected plan of exhibition walk illustrating the different floor patterns.

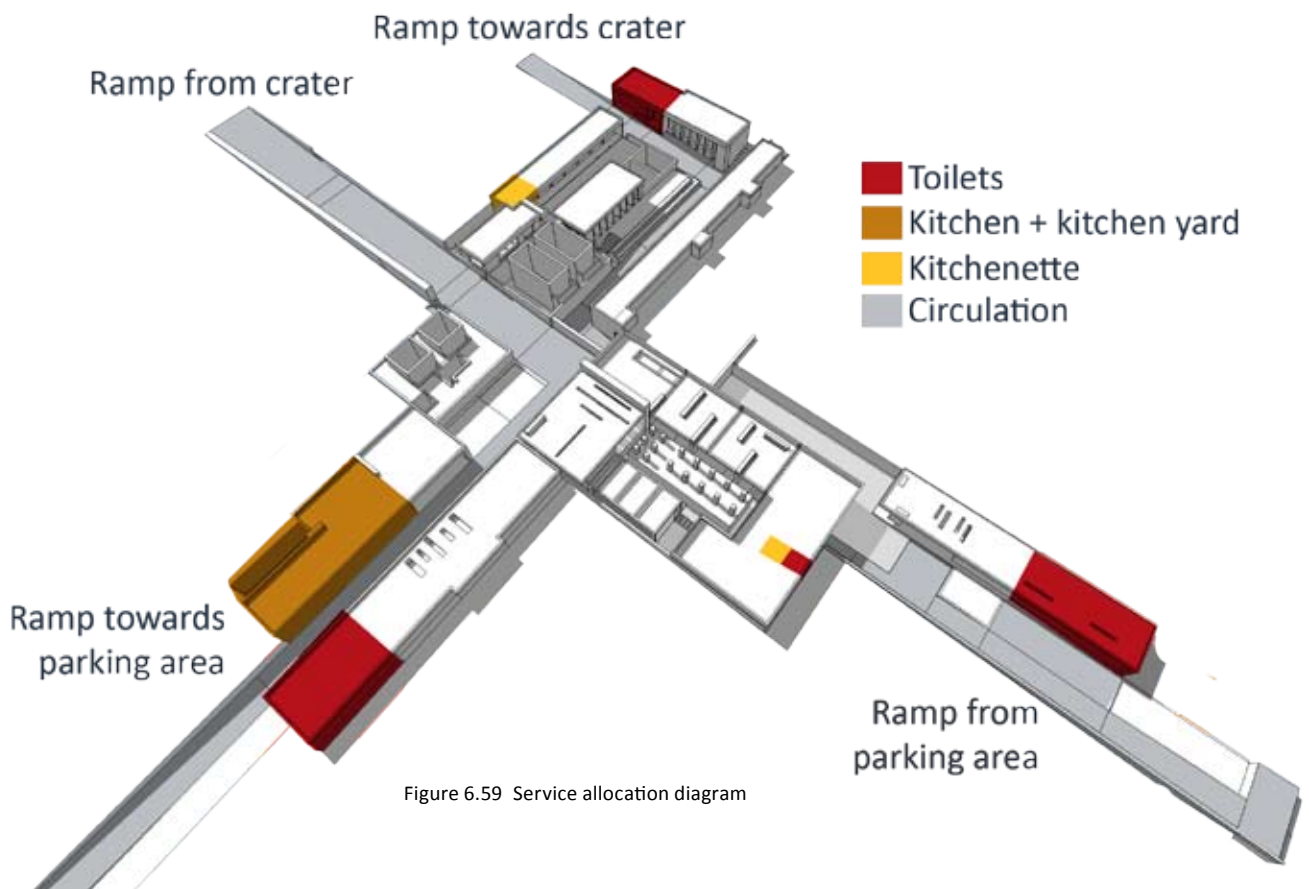


Figure 6.59 Service allocation diagram

6.9 Memory in architecture

The re-articulation of the perceived factory ruins, existing spaces, structures and volumes transforms an expired memory into an indirect memory that can be experienced by the observer as the existing structures are combined with a contemporary inspiration.

The flow of running water plays upon the original flow and flush of water which formed part of the salt and soda extraction process. The different accelerations and auditory qualities of the water evokes the memory of the factory process, while the echoes of the visitors' voices and footsteps become reminiscent of a once vibrant and alive process-driven architecture re-activated by the activity of movement and interaction in and through the spaces.

