

CONFLICT SPACES

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A design thesis project presented to Ryerson University
in partial fulfillment of the requirements for
the degree of Master of Architecture
in the Program of
The Department of Architectural Science

Toronto, Ontario, Canada, 2015
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Author's Declaration

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Fig ii Gerry Judah's interpretation of urban space that is affected by conflict and environmental catastrophe.

Abstract

Conflict Spaces
Master of Architecture 2015
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Conflict and architecture's relationship originated from the first rock throw that established space and distance between primordial humans and their aggressors, producing a spatial buffer, which enabled liberation from the evolutionary process (Ritter, 2012). This separation in space was the starting point of discerning the outside (sacred) and the inside (community). The outsider ("the other"), is an increasingly important aspect of societies involved in conflicts; prior, during and in the reconstruction phase. The symbols of memory within a conflict become the focal point, where architecture manifests the history of a place or space. This identity is first deconstructed during the siege, and reconstructed once the territory is pacified. This thesis is an observation of the changes that places and artifacts of memory undergo during a conflict, arguing that architecture is dynamically linked to people; building a foundation for memory, creating a collective identity; an object that is the focus for every conflict.

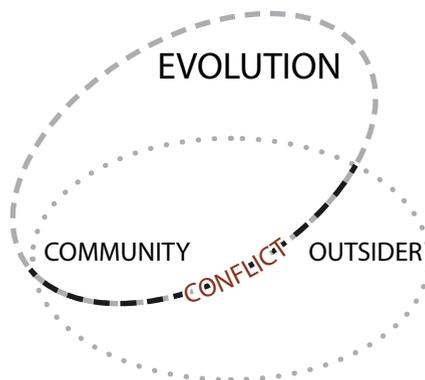


Fig iii Evolution and Conflict's Relationship

This book is dedicated to all those who carry the burdens of the loss of innocence from experiencing first-hand the devastation conflict incurs.

Acknowledgements

It is with great pleasure that I wish to thank the following individuals.

My thesis supervisor, Arthur Wrigglesworth for his enthusiasm day in and day out for my thesis topic and my own abilities to perform. It is undoubtedly, through his confidence in my abilities that I was able to produce this work and really challenged me to fully dedicate myself to this journey.

My second reader, Scott Sørli for his incredible insight into the conditions of people and the world. It is with your positive outlook of my work and the ability to illuminate parts of my work that allowed my ideas to truly flourish. Thank you for the spectacular readings you have provided me.

Furthermore, I also wish to extend my appreciation to Professors Vincent Hui and John Cirka for your critical examination of my work and providing me a direction in which to further my work. It has, without a doubt, made my work much more solid and convincing in the end.

I would also like to thank my family, friends and colleagues at Ryerson University who have had to endure my explanations and indulge me with my ideas as I've brought it to them many times in order to further clarify my ideas.

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1.0 Introduction

“Anybody interested in the effects of war quickly becomes an expert in ruins.”

Simon Norfolk

The subject that often comes to mind when discussing conflict is that of war, destruction and death. Conflict is to humanity as evolution is to nature; it is a process in which humans exert their influence over other humans, while deepening the use and need for our technological advancement. Throughout history, it is common to see a thread of immense growth in the ability to fashion nature to our whim, at times when our survival is at stake. It is in these periods that our unnatural evolution has hastened to heights not seen or experienced during times of peace. Conflict in these instances is the driving force for our establishment in this world as the alpha species.

In times of war, architecture becomes the boundary condition; separating the “outsider” from the community. Fortifications were made to secure the people and great walls were built along castles or territories that regulated people’s movement. Defensive wall construction and technology changed, followed by a game of cat and mouse, with defensive and offensive strategies evolving into more complicated and effective

technologies to breach or defend the barriers architecture provides.

More important than just a defense mechanism, architecture not only housed the people who sought protection, but also encompassed the identity, ideals, history and memory of those who built and maintained it. To this end, architecture became an object requiring defense from enemies who sought to first deconstruct and reconstruct it according to their own needs, thereby producing a new set of memories and guiding a new history.

The scope of conflict must first be defined for it to be understood within the context of architecture. Conflict occurs on various scales, ranging from large wars that encompass continents to minor local and urban warfare. The breadth of conflict that this thesis intends to study ranges in size between individual houses and rooms, to that of an entire city. Events larger than this become too cumbersome to study for the motives(,) and the violence stems primarily from political and

international factors. With individual cities, down to the size of houses, it is possible to micro-analyze violent acts and the involvement of various factions in the conflict. It also provides the ability to confine certain motives and reasons for violence and derive conclusions from these acts, thus enabling a type of forensic investigation to take place, and to a certain degree, the ability to dissect the event and explore the different vectors that influence the outcome of conflicts.

Legitimizing Violence

Waging war requires a certain calibration of a population's psyche. In Germany, between the first and second World Wars, Hitler's propaganda machine portrayed the Gypsies and Jews as enemies of the state. Persecution began slowly building in the early years of the Nazi regime, propagating the idea that these individuals are foreign elements living within an otherwise homogenous realm belonging to a certain group. This is one example of how illegitimizing a group allowed for "legitimate" violence defined by the majority.

The defining of war is required to engage in violence. By defining what is "peace" and "war," it is possible for a state or actor to further define what is legitimate, illegitimate, indiscriminate, preventative, self-defense or extreme violence (Herscher, 2008, p.36). A certain narrative needs to be produced to legitimize or make actionable the violence towards people and the places that they reside in. By conducting this narrative, an oppression of a people begins, starting from the top and working its way down through society, where it is politically beneficial for certain groups. It is apparent in many cases, that this process begins gradually and with finely tuned language to make it seem as if the violence is

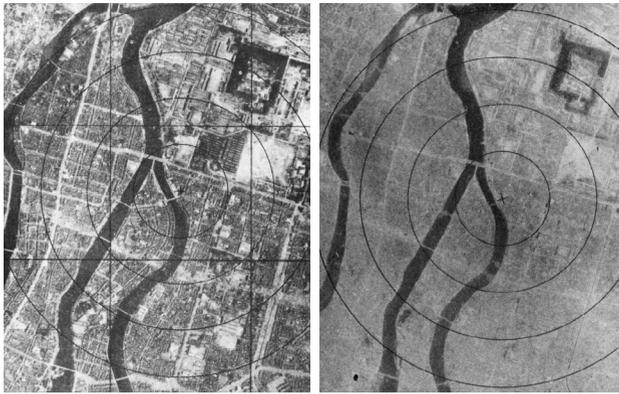
being conducted in the form of self-defense; in hopes of expelling a foreign substance or entity for the betterment of the whole.

Architecture quite often takes the role of objects that belong to different types of people. Identifying certain types of people and the architecture they are affiliated with allows for a message to be sent to the same people with the destruction of those symbols. The destruction of the Reichstag during the Second World War resulted in the end of the Third Reich, and the toppling of the Saddam Hussein monument during the 2003 invasion of Iraq likewise represented the end of that regime. Dresden and Hiroshima were determined to contain factories that produced arms and thus were deemed important targets to be razed to the ground. Any person in Palestine is deemed a dangerous target due to the ability to carry bombs under normal clothing, so strict inspections are required regardless of age and sex. (See Figure 1.1-1) These moments in time represented the shift from one line of memory to a new identity being created in its place by the victors.

Fig 1.1 - 1 Targets of War



Dresden



Hiroshima



West Bank

Liminal Entities

"Violence against architecture, like violence against the body, often involves the same forensic investigation, the same attempt to define an other in the midst of destroying it."

(Herscher, p.36)

In any conflict, there needs to be the "other" that is dehumanized, devalued and excluded from the reorganization of a new space. This involves a group of people being victimized, based on either racial, religious, political and ethnic lines. By having these individuals become excluded from the norms of society, do they become what is known as liminal entities. In *Liminality and Communitas*, Victor Turner begins by defining liminal individuals or entities as "neither here nor there; they are betwixt and between the positions assigned and arrayed by law, custom, convention, and ceremony." (Turner, 1967, p.95)

In spatial terms, the social structure appears as:

- Edge Zones (Liminality)
- On the edges (Marginality)
- Outsiders (Inferiority)

Once an individual is pushed into the liminal state, their status becomes ambiguous, forcing them into a temporary mode of exclusion from the normative.

Example: the Massacre in Bosnia & Herzegovina:

"Contemporary science and religion holophrase the politics of terror which, in order to carry out the massacre, first had to construct the object of their collective hallucination, the "Muslim-Islamic fundamentalist," an object nonexistent in pre-genocide society in Bosnia."

(Monument Group, p.64)

This fabrication was used to wage indiscriminate violence on Sarajevo, by stripping away the individuality and dehumanizing the citizens so that they all appeared inferior and part of the same group, furthering them into a liminal state prior to the violence on the city. The fact is that the city was and still remains to be a multiethnic zone; however to legitimize the violence against the Bosniaks, they were described a certain way to make it appear as if they were in fact a threat to the larger pan-Serbian goal of a post-Yugoslavian state claiming the majority of the Balkan region.

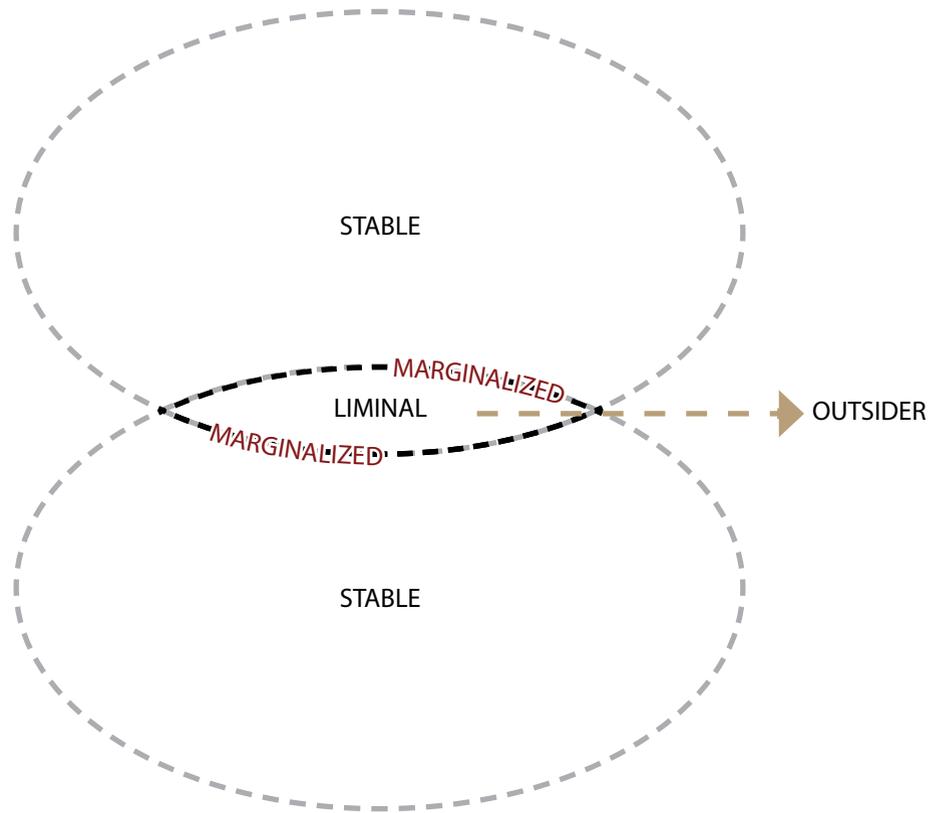


Fig 1.2 - 1 Social structure using spatial diagramming

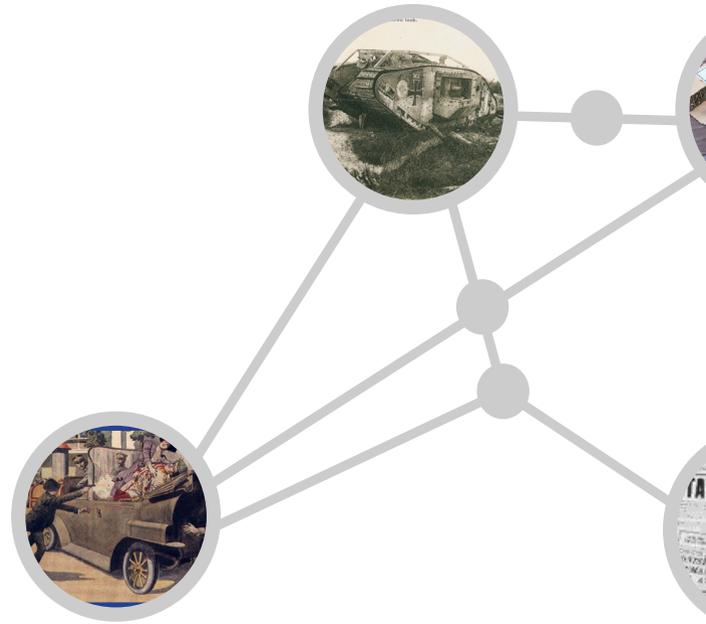
Slow Violence

The visible acts of violence that take place in urban conflicts are considered *fast violence*, where in buildings are destroyed and lives are lost. These events are a direct result of specific actions that take place in the zones of conflict and are considered to be minor vectors in the larger scheme of thinking. The scale of slow violence takes the form of shifting identities of places and reterritorialization of territories (Deleuze and Guattari, 1987, p. 68). Rob Nixon in his prolific book, *Slow Violence and the Environmentalism of the Poor* brings forward the ideas of long term, hidden from view, negative effects that can be invisible yet immensely impactful on the world. He goes on to define *slow violence* as "a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (Nixon, 2011, p.2)

