

CONCLUSION

Christian Norberg-Schulz emphasises the idea that dwelling satisfies the need for belonging and participation. Architecture is the concrete facilitator of dwelling, enabling human beings to experience a sense of being. The role of architecture extends far beyond basic shelter. Architecture influence lives on a daily basis, and this proposal illustrates its role in protecting cultural heritage by remembering a past and facilitating a future.

With technology as a potential threat to public spaces, the emphasis of architecture needs to shift to the experience of the visitor, an experience that cannot be entertained by the Internet. The project therefore stressed the intangible elements such as sensory exploration and atmosphere as integral to the design solution.

The memorial as building typology may be confused with a space dedicated to silence and contemplation. In contradiction, memory is a live element. Memories are constantly changing as time pass, and it is essential not to focus merely on the past, but on the present and future as well. The 'memorial' should inform future generations of *all* the associated memories. The research facilities integrated in the design was therefore considered as a vital element, to ensure that the site continues to develop as there is much left to discover at this exceptional location.

South Africa's natural and cultural heritage is constantly under threat. The proposed design intervention poses to enable management and sustainable future development by means of research. Financial aid is more likely to be encouraged from both the private and pub-

lic sector when the site is managed properly and other activities such as invaluable research is conducted. The site is made accessible to the general public, enhancing awareness and education.

Environmental, social and economic sustainability are considered as essential elements to consider when development is proposed. The SBAT system developed by J. Gibberd was used as an assessment tool. The proposal addresses the aspect sustainability in various ways such as the integration of existing structures, minimising the footprint of the development and integrating the local community in a variety of ways. Inclusive design was another fundamental design consideration as all public spaces should be accessible to the general public as a whole. Ramps throughout the design is one example of integrated inclusive design principles.

The existing structures of the historic salt and soda factory is re-utilised, retaining both the physical and metaphysical memory related to the site. The Burra Charter was used as guide to inform design decisions, ensuring the proper protection and integration of the cultural heritage, preserving it for future generations and exposing it to the general public.

The project resulted in an unavoidable integration of the three disciplines, Architecture, Landscape Architecture and Interior Architecture, proving that one cannot be regarded without the other.

In conclusion, the project illustrates that architecture becomes the celebrated meeting place between the old and the new, the past and the future, architecture and the human being.

ACRONYMS

MCDC: Mabopane Centurion Development Corridor

TMC: Tswaing Impact Crater

TOSF: Tshwane Open Space Framework

UNESCO: United Nations Education, Scientific and Cultural Organization

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ADDENDA

8.1 Tswaing Framework: Site analysis

Problems + Constraints

- o Close to Soshanguve
- o The site is affected by the air, light and water pollution from the informal settlement.
- o Environmental degradation is caused by the exploitation of natural resources such as water and firewood.
- o Poverty in the informal settlements may lead to security problems.
- o Future expansion of informal settlement may threaten the conservation area.
- o Environmental degradation such as erosion
- o Mismanagement
- o Unskilled labour

Opportunities

- o The planned Mabopane-Centurion Development Corridor as well as the upgrade of public transportation to Soshanguve will improve the accessibility and exposure of the site.
- o The informal settlement provides the opportunity of a local workforce that can benefit from skills transfer on the construction site.
- o The significance of the site makes the site marketable as a destination for foreign visitors that bring capital injection.
- o The proximity of the site to the city enables local visitors easy accessibility.
- o Although close to the city, the site lies outside the urban edge and thus has a rural character.
- o The history of experimental farming and other activities on the site may be an indication of possible future endeavors.
- o Astereological studies can be performed on the site and could attract specialist researchers.
- o The unique nature of the site suggests it as a World Heritage site. This promotes it as an eco-tourism destination and could attract external funding.