Selected elements of the original structure are left to decay over time. In this way the natural process is enabled to continue with spontaneity.

An attempt is made to clear out the existing structures, remove excess rubble and expose the different layers of construction, materials, and textures in the process. The existing shell structure becomes part of the exhibition, narrating the history of the site. The idea is to make the history visible, rather than pretending to re-enact it by overlaying fragments of construction.

Due to the mysteries revolving around the exact functioning of the factory, literal translations have been avoided. Abstract interpretations focus on the sensory experience of the visitor by means of experimenting with the sounds, temperatures and visual stimulation of materials, light, shadow and water.

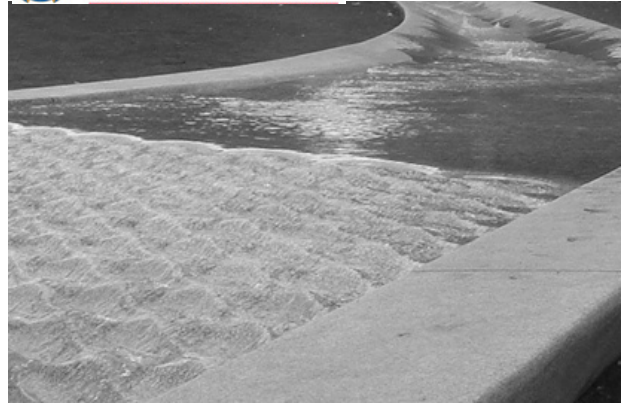


Figure 6.60 Movement of water over different textured surfaces influence the visual and auditory effect. Diana memorial, London [June 2009]



Figure 6.61 Falling water at the Barbican in London [June 2009]



Figure 6.62 Cascading water. Chatsworth, England [June 2009]

6.10 Working within existing structures

In *The Lamp of Memory* John Ruskin states:

[It] is impossible, as impossible as to raise the dead, to restore anything that has ever been great or beautiful in architecture. That which I have above insisted upon as the life of the whole, that spirit which is given only by the hand and eye of the workman, never can be recalled. Another spirit may be given by another time, and it is then a new building... [Ruskin, 1849:269].

The existing structures on the site are by no means representative of great architecture. They do however contain layers of memory that cannot be replaced, representing a certain time and a great influence without which the TMC cannot be fully comprehended.

William Morris exclaims that *It cannot be, it has gone! They believe that we can do the same sort of work in the same spirit as our forefathers whereas for good and for evil we are completely changed and we cannot do the work they did. All continuity of history means is after all perpetual change, and it is not hard to see that we have changed with a vengeance, and thereby established our claim to be the continuers of history'* [Murphy, 1990:4].

The dilapidated structures present an opportunity for daydreaming as the unrepresentable, uncoded, sensual, heterogeneous character of the ruin creates endless possibilities in the mind's eye.

Ruins convey a sense of melancholy. They may be considered as emblematic of the cycle of life and death, i.e. symbolic of the inevitable. The natural world becomes the home to which the human life and its structural realm will inevitably return, despite any pretentious attempts at achieving immortality. Ruins echo memories

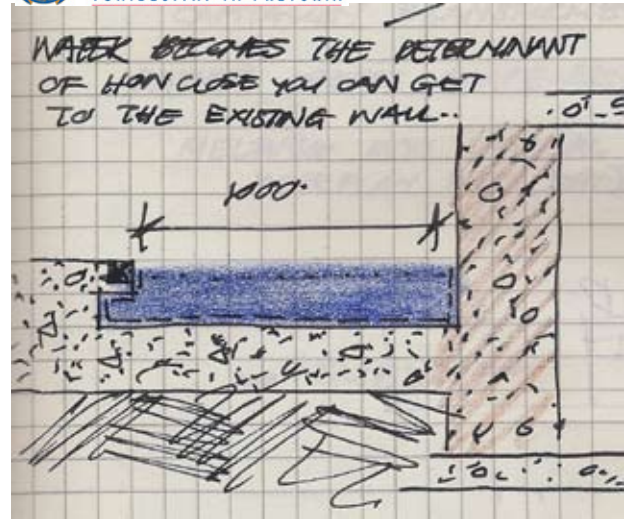


Figure 6.63 Conceptual solution to working within the existing structure [August 2009]

of what once was. These memories cannot be recreated, but should not be obliterated either.