A way of thinking about the issues that slow violence brings up in a physical form that is relatable, is to think about events such as nuclear fallout after a cataclysmic event. The explosion of the Chernobyl reactor occurred in an instant which was highly visible

and fleeting in time. However, the aftermath, which is not visible, requires the aid of representation to properly view the spread of toxic radiation across much of the western USSR and Europe at the time. This radiation has affected the people for decades and is currently still being investigated for its long-term effects related to cancers and birth defects.

Slow violence connects each of the conflicts that are the precedent studies for this thesis. Represented in Figure 1.31-1, the following connections can be made between various events; the start of The First world war



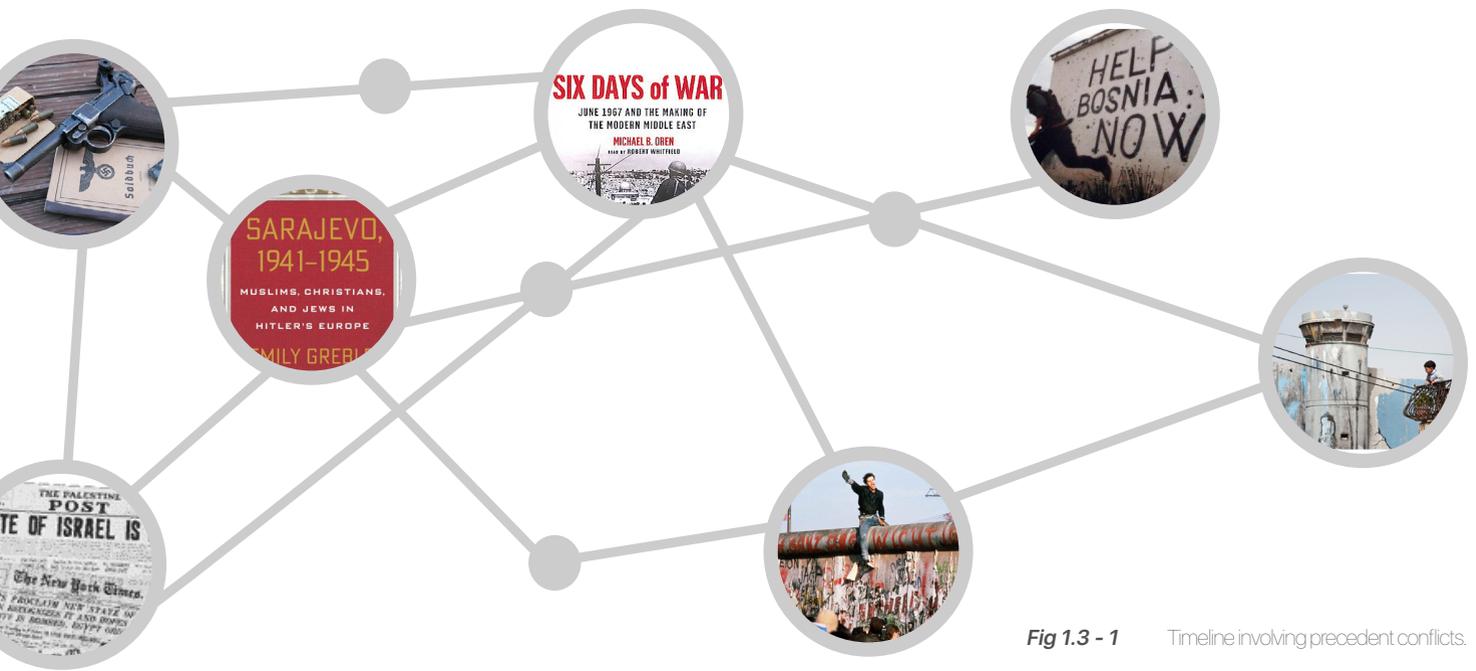


Fig 1.3 - 1 Timeline involving precedent conflicts.

began with the shooting of Archduke Franz Ferdinand which was committed by the Serbian secret society named Black Hand, and led to total war, forcing Germany to capitulate at the end of the conflict. This conclusion pushed the German people to place blame on and exclude others, which later became a major issue of war atrocities after The Second World War. The displacement of the Jews destabilized the Middle East as they started to migrate to the highly disputed lands surrounding Jerusalem between the Golan Heights and the Mediterranean. This further displaced the Arabs within those regions and caused half a century of strife between the two factions that continues

to this day. The 1992-1995 siege of Sarajevo began on the same streets which initiated World War I with the killing of the Archduke.

The events listed prior are all connected by the exclusion of certain groups of humans, causing mass migrations which further excluded other groups. The mass structural changes of populations and movement between liminal states causes many ambiguities which opens groups of humans to acts of *fast violence* without justice or proper rights and laws to defend them.

Slow Violence sheds light on the understanding that flashpoints within conflicts are not instantaneous, that they have in fact been growing throughout time to a maximum breaking point. Becoming a visible form of violence can take from decades to centuries, given the right conditions. The fact that humans currently live much closer to each other, in far more urbanized spaces, conflicts are becoming quicker to initiate and longer lasting, making them difficult to end. This situation is due to the fracturing of conflicts between government bodies. When government bodies are no longer in control of an armed population, there is no central control for the outcome of a conflict. With much of the strife in the Middle East occurring between factions of groups rather than state actors, the tensions are harder to control by worldly bodies such as the United Nations or even local governments. This is not to say that the Middle Eastern conflict is only a recent phenomenon, it isn't. Eyal Weizman uses the term "Field Causality" to describe violence that is continuous and slow where the start and ending aren't obvious to point out (Forensis, 2014, p.27).

The examples of *slow violence* presented here act as a background condition behind the conflicts as they are the obviously visible aspects. They are the ruptures in time and space, however, it is necessary to understand

that they are not stand alone events, but rather connected to each other. This quality of *slow violence* to the conflicts is the reason why they have been singled out as examples for study rather than abstract selection based on conflicts that are not as related.

Memory and Identity

Memory is constantly changing. Much like virtual memory, it is frequently being written, updated, erased and in decay. These properties of memory make it highly malleable and prone to change from outside interferences. In this memory we contain the *Self*, the individuality that guides us within the cultural landscape we inhabit. There is a parallel between memory of self and the memory of urbanity. The latter also constantly being built, renovated, destroyed and decaying. These two forms of memory coincide with each other, interacting to produce a reality that helps build a narrative of our past, present and possible futures. Vladimir Czumalo in the article *Architecture and Identity* contends that memory "not only reconstructs of the past but also organizes the sense of the present and future" (Cuzmalo, 2015, p.47). As architecture changes through time, usually by being torn down or through natural decay, and eventually being rebuilt, the memory and identity will correspond

with those changes. The idea of destruction leading to a renewal of the built environment enforces the shaping of identity and memory.

Shaping one's memory does not simply come from the existence of an object; it additionally is significant to note that absence is of equal importance. It is the attachment that occurs between people and their surroundings that produce this notion of "place memory" as Dolores Hayden describes in *The Power of Place*. Hayden goes on to explain that place memory contains our faculty to associate with the natural landscape and the built environment which when combined, represents the cultural landscape. This space that is occupied allows for the objects to both build and elicit "memories of a shared past" (Hayden, 1995, p.46).

Gregory Dowell in *Memory and Identity: Destruction and Rebuilding* believes that buildings contribute more than just objects in the physical world. They also allow memories to become connected to them due to their social and political implications that permit these physical objects to be connected to people through shared memories. Dowell iterates that "Memories are attached to places because of the social and political meanings people link to their physical form and aesthetic

beauty." In essence, individuals are able to connect with the physically built form due to the similar characteristics as they see themselves also within the buildings.

Memories and Identity are fundamental to the equation of why and how conflicts occur. They are the root of the established people of a space and if the goal is to uproot the people, the intended targets are the qualifiers for their memory and identity. With those objects out of the way, do the oppressors begin to rewrite history and introduce a new timeline for a new people.

2.0 Architectural Theory

Architecture as

CON*struction* / **DE***struction*

Architecture as a verb is an inherently destructive force according to Newton's laws of thermodynamics. By creating architecture, it must result in the destruction of many other compounds and elements and be remoulded into the artefact that is being designed. The generation of architecture can be lead from the destruction of previous architectural objects as well. The act of deconstructing older modes of architecture to supply new ones is common practice. The issue arises when violence is the force that reforms architecture and gives it new meaning.

I contend that the destruction of architecture through violence is also a form of creation or construction. Though the architecture may not be—at the very least—acting according to the original design or even—at worst—completely inhabitable, the architecture does in fact occupy a new identity than what it originally was intended for. This is significant as it is both an effect of urban warfare that is a minor vector and a symptom of a larger reterritorialization by the offensive force that becomes harder to identify while a conflict is on going. "From the political/military point of view, the city is a social/physical

obstacle that must be reorganized before it can be controlled" (Weizman, 2014).

The reorganization of space is a critical goal of any violent act that involves taking over of place. To control a space, Weizman acknowledges the need to reorganize the intended target. However, this does not strictly mean the physical space. There are many different kinds of spaces that are affected by violence of all sorts, particularly space that is culturally significant as well as space that contains the collective memory of a people. It is important to note as well, that there is planned violence and violence that is abstracted with larger intentions but no clear final outcome (Weizman, 2014).

Hausmann's reconstruction of Paris involved an extreme case of violence against many areas considered slums. In this action he was committing, the city as a whole would be moulded into a new identity at the exclusion of the poor or working class. The difference is visible in Figure 2.0-1. By constituting the areas that required to be demolished as illegitimate and impoverished, he was able to reterritorialize through exclusion. The families in the region were forced into the suburbs of Paris due to their illegitimate state, loss of place, loss of identity as well as



Fig 2.0 - 1 Before and after of Paris with Haussmann's urban renewal.



Fig 2.0 - 2 Bamiyan Buddha getting desecrated.

speculation driving up living costs. In this situation, it was an idea of renewal that Haussmann was proceeding with for the city of Paris. However, there was the same act of violence, exclusion, reterritorialization and finally building of the new identity that he required for the place.

Much like Haussmann, though with arguably much more violent means the attack on a Buddhist structure in Afghanistan represents much the same mode of reconstituting memory and identity. The rise of the Islamic fundamentalism in the region determined that the structures that represent deities were to be vilified. Thus, an exclusion for the Buddhist structures began, concluding with their bombardment as seen in Figure 2.0-2. In this case, it was not to rebuild, but to completely re-identify through destruction. Though, there is no end design or final form that was conceived of before the act other than to demolish the structure, the end result remains the same. Violence is legitimized through the exclusion of those that are deemed inferior and new forms appear through the reconstitution of existing elements to build a new identity.