Potential projects/opportunities

The above problems and opportunities suggest some potential projects:

- o Eco-tourism: nature reserve, hiking, bird watching, entomology
- o Education: astronomy, ecology. This can either be for day visitors or programs that extend over periods of time.
- o Retreat or contemplation space.
- o Research facility
- o Overnight accommodation [middle to upper-class]

8.2 Tswaing Framework: Proposal

The framework suggests that the Tswaing Crater is to be protected,

used, developed, conserved, managed and controlled in a sustainable and appropriate manner. It is important to ensure that the utilisation of the Tswaing Crater is efficient, sustainable and beneficial to all the relevant parties associated and involved with the site. It is of great importance that social and economic development is accommodated. It is also of importance that the facilities and management of the site is equitable on a national and international level within the African context. The following key areas have therefore been identified

1. Community link

This area is located directly across the small existing Soutpan community. There are no available services such as water and electricity currently available in within this community. The allocated area in the framework is the current location of the visitor centre where visiting guests pay admission fees and a scale model of the site can be viewed. Toilet facilities are also available in the building. The proposal is to remove the current function of 'visitor centre' from the allocated area and relocate it within the fenced site boundaries. It is therefore suggested that these existing facilities are integrated with the immediate community (the Soutpan community) and that the utilisation and management of the facilities will be monitored by the Tswaing Crater Museum authorities, while at the same time, an opportunity for education and economic development is integrated into the community.

2. Entrance

This is currently the main entrance to the conservation area. The proposal is therefore to formalise this entrance, and combine some of the previous functions from the visitor centre such as entry fees and information brochures with the new facility.

3. Educational/accommodation

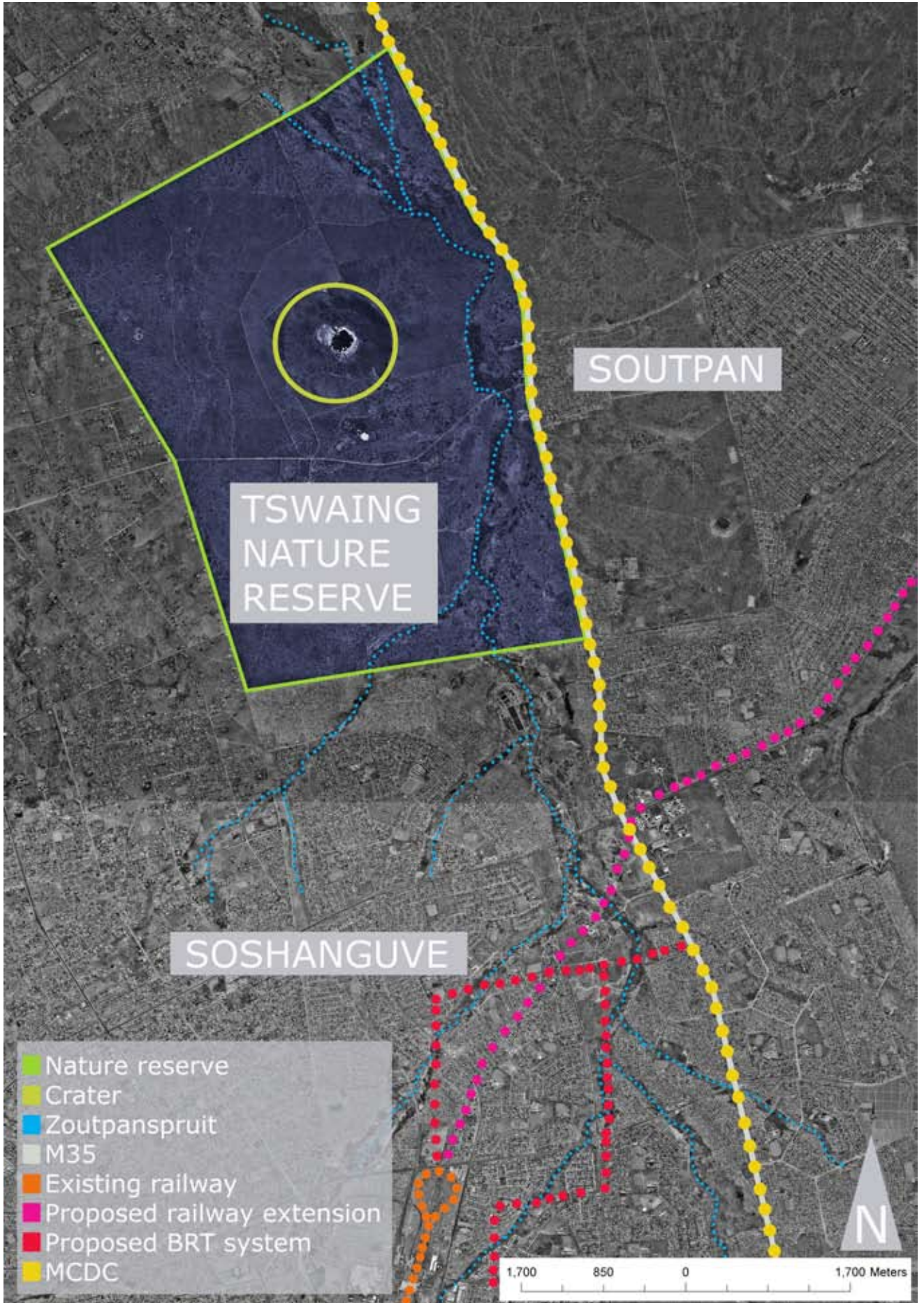
The Kgotla is currently situated here. The suggestion is to retain it and its associated function of accommodation in this area. It is also proposed to integrate the educational aspect of the site into this area as the target group for these specific facilities will be school groups and other large groups.