The existing structures are generally unstable due to the fact that they have been almost completely ignored since the demolition of the factory in the 1970's.

According to Anne-Catrin Schultz, '[m]ere reconstruction avoids the complexity of time by replicating a destroyed object and thus pretending a continuous existence' [Birksted, 2000:50].

The architect's role, in this case, is to be an instrument for the continuance of history. To preserve as much of the memory as possible, a decision was made to retain the structures as far as possible, and to design around them, enabling visitors to experience the structures in a stable environment.

In the design approach, there seemingly is an overlay of solid and void, the structure being neither totally excavated, nor completely demolished. Imagination allows one to simultaneously see both elements, in a composition that is complete yet contradictory. The expressed gap between old and new suggests a moment of transition as the new structure claims its place while the old ruin remains.

The concept of layering is applied where the nature of the new layer over the old one is precise, positive and controlled in contrast to the decomposing existing structures weathering over time. The demolishing, excavating and cleaning of the existing structures can be considered subtractive while the new intervention of constructions within the existing represents an additive process.

The existing structure and new interventions are juxtaposed. New elements are inserted into the existing context, leaving a void between the two to allow each to exist on its own, yet to simultaneously connect the

previous era with the present and visually draw attention to the intrinsic differences between them.

The separated elements can be regarded as a confirmation of the new as merely another discontinuous layer inserted within the existing. The intervention becomes a continuation of history. Rather than merely restoring or preserving, room is provided for the narrative to continue.

Incisions are made in the existing structure to reveal the construction and materiality of the existing as it dematerialises over time.

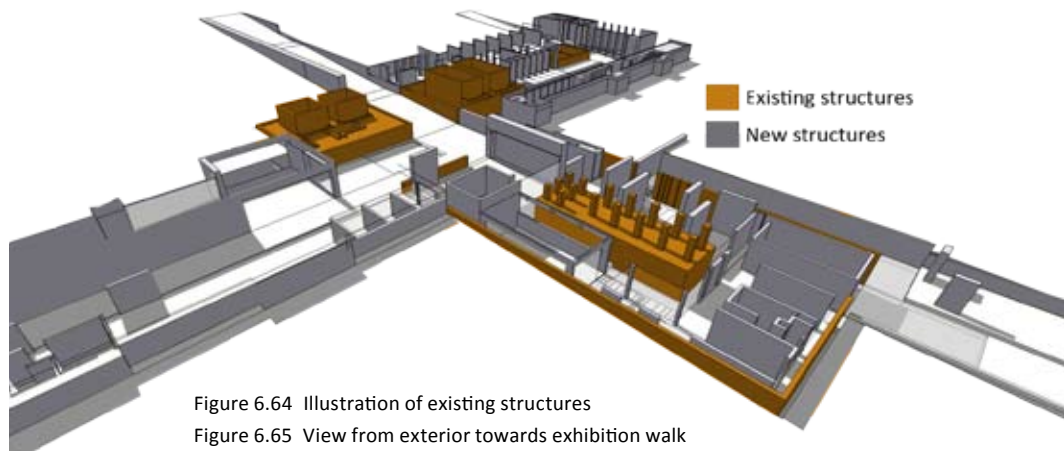


Figure 6.64 Illustration of existing structures

Figure 6.65 View from exterior towards exhibition walk

6.11 Museum design

One problem that has been identified is that there is currently no information available regarding the TMC and its related history at the Natural Cultural Historic museum, or at the Transvaal Museum. Due to a veld fire that started outside the fence of the TMC on 23 August 2009, the existing visitor centre and 500ha of the reserve were burnt down.

Museums facilitate education in a relaxed atmosphere, where people can be educated in an informal manner. When museums evoke curiosity, interest is awakened and the information presented is automatically remembered more efficiently.

Museum design can be regarded from two perspectives. On the one hand, neutral rooms resembling warehouses can be created and filled with almost anything, providing a clean canvas for an exhibition. On the other hand, the exhibited artefact can determine the design of the space as in Carlo Scarpa's Castelvechio interven-

tion. Here the approach seems to be almost theatrical as the works communicate directly with the visitor in the specifically designed volumes.

The proposed "memoseum" was deliberately not designed to be a conventional exhibition space with large exhibition rooms and great volumes.