(Collective Places of Memory)

Lieu de Mémoire - Architecture as a Container

"Dispute over spaces leads to their reconfiguration, destruction and renewal. Social memory also plays a significant role in spatial relations during and after conflict. Memory is used to claim spaces for particular agendas while forgetting is also used to eliminate inconvenient pasts."

(Paturel, 2009)

Architecture in war zones holds a multiplicity of significant roles that go beyond merely housing groups of people that are the intended targets of an offensive. In many conflicts, imagery of victories or endings of war take place among ruins of buildings or fallen statues that represented certain ideological and political beliefs of the defeated. These artifacts thus are containers for social constructs that occur over the period of which those objects were created and maintained. It is also important to note that they belong to a space and time defined by certain characteristics.

For example, during the final offensive in Berlin at the end of WWII, the Soviet Red Army can be seen taking the Reichstag (Figure 2.2-1). This building represents

a turning point from one political era to another within Germany, and now represents the victory over all of Nazi Germany by the Soviet Union. The Reichstag eventually was renovated and reused for political purposes, however, it does contain all this history of its influence prior to and during the war. To a point, there is a concentration of significant memory and time that is contained within the building.

Furthermore, the idea of architecture containing memory and time is significant for conflicts that want to forget the past by destroying and rebuilding certain containers. Haussmann accomplished this in Paris, where now the memory of Paris is that of the pristine and wide streets; the Taliban destroying the Buddhist relics that contains a heritage that does not conform to the current religious norms; Israel's Antiquities Authorities of destroying archaeological artifacts that contain the memory of holy Islamic sites for the purposes of Jewish parks and museums (Ma'an, 2014).

In these actions, there is considerable violence towards containers of memory, in an effort to erase these inconvenient pasts. I contend that the exercise of using violence to re-identify spaces is an act of violence against time. Robert Bevan in his book *The Destruction*

of Memory discusses the idea of a "continuity of successive experiences" through time being affiliated with the communal awareness of a place's past (Bevan, 2006, p.141). This communal awareness is built within this physical container, and if deconstructed will lead to the disruption and fragmentation of identities. He goes on to assert that "out of site becomes out of mind both for those whose patrimony has been destroyed, and for the destroyers"(Bevan, 2006, p.6). There is definitive power that comes from being able to control elements of architecture that potentially contain both space and time.

(Social) space is a (social) product... the space thus produced also serves as a tool of thought and of action; that in addition to being a means of production it is also a means of control, and hence of domination, of power; yet that, as such, it escapes in part from those who would make use of it.

(Lefebvre, 1991, p.26)



Fig 2.2 - 1 Raising the U.S.S.R. flag over the German Reichstag

The Act of Forgetting - Urban Amnesia

In many urban centres, there is a physical embodiment of amnesia as is referred to the result of both the modern and postmodern movement towards forgoing the historical past. Post modernism as a movement attempts to remedy this by combining a critique of the modern city with a rational attempt to invigorate it. The result is a combination of spatially and progressive aspects of the modern movement with a postmodern rationalization of the traditional forms in a practical way, leading to the transformation of urban space. By undermining the fundamental aspects of 'sense of place,' these movements alter the collective identity of a space enormously. There is an understanding that at times, the unburdening of a 'troublesome past' is required but in many cases, it's simply moving on with the new and forgetting the old; abandoning local tradition in favour of a more international scheme of operandi. This is a notion of 'resistance' as Vladimír Czumalo compares various machinations of memory and how it manifests in a city to build an Identity. The other option in a space that is undergoing a type of re-identification is 'escape' (Cuzmalo, 2015, p.48).

Vladimír Czumalo in his essay *Architecture and Identity*, deals with the diverging ideas of resistance or escape in a turbulent space. As discussed earlier, the modern/postmodern movements attempted a resistance of the past. There have been occasions where urban centers have decided not to move forward but to return to the past. Bevan writes that "rebuilding can be as symbolic as the destruction that necessitates it"(Bevan, 2006, p.176). Bevan specifically notes, a post-war Munich was rebuilt to look as it did before the aerial bombardment that flattened the city. The process of the rebuild created a space with no physical memory of a conflict, allowing for a 'false continuity' which connected it back to the less turbulent Munich in the 19th century. By erasing the connection to the Nazi regime that was under attack by the allied forces, it was able to rewrite its memory thus changing its identity, shedding the weight of its Nazi past.

Reconstructing Identity

"Territory contains resource and emotional value, leads to conflict between those that seek control"

(Paturel, 2009).

However not all people choose to erase the 'troublesome past' as those in Munich. Dresden holds a special place with those who bombed the city. It was one of the defining points in the war that showed senseless destruction by the Allied forces. The city was mostly

flattened by the air raids and firebombed as it was thought to be thought to be a military and industrial complex for the German war machine. The intent by the military command was to reduce the German military capabilities and that statement was used as justification for the destruction of the city. Even though this was primarily the purpose of the bombing, there has been the insight that by demoralizing the civilian population, it leads to victories militarily against an enemy sooner than later. One of the large churches in the city; the Dresden Frauenkirche



Fig 2.4 - 1 Dresden Frauenkirche before and after.

was destroyed during the bombing. The ruins remained till 1994 when reconstruction began. (See Figure 2.4-1) However, while rebuilding the church, the residents of the city saved much of the fragments allowing for conservation of many of the baroque church's materials. Much of the building contains the scars and damage the war has inflicted upon it yet contains the memory of the original church (Jazombek, 2004, p.55).

There is another way to continue on with the historical memory that has been accrued over time through destruction. An example Bevan cites are the religious extremists in Afghanistan and their actions causing the eradication of large Buddhist structures. He argues that the absence of culturally relevant architecture also forms the identity of a place (Bevan, 2006, p.194). In this case, the forceful impacts and outline of the statue are still visible and there is an awareness that great violence has been committed against a historically relevant object. (Figure 2.0-2) "The two Buddhas of Bamiyan were constructed in the sixth century, at a time when the area was a site of pilgrimage and learning for Buddhists... They managed to withstand the introduction of Islam to the region and the armies of Genghis Khan, but were unable to survive past the first year of the 21st century... The monuments had endured for centuries, only to disappear in a matter of

weeks" (Delman, 2015).

The issue for the religious extremists was the fact in which the existence of foreign deities was forbidden within their territories, thereby beginning a cascade of ruination on large Bamiyan structures in Afghanistan. The locals decided not to rebuild it to both remember the violence and as a reminder that destruction that can occur when religious extremism is allowed to take hold of rational sensibilities to determine the outcome of a cultural heritage. One of the locals, in discussing the decision not to rebuild, stated that "It's part of our history that the Taliban destroyed them. To rebuild would be to cleanse that history" (Bevan, 2006, p.190).

Recently, a temporary projection was used to bring back the Bamiyan Buddha. (Figure 2.4-2) 3-D Projections were cast on to the void of where the Buddha used to stand by projectors mounted on scaffolding. The idea of digitally enhancing what was once physically existent provides new ways of enhancing ruins and returning to the lost identity. These reproductions are not quite the same as the destroyed artifacts, however they do preserve some form of the cultural aspect that existed prior to the violence.



Fig 2.4 - 2 Bamiyan Buddha laser projection.

Reconstructing memory after deconstruction through violent means is a quandary that many post-conflict places deal with. To either resist the past, erase it entirely or allow it to propagate into the future are a few of the many options; however, it is these mentioned options which seem to be the most commonly pursued. For the purposes of this thesis, the progressive method of combining memories and allowing for the violence to be a part of the new identity allows for a potentially positive way to move forward in time. Understanding why the violence occurred, its effects on the people, and the inflicted pain on both people and territory will remind people of the past; forming the backbone of progressive thinking in the aftermath of a conflict and in dealing with resolving the damaged collective memory.

Rhizomic Conditions in Warfare – Spatial Tunneling

"Indeed, military attempts to adapt their practices and forms of organization has been inspired by the guerrilla forms of violence that confront it. Because they adapt, mimic and learn from each other, the military and the guerrillas enter a cycle of 'co-evolution'. The military capabilities evolve in relation to the resistance, which itself evolves in relation to transformations in military practice" (Weizman, 2007).

It is through the rhizome that we can discuss the conflicts through space and time as ruptures that bubble over the aether of constant *slow violence*. The rhizome as explained by Deleuze and Guattari is a non-hierarchical mode of operation, creating a map containing history and culture with attractors and influences without beginning or end (Deleuze and Guattari, 1987, p. 9). It is important to talk about the rhizome as existing in the middle, with no start or end, which is directly related to the concept of time being infinite and our existence simply in the middle. Pushing this idea further is the idea of multiplicity and how influences and attractors can affect the rhizome; that being the influence not affecting a single point but a multiplicity of points or as Deleuze clarified: a weave.



Fig 2.6 - 1 Algiers Casbah aerial map.

By using these terms and ideas, can we formulate what the current established military thinking is trying to achieve. With modern warfare squarely concentrated on dense urban conditions, the resistance has been, for many decades using the homes in the cities they live in as a means of which to move through the city. This has been noted from the early resistance to the French by the Algerians, who also used their Casbah as a staging ground for their revolution. By taking the fight to the city, they were able to utilize a mesh of passages that they know only too well, to appear anywhere at anytime and surprise the colonial army. The resistance is not only able to use tunnels through their individual houses but also a "rhizome of narrow curvilinear streets and stairs [which] added to an additional layer of connecting roofs in a dense urban fabric "(Lambert, 2013, p.26). The French paratroopers who were involved with putting down the revolt from the colony were more organized in terms of weaponry, equipment and training however fell short to the 'overwhelming advantage' that the Casbah provided to the insurgency. (See Figure 2.6-1) The Colonial army "were often lost and sometimes fell into a trap set by the insurgents" due to the labyrinthine conditions.

In the *Funambulist Pamphlets*, when discussing insurgencies, the author brings to light the notion of the

Parisian remake under Baron Haussmann as an attempt to "put an end to the insurrections that regularly occurred." This was the start of what Léopold Lambert categorizes as revolutionary urbanism. This transformation of Paris -as stated earlier in the introduction- under the guise of ridding Paris of its visible poverty and slums however was doubly important to also rid themselves of the constant pestilence that were the revolts (Lambert, 2013, p.26).

Spatial Inversion

While studying conflicts, specifically the assault of the Israeli Defense Forces on Nablus, West Bank; their movement through the conflict spaces demonstrated what Weizman describes as *Inverted Geometry*. This theory avoids movement through Nablus' streets which would be typical for major assault operations. They however, started moving through the walls of the densely urban Casbah (Market place). By containing their movement through the homes of the locals, they were able to avoid frontal heavy gun battles on the streets and to corner the Palestinian resistance from the rear.

"Rather than submit to the authority of conventional spatial boundaries and logic, movement became constitutive of space. The three-dimensional progression through walls, ceilings, and floors across the urban balk reinterpreted, short-circuited, and recomposed both architectural and urban syntax"(Weizman, 2007).

Observing how modern urban warfare has had to adapt to techniques used by primarily non-governmental militant groups within a dense urban fabric, (groups such as the IDF and certain U.S. infantry groups within the middle-east) it is clear that the relationship between architecture and the military have been redefined.

Weizman discusses the ideas that redefine peoples interaction with architecture in a war zone. The military has recently conceived of the city as a "social/physical obstacle that must be reorganized before it can be controlled." They are using a philosophy of 'Design by Destruction' which leads to the reorganization by military personnel filling in as planners to reshape the space to meet mission objectives. To reorganize the space, the military intercedes in the natural flows of the city, or in other words the key infrastructure such as roads, power, water and communications. Bombing campaigns, now as before involve the participation of architects and

planners to recommend key sites containing the likes of infrastructure, buildings with military value. In certain circumstances, they are asked to highlight cultural or heritage targets that would seek to cause a 'psychological' blow to the people (Weizman, 2014).