4. Research/accommodation

This area will potentially be linked with the Kgotla. The difference will however be that these facilities will accommodate smaller groups or individuals interested in the research fields associated with the site or visitors that wish to stay overnight for recreational purposes.

5. Staff facilities

The staff will be accommodated with all the related amenities that they should need in this part of the site. The existing structures were initially used as the reception area of the site, and are currently used by security staff members. There is also a picnic site and ablution facilities that will be integrated into the proposal for the staff housing.





6. Public area

This area will be dedicated to all the related public facilities such as a parking area, an area for refreshment, recreation, information and education. These amenities will be accessible to the general public.

7. Semi-public area

This part of the site will be accessible to the interested parties.

8. Open interpretation

The development or intervention in crater is open to interpretation, and each individual student will define the parameters as is appropriate with each scheme.

Pedestrian routes

These routes are dedicated to pedestrian movement only. The routes will be formalised to facilitate and encourage pedestrian activity.

Protected wetland + Soutpanspruit

The sensitive wetland area and Soutpanspruit are regarded as areas that will be protected with environmental and ecological management.

Controlled vehicle access route

These routes will only be accessible to vehicles with authorisation. These include for example, staff, management and authorised visitors that need vehicular access to the semi-public area.

Main vehicle route

This route will be formalised and accessible to all vehicles permitted through the entrance gate.

8.3 Soda-ash and salt extraction

Soda-ash production

1. Soda-salt liquid [brine] was pumped from the boreholes in the crater floor with electric pumps. The brine that was collected was brought to temporary reservoirs at a central pumping station next to the old wagon road.

2. The brine was pumped uphill from the central pumping station to the storage reservoir [holding 180 000 litres]. The foundations of the reservoir and remnants of the pipeline trench can still be seen.

3. The brine flowed downhill to the reservoirs at the factory [open concrete structures].

4. From the storage reservoirs, the brine was pumped to a three-

stage evaporating machine where some of the moisture was removed.

5. The brine from the evaporator was then cooled to air temperature in a cooling tower, and after that, pre-cooled to 15°C.

6. The pre-cooled brine was then brought to large rectangular refrigeration tanks. These concrete tanks with the capacity of 27 000 litres, were insulated with cork. Horizontal pipes filled with ammonia cooled the brine. The brine was cooled to -10°C which resulted in a sodium chloride liquid residue in the pipes that had to be removed with mechanical scrapers.

7. The scraped-off decahydrated sodium carbonate and salt liquid was drained from the refrigeration tank on a 30 minute cycle, where it was pumped to centrifugal separators. The washing soda was separated from the rest of the liquid and the remaining liquid was pumped to another part of the factory where it was turned into salt.

8. The washing soda crystals were bleached with chloride.

9. The bleached washing soda was melted in its own water in a steam heated remelting machine.

10. The melted mixture was pumped into a large vacuum pan where it was boiled under reduced pressure until the decahydrate lost 90% of its water.

11. The mixture was pumped to another centrifugal separator, where steam was used to wash out as much of the remaining salt as possible.

12. The monohydrated sodium carbonate was then transported with an elevator into a gas-filled Merton furnace, where it was dried into a white powder, containing 97-98% soda-ash and 1,2% salt.