'Trop d'espace nous etouffe beaucoup plus que sil n'y en avait pas assez' ('Too much space smothers us much more than if there were not enough'). [Bachelard, 1965]

This type of museum encourages exploration. The proposed project can be regarded as a defined part of the route through the site. The visitor is guided through a sequence of evocative spaces comprised of a combination of new and existing structures filled with slivers light that highlight fragments of information regarding the site and its history. The visitor is educated while progressing towards the main attraction of the site, the crater.



Figure 6.67 View of interior of exhibition walkway with slivers of light entering the space and the existing structures on the left



Figure 6.68 View of interior of exhibition walkway with slivers of light entering the space through the existing structures on the right



Figure 6.69 View of interior of exhibition walkway with slivers of light entering the space through the existing structures on the right



Figure 6.70 Exterior view of exhibition walkway with the exterior pond and water spouts



Figure 6.71 View of exterior walkway with existing structures and research facilities on the left and the drill core exhibition hall on the right



Figure 6.72 Interior view of drill core exhibition walkway with slivers of light entering the space

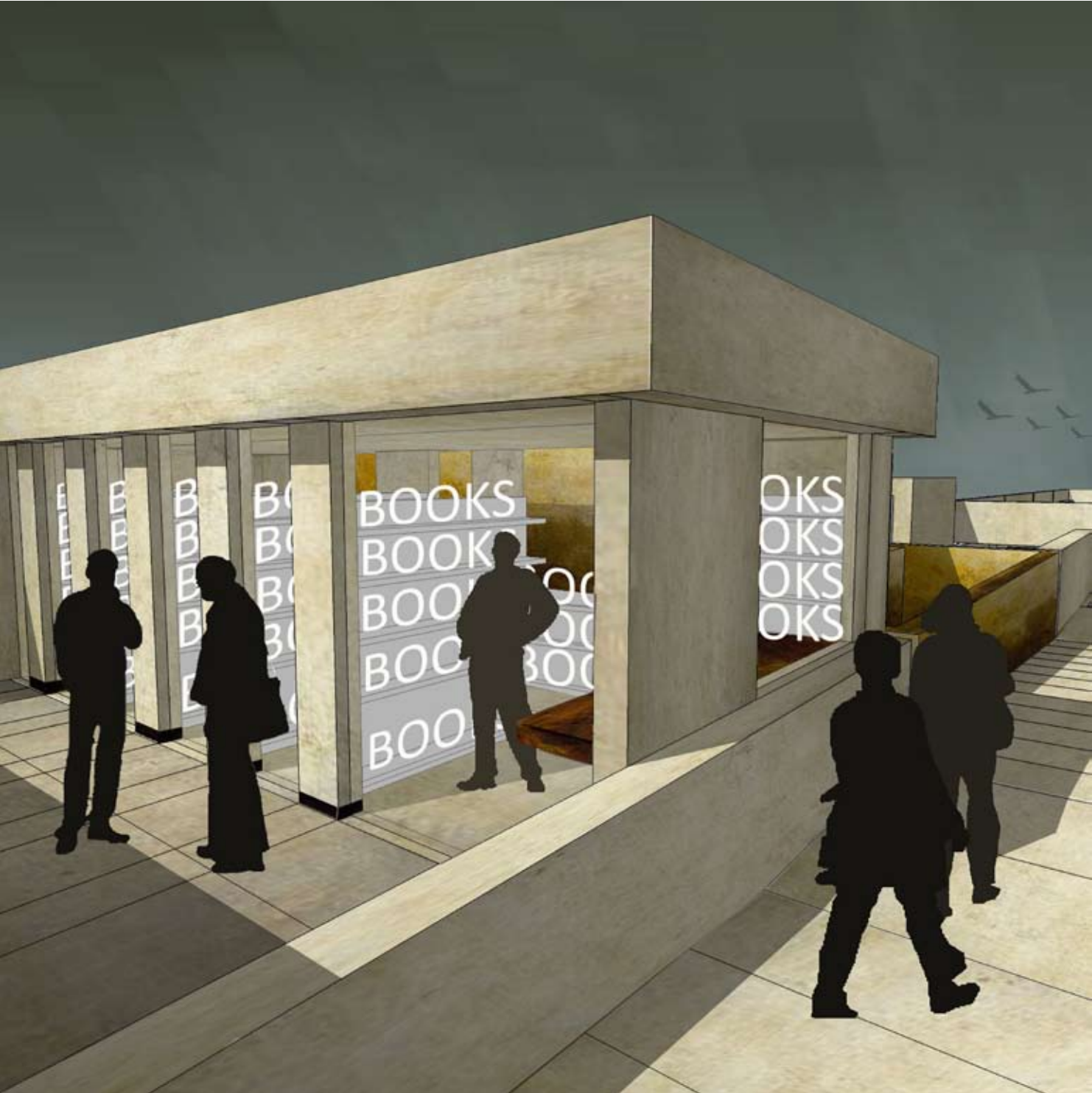


Figure 6.73 View of research library and ramp towards the shop from the crater



Figure 6.74 View of shop integrated with the existing structures, and existing structures in the background

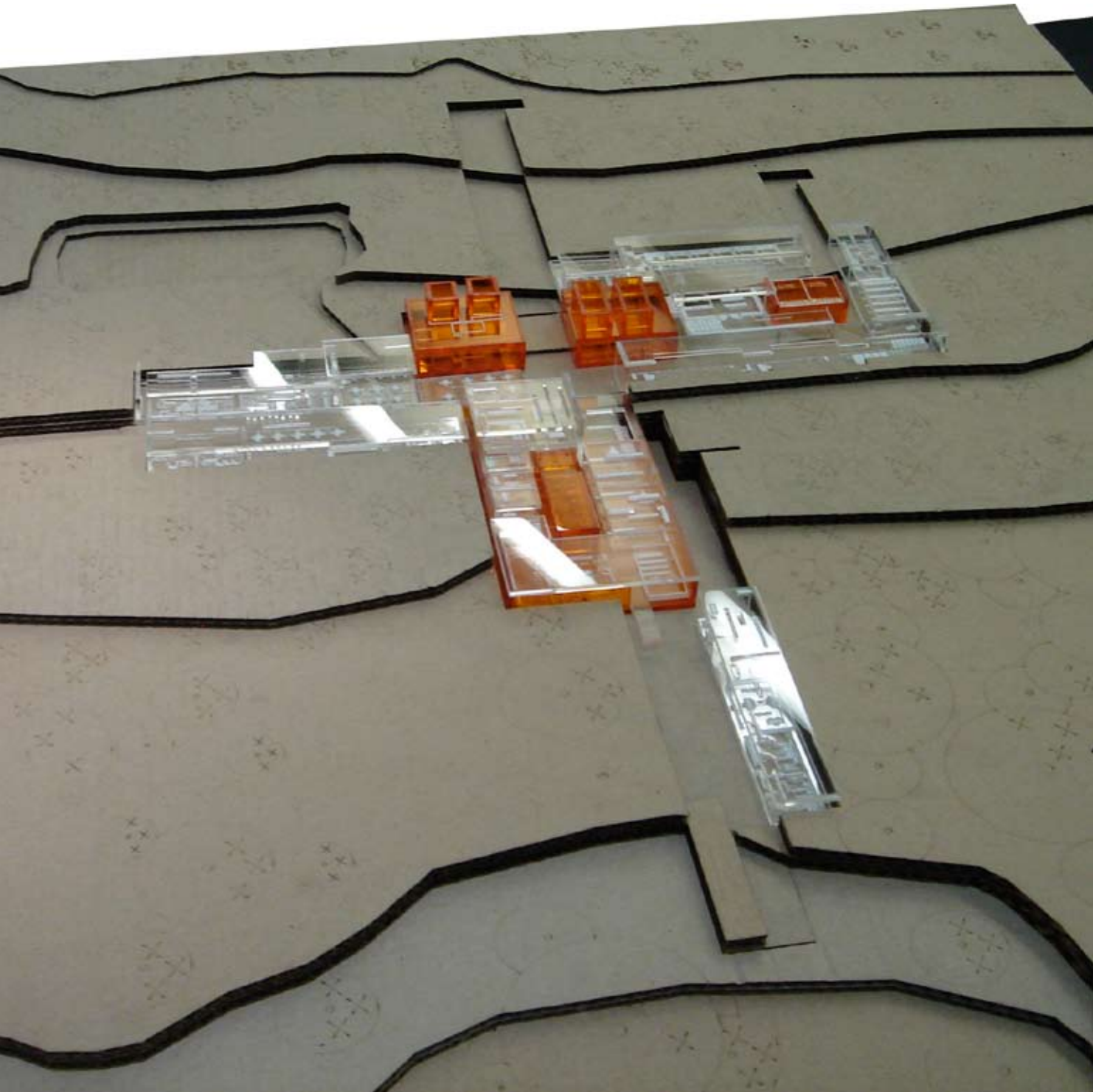


Figure 6.75 Physical model, constructed of layered cardboard contours with etched trees, and perspex model with engraved plans