The IDF in particular are reading texts by philosophers and architects to determine how best to alter reality of the urban fabric. Ideas from Deleuze and Guttari's notions of straightening out space as well as Bernard Tschumi's *Architecture and Disfunction* help in the ideation of accomplishing military objectives through strategic reorganization of space. Movement through the conflict spaces demonstrates what Weizman refers to as *Inverted Geometry*. This theory allows for the movement through the urban fabric of walls and houses rather than streets following a borderless strategy, where ambushes and the heaviest resistance is certainly to be met. He also discusses the current thinking by the military of "seeing and shooting through walls which becomes a fluid/metaphysical act on architecture"(Weizman, 2011, p.209). By breaking the very rules of the physical world, where one must walk around an obstacle, in this case a wall, is the military able to bend space and time, to act within the bounds of its own 'military fantasy,' allowing them to be anywhere at any time.

Thus the spaces that the persecuted exist within become completely and utterly transformed by the new insights into how to organize the space by the oppressors. If troops are able to enter your home not through your door, but through your walls, what exactly is a wall supposed to do? It has in essence, become a porous entity allowing objects or people through its' material. The same is true for both floors and ceilings as they have been known previously to safeguard people from exterior violence. The home has become a path for violence, and the violence that does occur indoors is out of sight. This becomes an issue for example in the West Bank where the satellites can no longer pick up the amount of damage truly being dealt to the people of the Casbah(Weizman, 2011, p.209).

Inverted Elements of Conflict

The elements that have been observed to contain inversions in conflict zones are the following: Walls, Doors and Windows, Corridors/Alley Ways/Roads and Roofs. These objects under conflict gain new properties and the relationship between them and culture get inverted as they come under siege. Tunnels are an interesting phenomenon as they appear to form organically during a conflict as a means of escape or infiltration. They are a new architectural mode within designed and built space which allows for travel. These will be further elaborated on in the design process and exploration of the various conflict zones. (See Figure 2.7-1)

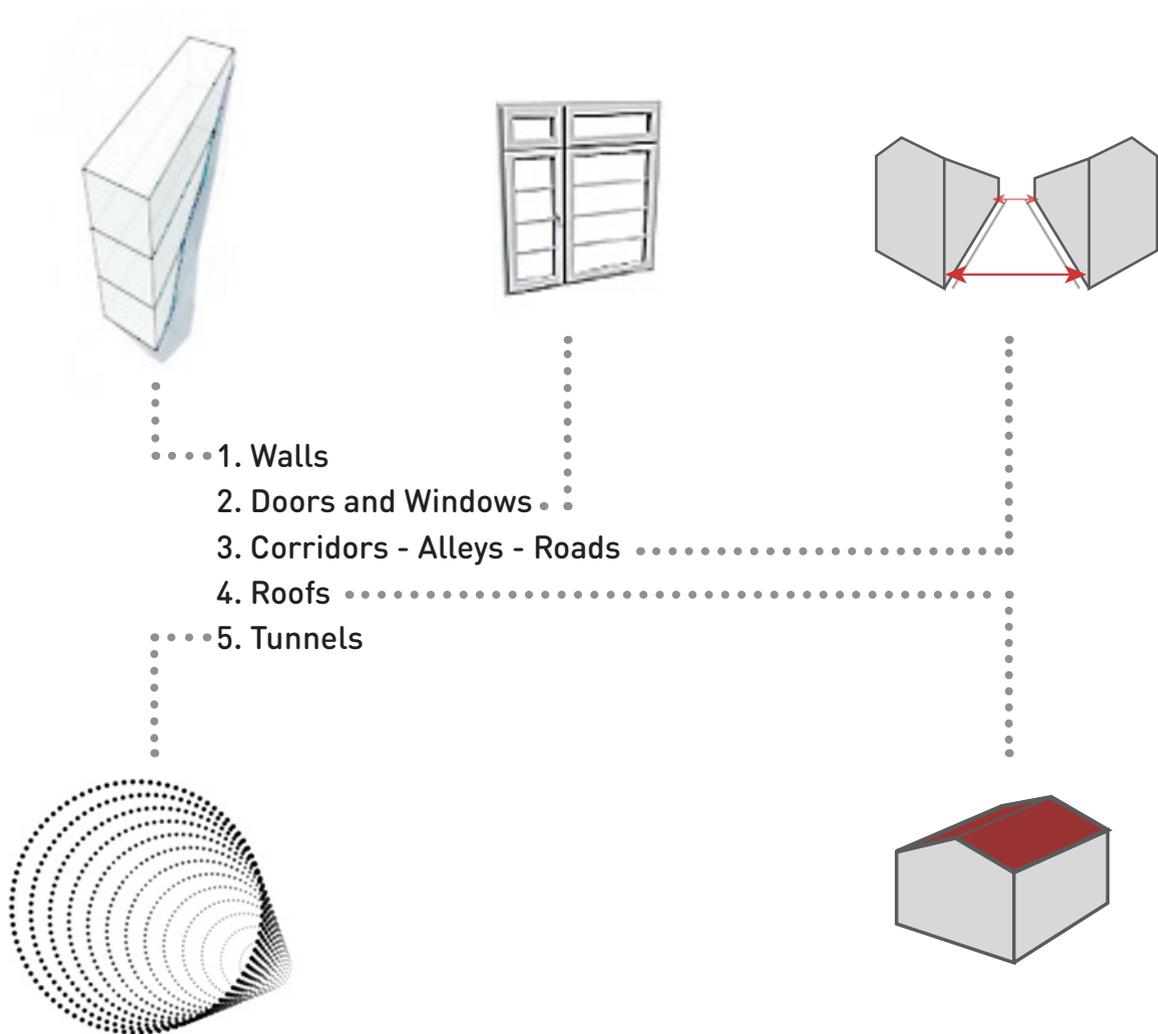


Fig 2.7 - 1 Architecture elements that have been inverted by conflict.

3.0 Conflict Zones



Tropic of Cancer

Equator

Tropic of Capricorn

Fig 3.0 - 1 World map displaying locations of interested conflict sites.



Conflict Study - Berlin, Germany

Berlin provides an opportunity to study various aspects of a conflict that has been well documented and thoroughly researched. The city constituted the might of the remaining Nazi forces that would not surrender towards the end of the war. (April 29 – May 2, 1945) Berlin also provides us with a look towards the aftermath of a conflict which divided the space into two separate types of politically and ideologically differentiated spaces. The friction between these spaces created a liminal buffer zone between the two, further resulting in the creation of the Berlin Wall. (1961 – 1989)

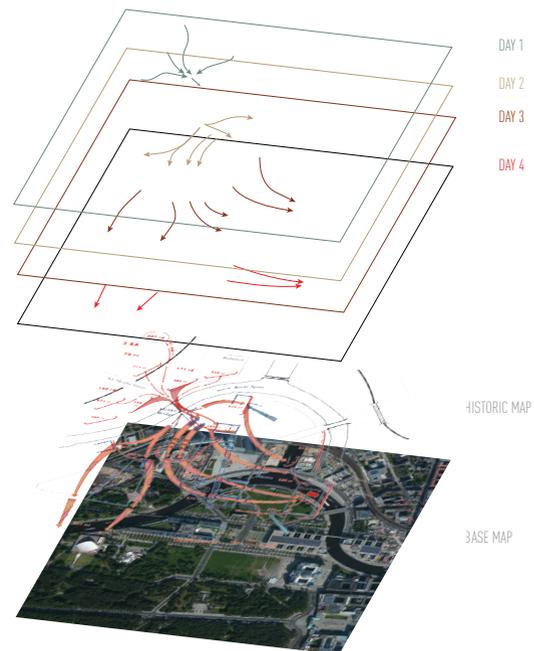
Taking the Reichstag (April 29 – May 2, 1945)

The Red Army progressed towards their final objective, as the Nazi Regime's remaining forces entrenched themselves defensively within the Reichstag. The building was built in the late 1800's and contributed to the political sphere of Berlin, and as such, became a predominant figure for its defeat by the Red Army. The main issue that arose from this however was the fact that during the Nazi rule, the Reichstag had been closed down as it no longer offered Hitler the representational architecture of his ruling party. The Third Reich's legislative body convened at the nearby Kroll Opera House instead. However, due to the cultural history associated with the

Reichstag, it became the Soviet's primary target that would, if occupied, represent the defeat of the Third Reich. The targeting of the Reichstag in this effort emboldened the Germans to defend it, and it symbolized their final stand in the war (Mentel, 2013).

The attack by the Red Army began on April the 29th, taking the troops to cross the River Spree by occupying and controlling the Moltke bridge. Fortifying the location enabled them to provide access to the heavier artillery units into the area surrounding the Reichstag. The other bridges were completely destroyed

Fig 3.1 - 1 Movement of Violence through Space + Time in Berlin.



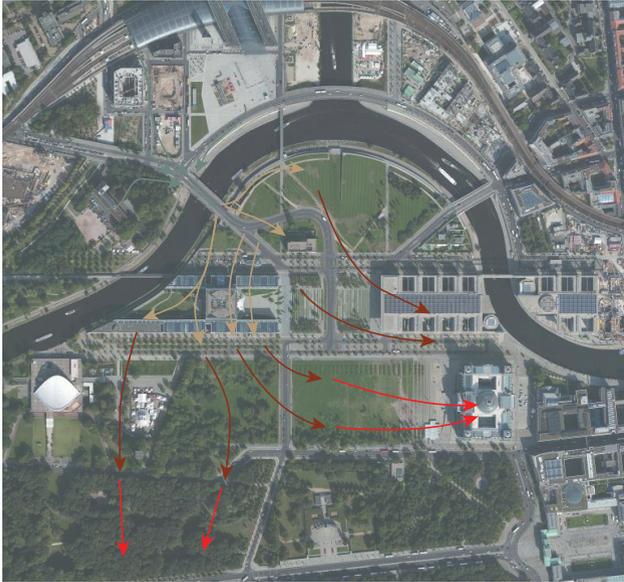


Fig 3.1 - 2 Attack on the Reichstag - April 29 - May 02, 1945
U.S.S.R. Red Army movement in Berlin

so the movement was limited to ground units thus making the troop combat similar to that of trench warfare till the damaged bridges could be repaired. Once closing in on the Reichstag, the Soviets began to pour into the entrenched building (Le Tissier, 2012, p.145).

It should be noted that the Reichstag was out of service since it was set on fire in 1933. This pivotal moment helped establish the Nazi Government in overthrowing many of the communist party members in Germany shortly after. The building was never repaired and as such created an opportunity for its fortification by the German soldiers. Once the Red Army started pouring into the building, they became entrenched in hand-to-



Fig 3.1 - 3 Soviet flag on the German Reichstag - May 02, 1945
U.S.S.R. Red Army in Berlin

hand combat. The finality of it being that the Red army took control of the building on May 2, 1945. The Soviet flag that was raised of the Reichstag represented the final battle within Berlin, and the fall of the Nazi government as a political and military entity. (Figure 3.1-3)

The lengths gone to and the lives lost to raise a flag, applying a nation's identity physically onto a building in the attempts to redefine history is of critical significance. The observation of the objectification of a building as an important place of identity for the German people reinforces the ideas that architecture embodies the people's collective memory, and effecting that is the primary goal for conflicts.

The Berlin Wall (1961 - 1989)

After the war had concluded, Germany was separated into four zones of occupation based on the Potsdam Agreement. The victors of the conflict that occupied these zones were split into two major camps; the Eastern bloc which comprised of the USSR, and the Western bloc comprised of the United Kingdom, United States and France. The division caused friction between the two as the USSR had a different reconstruction strategy compared to the Western block, generating unease amongst the populace, finding themselves in an area where the economy and civil liberties were stifled. This initiated a large migration from the East to the West which alarmed the Soviets, calling for ways to control the border, thus introducing the idea of a wall to be built.

Of Significance is the fact that the wall was being built to reduce the size of a liminal zone. As long as the border remained open between the two contradictory zones, the entire space would not be stable. With the construction of the wall complete, the liminal zone became completely limited to the wall, which allowed for a stable separation of differing political ideologies based on the occupiers. The east block called the wall an "anti-

fascist protective rampart" which was intended as to discourage hostilities from the West. The West believed the wall lowered the chance of conflict with a Soviet backed East as they were concerned that there could be a Soviet annexation of the whole of Berlin (Church, 1989).