Salt making process

1. After the separation of the washing soda from the liquid, the remaining ice cold liquid flowed to a large number of shallow cement ponds next to the factory where the liquid was warmed to air temperature.

2. From here the liquid was pumped to a salt factory, where it was filtered to remove dirt and other impurities.

3. The filtered liquid ran into a three-stage evaporating machine. Steam from the soda factory was used to evaporate the water to crystallise salt.

4. The moist salt went to a centrifuge to remove more of the water.

5. The salt was packed into bags and stored in a drying-shed, where the remaining moisture gradually evaporated, leaving behind a coarse powder consisting of 99% salt and 1% Soda-ash. This salt was pure enough to be used for the salting of butter and the curing of meat, but not pure enough for table salt.

6. The remaining liquid was pumped back into the crater through Mauss's cutting.





ARTICLE	BURRA CHARTER	BURRA CHARTER SUGGESTIONS	CURRENT SITUATION	PROPOSAL
2	Conservation and management	All significant places should be conserved as an integral part of the good management of the place	Poor management results in limited available funding	To provide a physical structure allowing management and research to continue as an active part of the site.
3	Cautious approach	Change as much as necessary but as little as possible	The factory is deteriorating over time as it is left to decay. The site is dangerous to any potential visitors as the structures are in an unstable condition.	To retain as much as possible of the existing structures and to make them accessible to the general public in a controlled way.
4	Knowledge, skills and techniques	Bring together the necessary skills and knowledge	Nothing has been done around the factory ruins and it is suspected to be partially due to the lack of proper skills and knowledge due to limited financial funds.	The appropriate knowledge and skills related to working with unstable structures should be employed. The proposed project focusses on the architectural element involved in the potential development.
5	Values	Consider all values related to the site	Various communities are still involved with the site, mainly related to the sacred nature of the site. Research is also conducted.	Various discussions with staff and other members of the community illustrated that the site has a significant influence on the community, the framework proposes to include special access for the community.
6	Process	The significance of the site should guide decision making. Determine the significance by investigating, make a decision and take action	The factory is significant as a physical representation of a memory passed.	The proposal investigates the role of memory and how memory can be continued as a live element of the site while protecting the existing as far as possible.
7	Use	Options to retain significant uses need to be re-investigated. A new use should involve minimal change to the place	The structures are part of the existing hiking trail	The proposed intervention includes the existing structures as part of the route through which the visitor experiences the site as a whole. Research is also included in the new use, and room for management has been allowed.
8	Setting	The setting contributes to the significance of the place	Only a few of the structures are visible from the hiking trail and large parts of the factory consists of underground storage tanks	The design proposal respects the submerged nature of the factory and it is consequently implemented as a design guideline.
9	Location	The location of structures is integral to their history and significance.		



10	Contents	Contents, fixtures and objects that contribute to the significance should be retained at the place	The physical evidence of the factory's existence is slowly becoming part of the surrounding landscape, rendering it more difficult as time passes to determine what is where and why.	The proposal includes as much of the existing structure as possible, enabling visitors to view the ruins in a stable environment. The structures are generally left to decay in a controlled environment. This decision was made to allow the memory of the structure to continue in a natural way.
11	Related places and objects	Objects not at the place may contribute to the significance. Other places may also contribute to the significance	The Vredefort Dome is the other impact crater site. The visitor centre was visited earlier this year and was unfortunately experienced as disappointing. The Natural Cultural Historic museum and the Transvaal Museum currently only have one printed document related to the site, <i>Tswaing Meteorite Crater: An Introduction to the Natural and Cultural History of the Tswaing Region Including a Description of the Hiking Trail</i> .	The proposal aims to provide a comprehensive understanding of the site and in this way compensate for the general lack of available information.
12	Participation	Many people may have interests or special associations with a place. All should be given the opportunity to participate in the conservation of a place	The Soutpan community and members of the Soshanguve settlement are currently employed at TMC and various other spiritual community members visit the site on a regular basis.	
13	Co-existence of cultural values	A place may be valued by more than one community. A place should be managed to conserve all values		
14	Conservation processes	Processes used should be those that best retain the significance of the place	No obvious conservation processes is currently employed concerning the factory ruins.	The proposal integrates the existing structures and enables exhibitions covering the various aspects related to the site's history and significance.
15	Change	Identify the reason for change. Options that retain the fabric or other characteristics that contribute to the significance are preferred	The structures are unstable and deteriorating.	The design proposal makes use of reinforced concrete as construction material, retaining the material memory, yet applying a contemporary, clearly distinguishable finish.