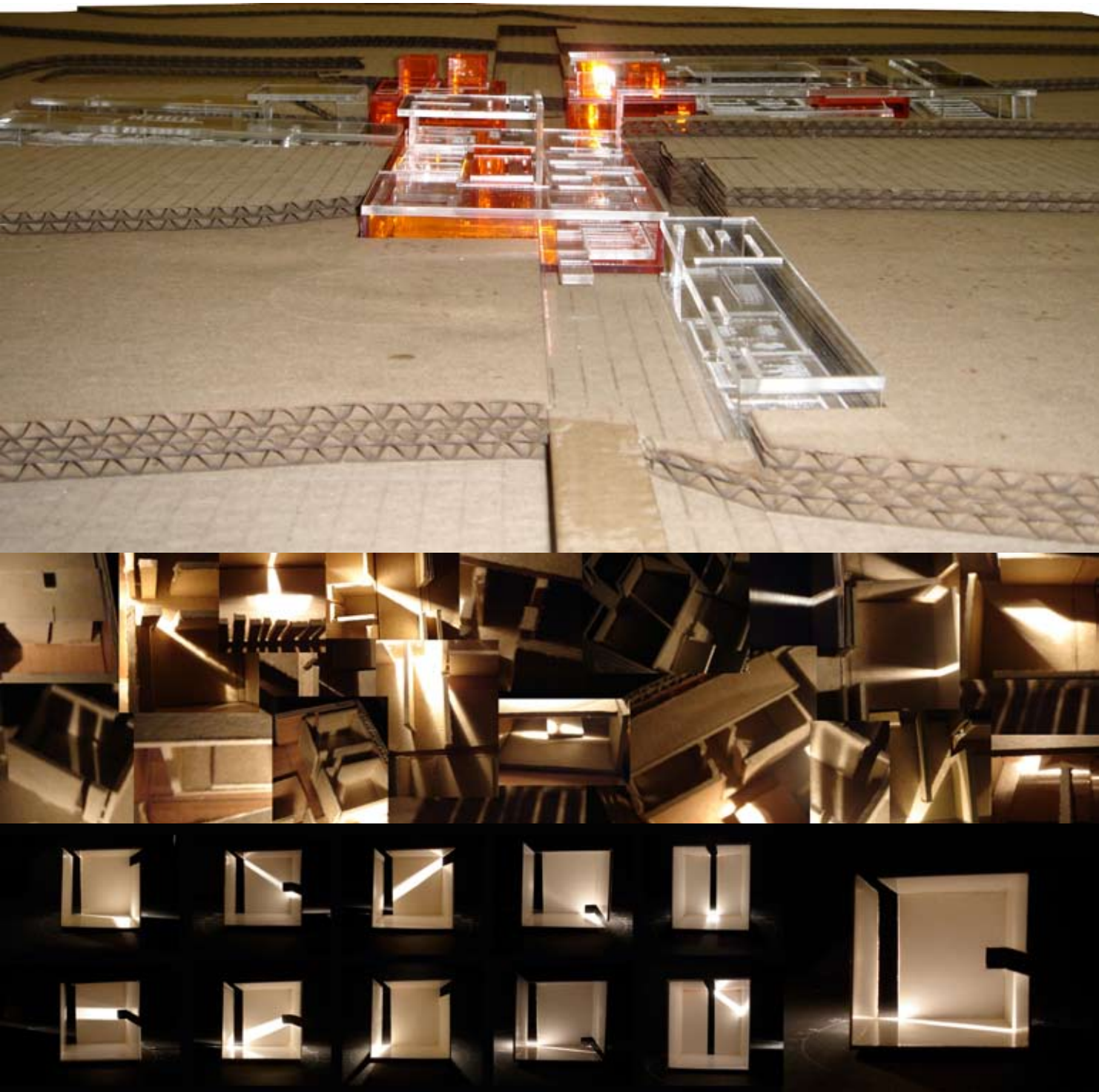


Figure 6.76 Presentation graphics of physical model and abstract light experiments