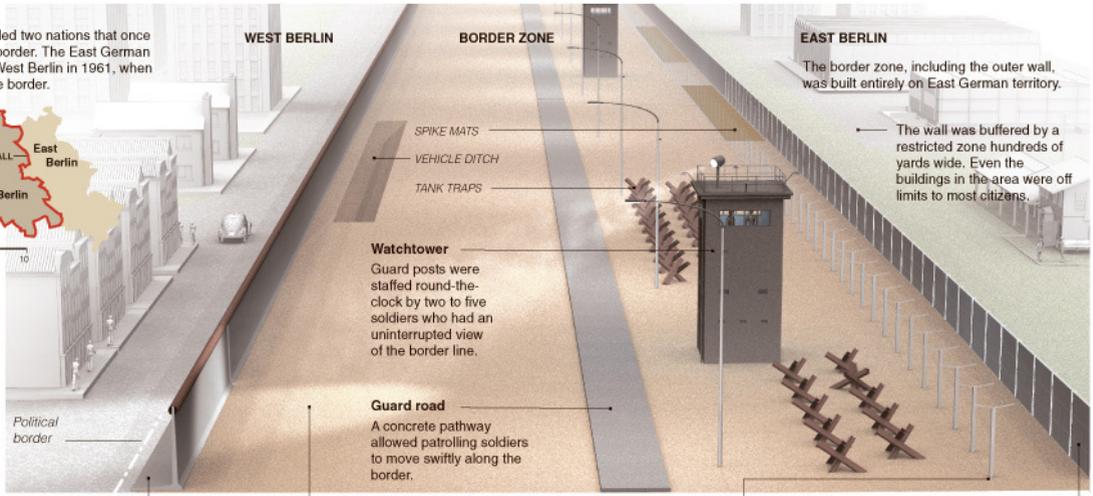
The liminal zone that was created between the walls established a divider of space, giving individual yet separate meaning to those of the East, and those of the West. Where there was no limitation to movement for the people of Germany, blockades were erected that altered how people moved between places. (Figure 3.1-5) Due to the differences in the spaces, the people of the Eastern bloc would try to defect over to the West. Overall, there were approximately 5,000 successful defectors with over 100 deaths due to the shooting orders that the guards were given (Church, 1989). The wall provided the security guards a method of traversing along it, while providing limitations to those trying to cross it. Many security measures were employed throughout the length of the wall; Concrete walls with pipe caps, soft sand surrounding the walls to determine escape attempts, barbed wire fences which when tripped would activate a signal, and natural objects as well such as rivers and earth bunds. The objective was to physically impede the movement of the Berliners, though many of the attempts proved successful.

The Berlin Wall

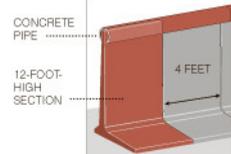
As the Berlin Wall fell 20 years ago it melded two nations that once were separated by more than a common border. The East German authorities began blocking the access to West Berlin in 1961, when tens of thousands had already crossed the border.



BORDER CONTROL ZONE
The width of the border zone varied from 20 feet to hundreds of feet in different locations along the border. The wall structures and other installations on the border zone had been constantly updated since 1961. At right are typical features of the border strip in Berlin in the 1980s.

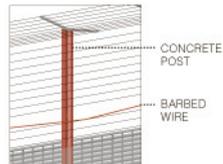


Outer wall
The concrete wall was capped by a round pipeline channel to make climbing over it more difficult. Some sections were left intentionally weak to allow East German tanks to break through in case of war.



Death strip
The area between the inner and outer wall was covered with soft sand that would show footprints of escape attempts. Only the most trusted soldiers were allowed access to the area. Guards would shoot anyone trying to cross the border.

Signal fence
A signal fence with barbed wire spanned concrete posts. Anyone trying to climb the fence would press wires together, completing a circuit and tripping an alarm in a watchtower.



Rear wall
The first barrier on the east side barring entry to the border zone was a 10-foot high concrete wall.

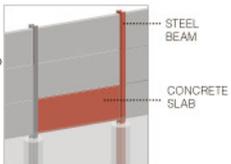


Fig 3.1 - 4 Berlin Wall Infographic.

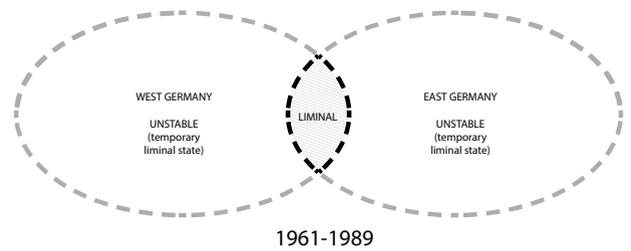
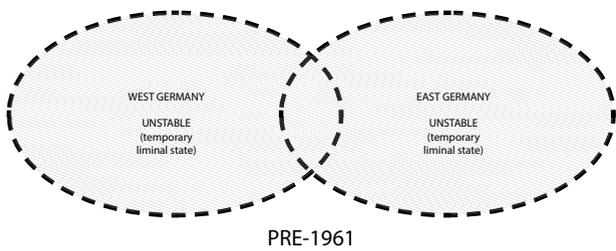


Fig 3.1 - 5 Venn diagrams displaying the liminal states of Berlin before and after the wall.

The order to fire on the people who crossed the boundary condition is one that placed the guards at unease as they would be firing on their own people, although the day came when the orders were issued and they did fire upon an individual trying to cross the River Spree, ultimately killing him (Kempe, 2011, p.364). This act of violence within the Liminal zone provides a space that allows for this type of killing to take place that would hold no legal grounding elsewhere. By being a completely different legal zone that is a combined agreement between the occupying forces, the space becomes completely foreign even though it occupies the same land as the East or the West.

One method of crossing this boundary condition was to use tunnels. This was accomplished at various points across the length of the wall and provided a method of moving supplies between the two, especially currency which moving through the border legally would have been limited substantially. The Western block limited the amount of currency that could move into the East. However, the main reason for the tunnels was to migrate to a richer more normative condition that the Germans were once used to. Tunnels in this example became a symptom of the exasperated conditions in the East and with the limitations on their livelihoods, the people began to construct their own method of crossing the boundary.

They were simple, rudimentary tunnels with basic wood supports to keep the ceiling from caving down. They were created not by architects or civil engineers, but the people who wanted to carve out their own path that has been otherwise restricted. Where the Wall physically took space on and above ground, the condition of the tunnel was to materialize below the spaces that the walls occupied and surpass them (Aguirre, 2014). This condition will be relevant as it informs part of the reason why tunnels are extremely relevant to the thesis topic. They appear in sites of conflict during the conflict, by the people, for the purposes of delimiting their movement to and from safety, as it is one of their minimal ways to safely interact with a given conflict.

Conflict Study - West Bank

The Israeli-Palestinian conflict has been one of the longest ongoing struggles between two people. Its relevance to this thesis lies in the movement of troops through urban space, the Israeli separation barrier, and finally the tunnels that appear throughout the various conflict zones. The IDF (Israeli Defense Forces) utilized various architectural texts to revolutionize the conventional rules of conflict. Some examples provided by Major General Kochavi of the IDF were Deleuze and Guattari's *A Thousand Plateaus* as well as Bernard Tschumi's *Architecture and Disjunction* (Weizman, 2007). By reading into these texts, are they able to apply architectural theory to military methodology and have since changed the process of urban warfare and how it is being conducted throughout the world.

The urban fabric has now become the "battlespace" in an Asymmetric war that has, for the most part since 9/11, become the norm according to Stephen Graham, author of *Cities Under Siege: The New Military Urbanism*. This particular type of conflict has also been called low-intensity conflict which resides within spaces of typical dense urban fabric that includes the likes of circulation spaces to indoor spaces such as within buildings and homes. He goes further into discussing the effect the Israeli conflict is having on the technologies and

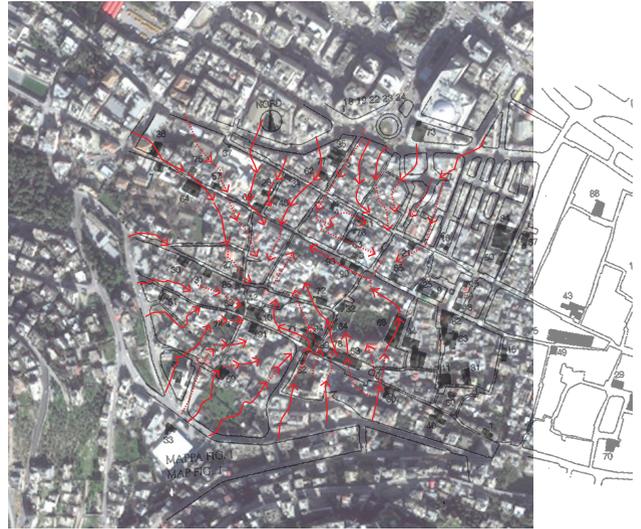
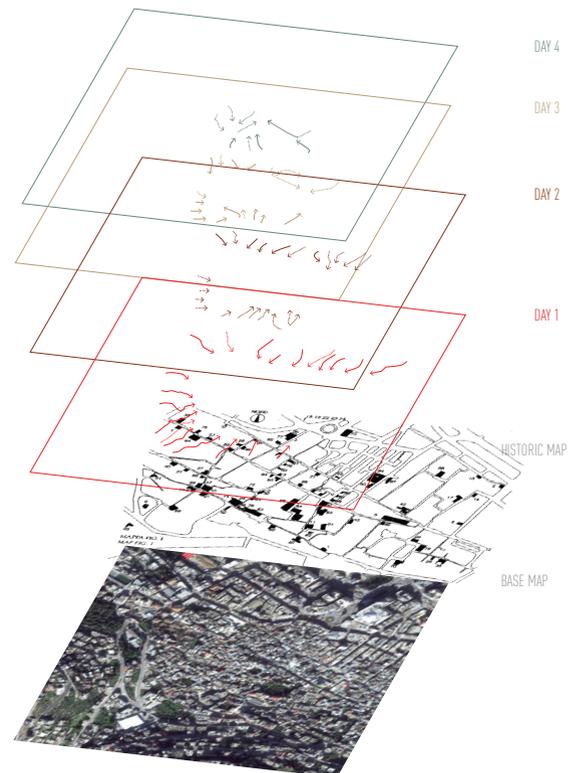


Fig 3.2 - 1 Siege on Nablus - April 5 - April 8, 2002.

Fig 3.2 - 2 Movement of Violence through Space + Time in Nablus.



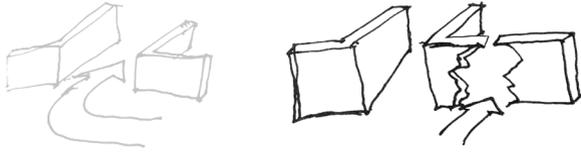


Fig 3.2 - 3 Walking through walls - Involving an IDF Caterpillar D9.

tactics being used, and how they are being outsourced to other conflicts, primarily the U.S.'s occupation of Iraq and Afghanistan (Graham, 2011, P.27). These tactics come directly out of the Second Intifada between 2000, and 2005 which marked a period of intensified Israeli-Palestinian violence, in particular the sieges on the urban centers of Jenin and Nablus. The works of Deleuze primarily were used in processing the difference "between the concepts of 'smooth' and 'striated' space" (Harel, 2004). When the IDF uses the term to smooth out space, they refer to an operation where in space contains no borders and try to reproduce that operationally within a city such that there are no borders or boundaries. This translates into turning dense (striated) Palestinian urban space, and cutting

through ditches, breaking down walls and entering homes to reach objectives rather than following streets and alleyways. In this way, they are moving through built space, or as Weizman has titled his book, *walking through walls*.