16	Maintenance	Regular maintenance is good practice	With the exception of part of the hiking trail, the structures are ignored as part of the site at the moment.	The proposed facilities will accommodate administration facilities as well as research facilities, allowing continuous management to be activated.
17	Preservation	Preservation maintains the fabric in its existing state and retards deterioration, protecting the fabric that should not be altered. Where insufficient investigation has been carried out to allow decisions to be made, preservation is the preferred conservation option	The structures are weathering due to natural determinants.	The proposal protects certain elements from extreme weather conditions, yet a decision was made to let nature take its course, and in that way allow the memory to continue without creating a false representation of the existing conditions.
19	Restoration	Returning to an earlier state without introducing new material		
20	Reconstruction	New work that is returning to an earlier state with the introduction of new material. The work should be identifiable as new		
21	Adaptation	Ask why change is needed. Explore alternative solutions for effectiveness and impact on significance. Adaptation should provide benefits by maintaining or interpreting significance.	The memory of the structures is disappearing as time passes.	The design intervention facilitates management and research facilities to accommodate the future of the site.
22	New work	New work and existing work should be clearly distinguishable. New work should be similar to existing fabric in its consideration of matters including siting, bulk, form, scale, character, colour, texture and material, but should also be contemporary		The new construction material is reinforced concrete with a contemporary finish. The scale and proportion of the existing structures determined the scale and proportion of the new intervention by means of a grid system that was employed.
23	Conserving use	Places that are used survive. Most places have historical or social value because of their use. Continuing or reinstating a use may require changes to significant fabric. These should be minimised	The ruins are deteriorating at a faster rate due to the fact that it is generally ignored at the moment.	The motivation for the design was to ensure the survival of the structures, and more importantly the memory of the site.

24	Retaining associations and meanings	Many people have special connections to a place. Often significant associations and meanings are linked to the use and fabric. Retaining relevant fabric and use may be the most effective way to retain associations and meanings.		
25	Interpretation	Interpretation integrates understanding, appreciation and enjoyment of a place and may involve signs, brochures, tours, exhibitions, events, publications, artworks and other forms of expression. It may not be confined just to the place.		
26	Applying the Burra Charter	The place should be studied, a statement of significance prepared, policies developed and necessary work done to conserve the cultural significance	Almost no documentation exist regarding the factory, with the exception of one photograph and a diagramatic plan indicating the pipelines from the crater floor.	The site was documented as far as possible by means of surveys, photographs and research [including interviews with related parties]
27	Change	Changes to a heritage place should not damage the cultural significance. Record existing conditions before any changes are undertaken.		
28	Disturbance of fabric	Fabric should not be disturbed unless it is necessary for the conservation of the place.	The factory site consists of rubble to a great extent.	Only the necessary structures will be removed to facilitate intervention. The aim is to retain as much as possible.
29	Responsibility for decisions	Identify who is responsible for decisions about a place		Management should be properly initiated and provide appropriate techniques and strategies concerning future decisions.
30	Direction, supervision and implementation	Competent direction and supervision is required during all stages of the conservation of a place		
31	Documenting evidence and decisions	Conservation is ongoing. New evidence, new historical records and decisions should be recorded systematically		Research facilities such as a library, workshops, offices and storage space is provided to enable future research and continuous documentation thereof.
32	Records	Records associated with the conservation and history of a place should be properly cared for and available for public access where appropriate		The library and visually accessible workshops aims to provide the general public with a better understanding of the site.
33	Removed fabric	Removed fabric should be catalogued and stored at the place		Storage facilities are provided in the design proposal.
34	Resources	Conservation work needs knowledge, skills, experience, time, money and goodwill. Resources should be reviewed in conjunction with the policy and integrated into financial planning cycles.		Commercial activities such as a restaurant and shops have been integrated in the design to increase financial income for the site. Proper research facilities should also encourage funding from both the private sector and Government authorities.