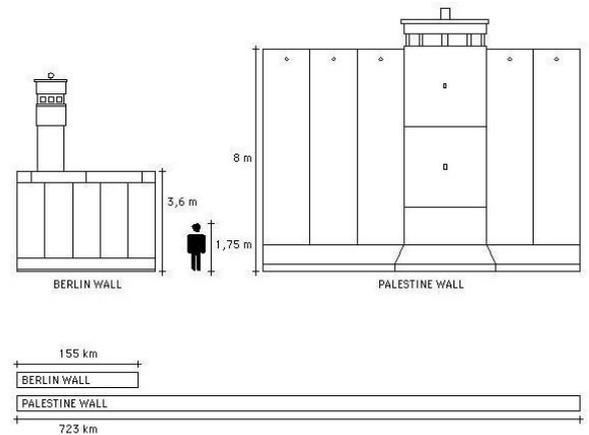


Fig 3.2 - 4 Wall comparison between Berlin and West Bank.

The construction of the Israeli Separation Barrier began construction during the Second Intifada due to ongoing terrorism activity by the Palestinian militants. (Figure 3.2-4) Some critics, such as Weizman in particular, tend to believe that the wall also serves to enclose and shrink the space that is available to the Palestinians. Much like the Berlin wall, due to the frictional condition between the two zones, the wall stabilizes the liminal zones; the Israeli controlled territory and those housing the Palestinians and minimizes the liminality to the threshold of the wall

compound structure. This fortifies not only the physicality of the Israel-Palestinian border, but also their identity and its attachment to the land they occupy, becomes solidified. The wall in this sense is as much an act of applying identity onto a land as the raising of a flag upon a cultural monument, similar to the Red Army's actions in Berlin.



Fig 3.2 - 5 Rhizome idea drawing - Walking through walls

Finally, the method of *walking through walls* allows us to be informed by the rhizomic movement through space that takes place in urban conflict zones. Historically, this has been used by groups that were conducting guerrilla warfare to defend their cities and towns from occupying forces. The IDF by transforming theories from the likes of Deleuze and Tschumi and applying them directly to the movements of troops in

space, changes their operational parameters in a given conflict zone. Swarming is the ability for troops to work simultaneously on parallel objectives however they are able to themselves change the parameters of their objective depending on the in-field circumstances that arise without requiring the approval from an upper military rank. This gives them the ability to make decisions on the fly and to adapt to rapidly changing situations given the information at hand. With technology giving more situational awareness of a transforming urban conflict, it is possible for local troops to define the most successful method of achieving an objective given to them. This breaks down the most fundamental chain of command that would typically be getting approval through a systematic military hierarchy. By conducting war in this process, they are able to mimic the situational awareness that is also being used by the militants to respond to rapidly changing situations in combat (Di Carlo, 2010).

By working without any borders, the IDF are able to navigate through space as though buildings have never existed to obstruct their paths. Using their resources in tanks and bulldozers that have been fortified to deal with IEDs (Improvised Explosive Devices), they are able to create openings in walls of houses or buildings that they have determined is their most opportune

method of entering a conflict space and tunnel through the building's fabric to reach their objective. They use technology that allows them to see through walls to gauge whether there are militants with weapons, or booby traps that would impede in their movement through the space and neutralize them without having to be present in that space. Once they clear these obstacles, they continue to tunnel through people's homes and what are typically no-fire zones due to their new borne philosophy in combat.

Combine *swarming* with walking through walls and you start to realize that conventional combat has been completely inverted to deal with the new threat of military factions with no sense of governing hierarchy, where people can change from female garb to a soldier in an instant and where objects as innocent as a fruit cart can become a bomb. The IDF is now selling their technology and tactics in their experience with the Palestinian militants to other forces around the world thereby changing the way the military and architecture as a whole react to each other. Architecture in this instance is completely ignored, inverted and desecrated as it falls into the background noise of striated space that simply needs to be smoothed out for the military to achieve their objectives. (Figure 3.2-5)

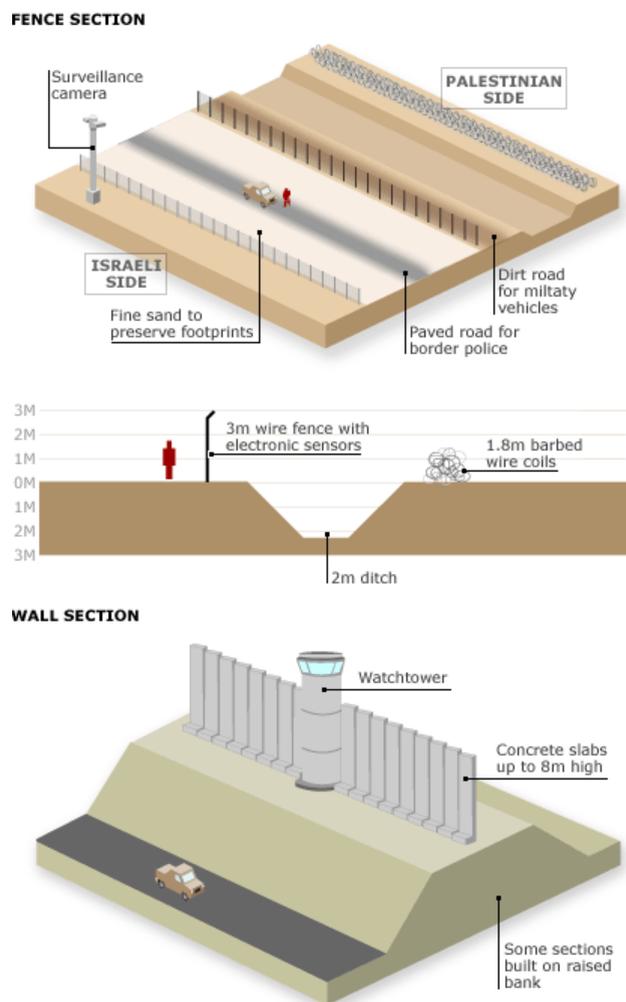


Fig 3.2 - 6 Construction of the Israeli Walls and liminal zones

4.0 Siege of Sarajevo

Beginning on April 5, 1992, the siege of Sarajevo was the longest ever such in the 21st century, lasting close to 4 years. The siege and a year longer than the Siege of Leningrad. It was a brutal battle of attrition, however it was mainly single sided as the Serbian forces (VRS) were better equipped at the start of the war and strategically surrounded the city to limit the flow of people, weaponry, food, medicine, water and even electricity to and from the city. The initial force stationed to take over the city consisted of 13,000 VRS troops forming the blockade. The Bosnian soldiers (BiH) within the city was 70,000 however they were mostly fresh recruits and were poorly equipped.

The UN played an integral part in attempting to bring in food stamps and water as they took over the airport. This was the only part of the blockade not controlled by the Serbian forces, however, the movement of the Bosnians living within the city was still limited. The attacks initially consisted of armoured columns trying to take the parliament building, although these were unsuccessful, at which point the battle of attrition began with the VRS concentrating their efforts to bombarding

the city from fortified positions and bunkers in the surrounding hills. The dotted red line shows the overall territory that the VRS had gained through the conflict. Their position near the center created vast sniping opportunities that the VRS exploited creating what was referred to as the "Sniper Alley." The Olympic villages along the hill sides also became targets of the conflict as they were destroyed in order to ruin the global identity that Sarajevo contained (Annex VI, 1994).

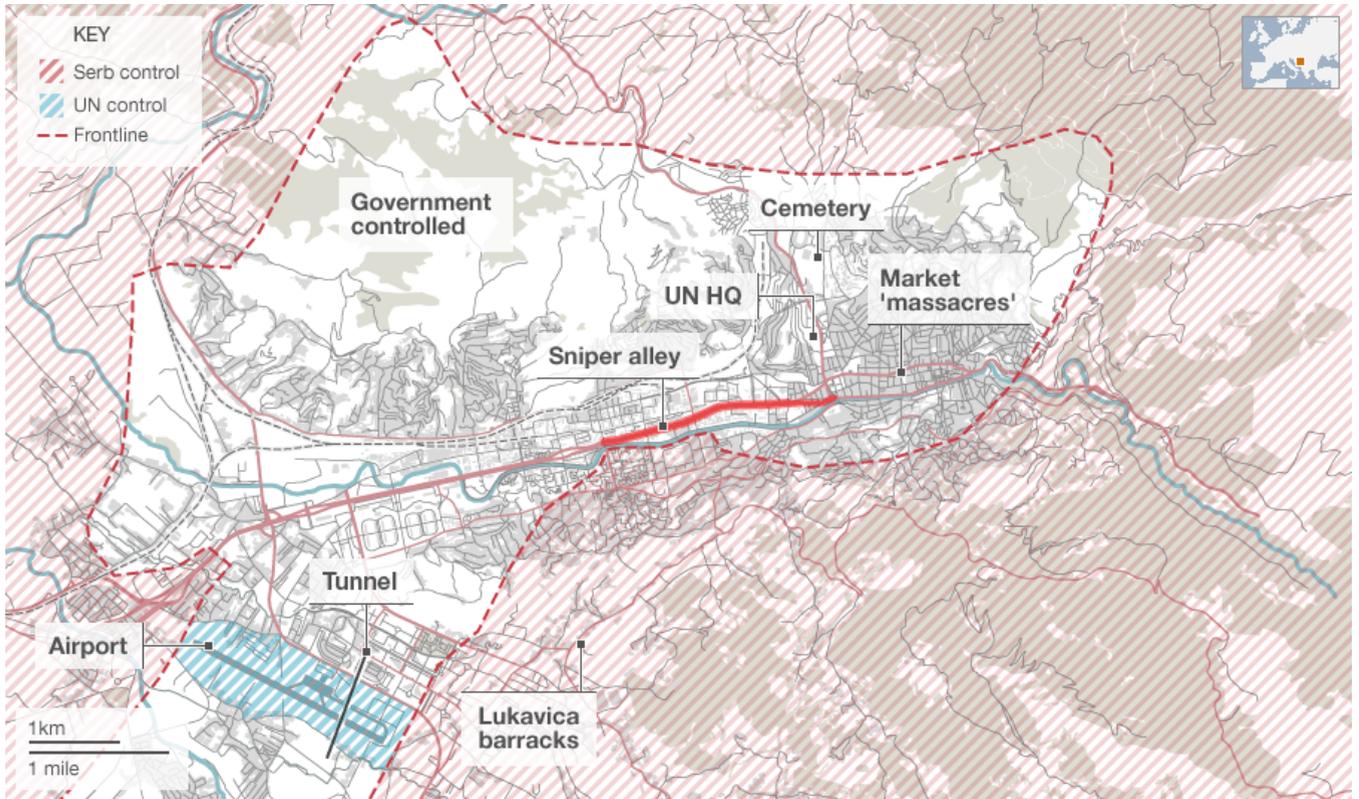


Fig 4.0 - 1 U.N. map of Sarajevo during the siege.

Began: April 5, 1992

VRS: 13,000 well equipped troops

BiH: 70,000 mostly recruited from city

Timeline: 3 Years, 11 months -

Longest siege in modern warfare

Dead: 13,952 deaths of which 5,434 were civilians

2,241 VRS Fatalities

6,137 BiH Fatalities

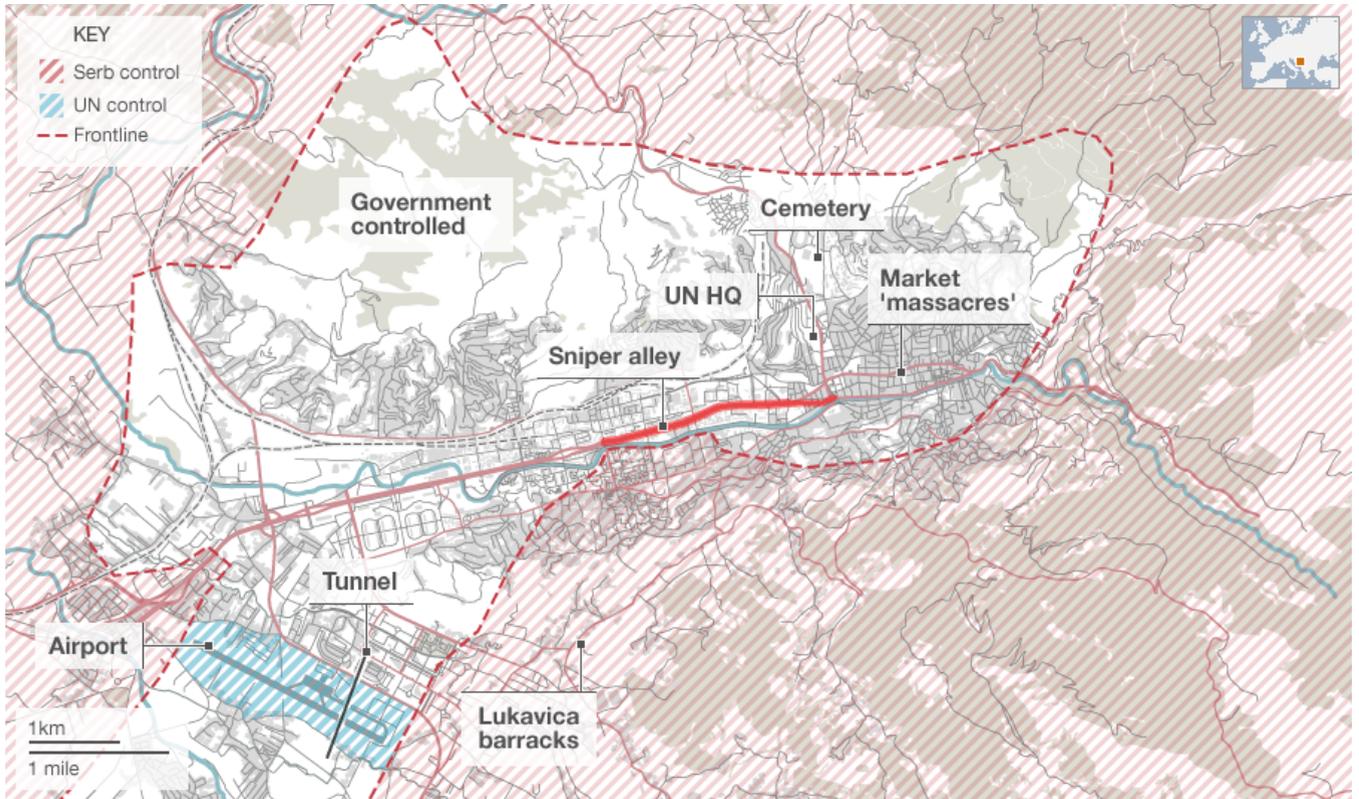


Fig 4.0 - 2 Statistics from the U.N. Security Council (Annex VI, 1994).

Urbicide Sarajevo



Parliament Building



Holiday Inn



Military Hospital



Sarajevo Library



Sarajevo Cathedral (Rose)



Sniper Buildings

Fig 4.0 - 3 Urbicide condition in Sarajevo.



Newspaper Building



Post Office



City Hall



University Library



UNIS Business Towers



Market

5.0 Sites of Conflict - Sarajevo

- 1. Freedom Tunnel (Airport)
- 2. Sniper Alley
- 3. Olympic Village
 - Luge Track
 - Cable Car
- 4. Olympic Stadium

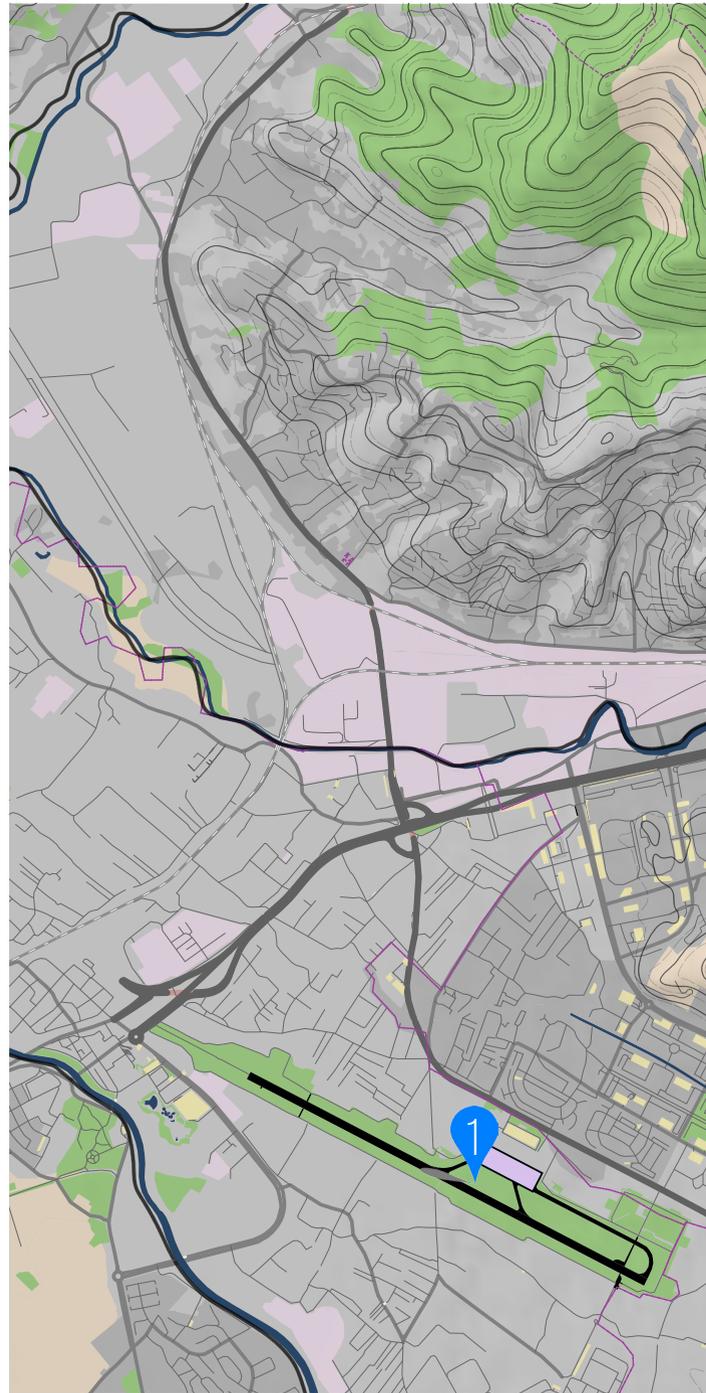
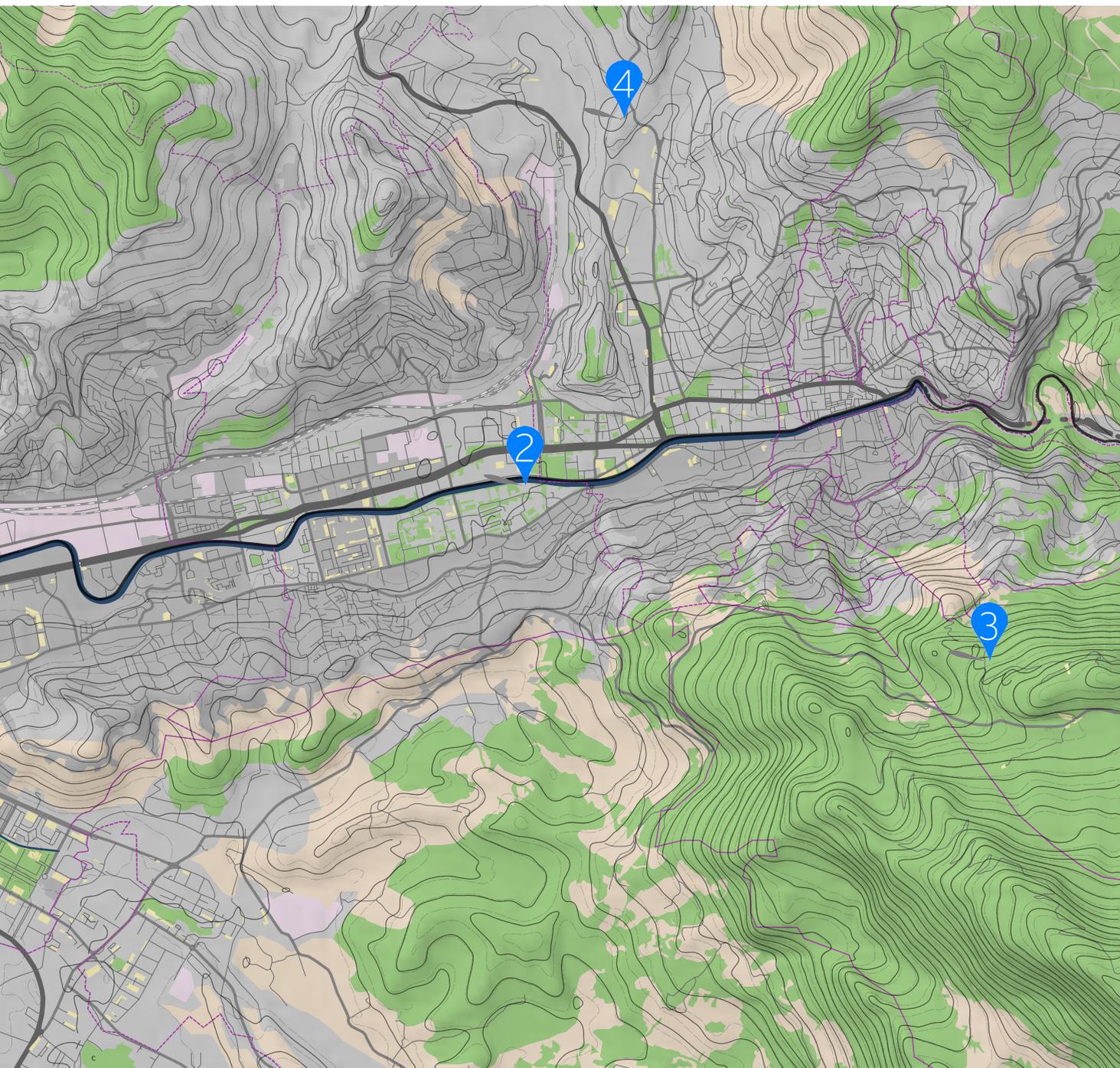


Fig 5.0 - 1 Site map of Sarajevo





Freedom Tunnel

A month after the start of the war in May 1992, the government hired a civil engineer to design a tunnel that spanned beneath the Airport. This was decided to be the most secure route of the city as it was protected and the VRS would not be able to fire upon the UN stationed there. The tunnel was first completed on July the 1st, thus beginning operations. While the construction was underway, the tunnel was dug by hand using shovels and axes, a primitive method which nevertheless proved successful. It allowed for the flow of people, food, weapons and medicine to flow back into the city, especially electricity and gas for heating (Russel & Cohn, p.12).

There is an irony for the need to build a tunnel below the airport that is a fundamental observation of inversion. The airport typically serving as a point from which people travelled into the sky, is in this case used as a way for people to burrow below the earth for safety and refuge. On the north end within Sarajevo was a house that was being used to safe guard the entrance of the tunnel while the south end contained an opening to the fields which were classified as no man's land as the VRS was constantly using artillery to pound away at the suspicion

of a tunnel. They were never able to confirm its existence till the end of the war however.

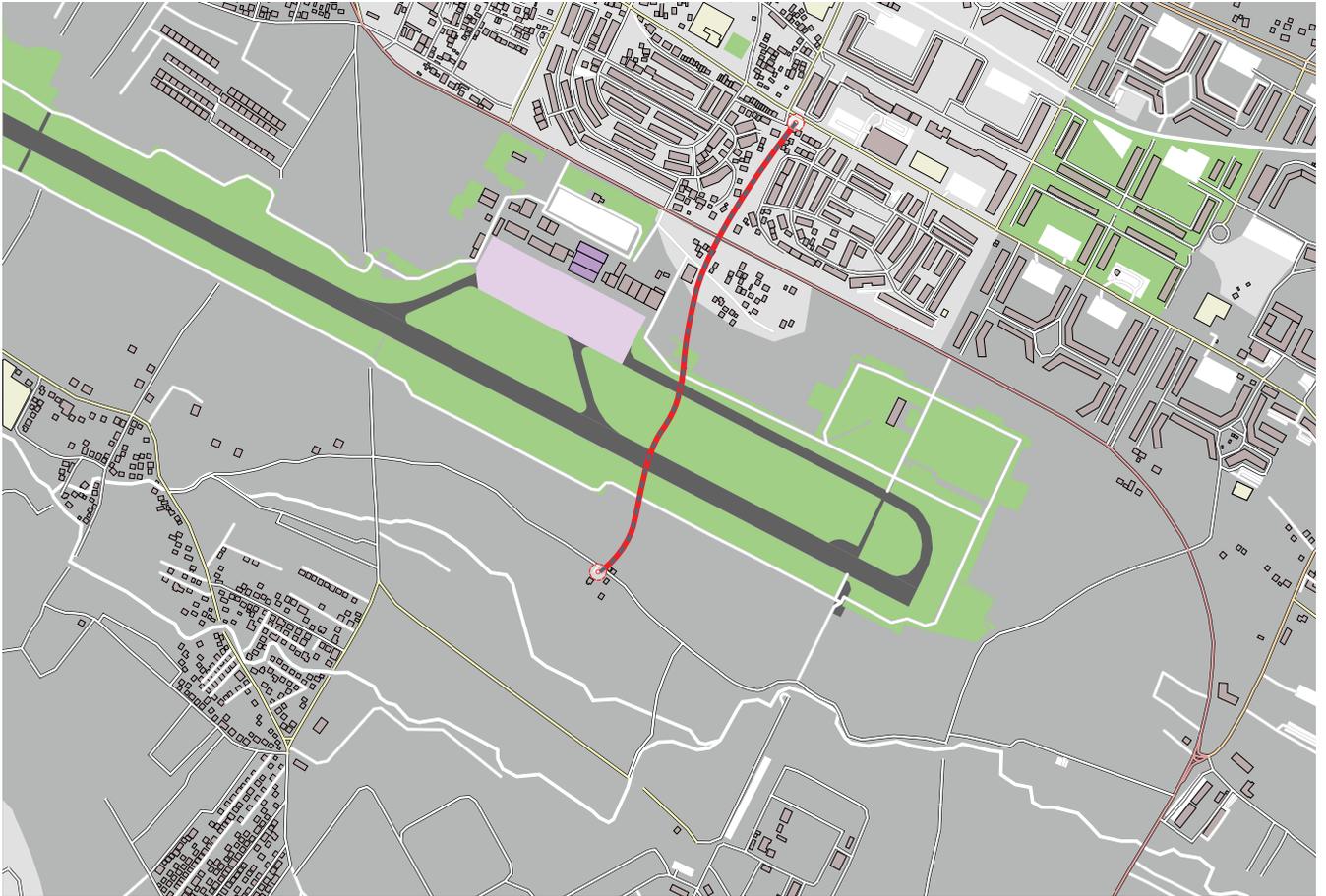
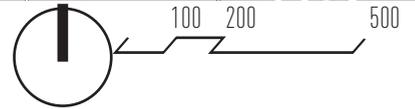


Fig 5.1 - 1 Sarajevo "Freedom" tunnel spanning close to 900m.



With the way the tunnel was constructed, it allowed for the flow of people only in one direction. This caused problems if anyone was to collapse while in the middle of it. This occurred a few times as explained by the tour guide sharing his experience of the tunnel while it was active. The air was humid and they had to constantly pump the water out of the tunnel due to either snow or rain depending on the season. To traverse through it required the average adult to hunch over while carrying their loads for close to a kilometer. As water and ammunition were pretty commonly transported, these posed to be a problematic initially. Eventually, the tunnel allowed for a small railway track with carts that "could be loaded with 400 kilograms of goods" and supplies. It would nominally take 2 hours to walk through the tunnel at a time, and it is numbered at about 2 million individuals, both Bosniak and U.N. soldiers who travelled through the tunnel (Alic, 2002).

The expression of the tunnel represents an artifact of most conflicts that were researched. People intuitively attempt to escape conflict by digging deeper underground. This is especially true when completely surrounded by clear, visible or even invisible boundaries.



Fig 5.1 - 2 Going through the Sarajevo "Freedom" tunnel.

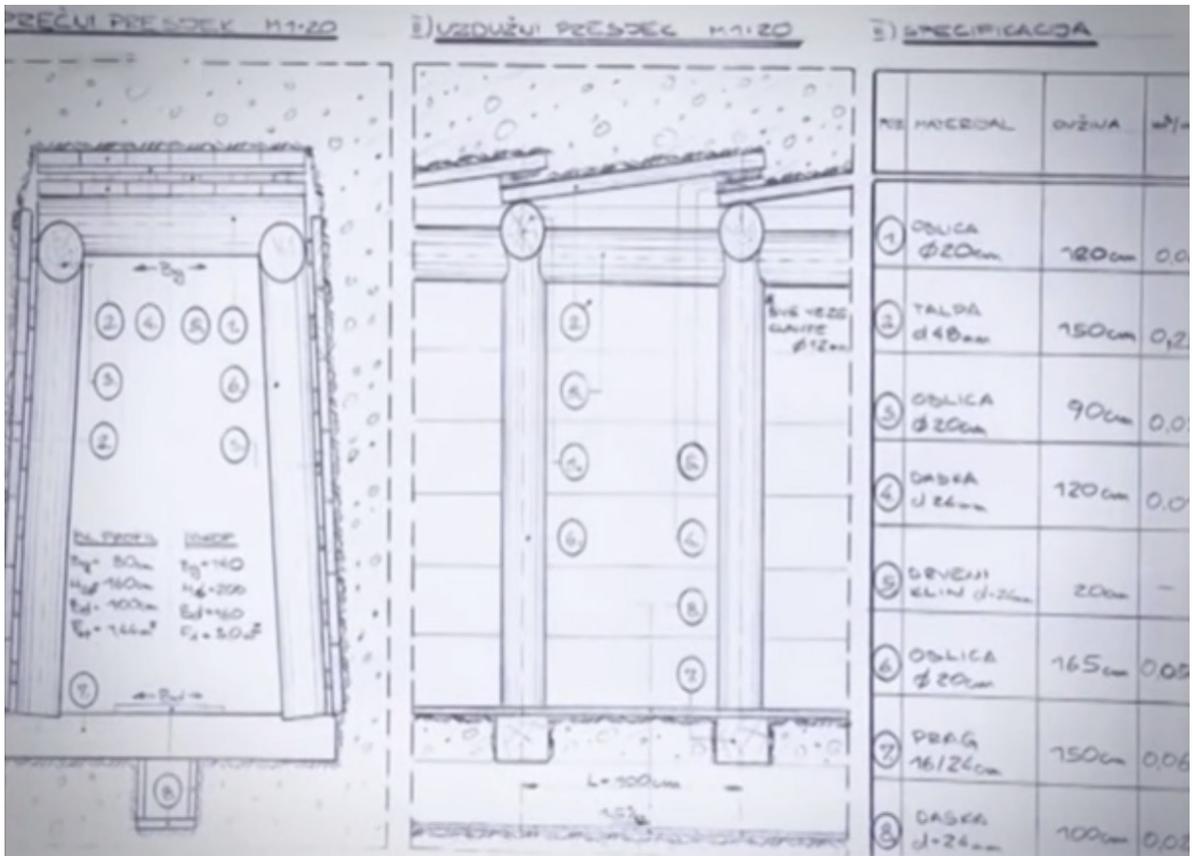


Fig 5.1 - 3 Schematics for the Sarajevo "Freedom" tunnel.



Fig 5.1 - 4 North entrance through a house in Sarajevo.



Fig 5.1 - 5 Southern entrance through a tunnel in the free territory.



Sniper Alley

Dragon of Bosnia Street was called Sniper Alley during the war due to its close proximity to the Miljacka river which acted as a boundary between the Government controlled area and the VRS controlled territory. This road was a major boulevard to reach the industrial part of the city and closer towards the airport. Even though it was constantly under siege, people still required the route to traverse to places of work, to acquire food or to seek refuge.

The south side of the Miljacka river was predominantly Bosniak Serb before the outbreak of the war and was easily taken over by the VRS. The high vantage points provided by apartment buildings and hotels allowed the VRS to have a greater *Field of Fire* which were also better fortified.

Along the streets, wherever there were areas known for greater sniper activity, warning signs were placed to alert the populace. Signs reading "*Pazi - Snajper!*" which translates to *Watch out - Sniper!*, allowed for people to run through those windows of danger. A typical action would see two individuals on either side signal to run at the same time, thereby distracting the sniper from

concentrating on one target. This was practiced daily during the day when visibility was at the highest (Burns, 1992).

The U.N. provided armoured vehicles which could be used as a shield for pedestrians and the government military would also build walls from various detritus including broken down cars. The walls would alter the way the population saw the city, normally they would be able to see the rest of the city as it was a basin, whereas now their view would be entirely obstructed.

The world the Bosniaks lived in became smaller due to the conflict as they tried to shrink their presence and limited their external views. Not wanting to be seen or to see their oppressors became a daily instinct of survival.

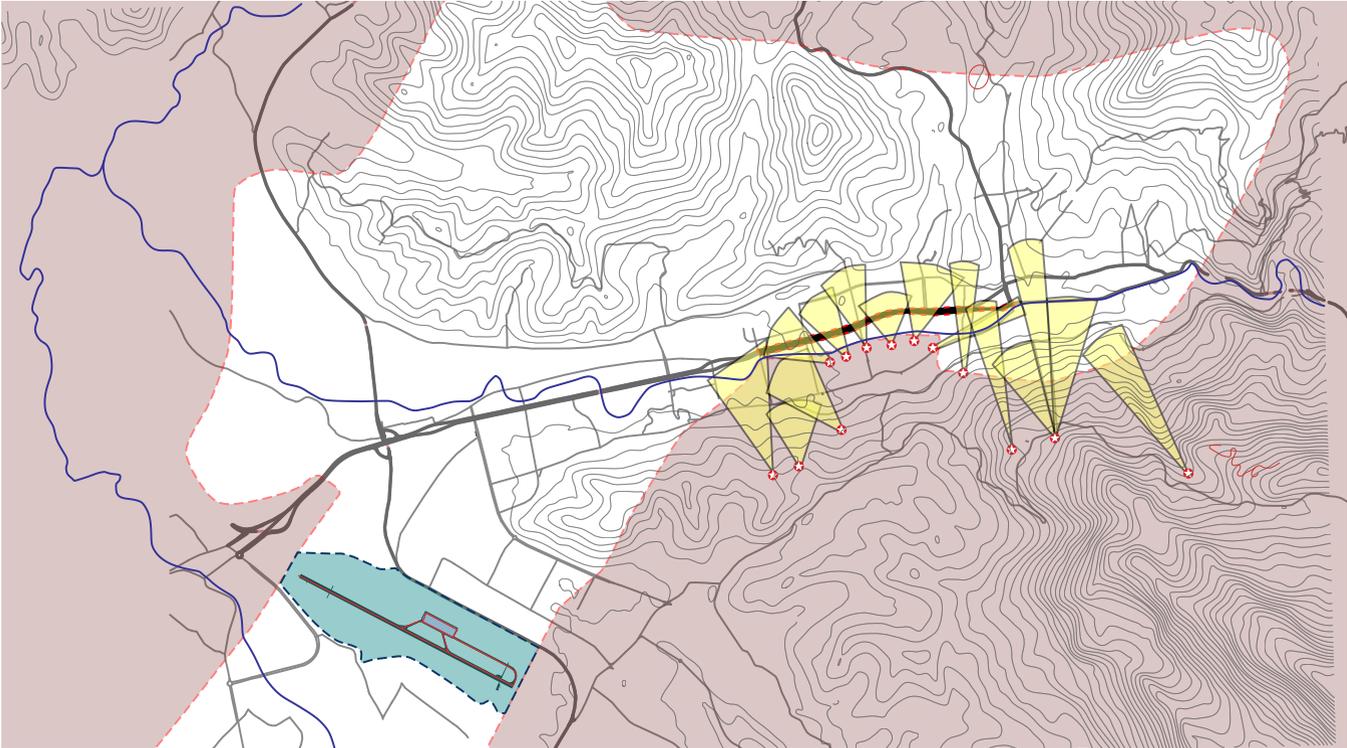


Fig 5.2 - 1 Site map showing locations of snipers and their field of fire.



Fig 5.2 - 2 Warning for pedestrians about sniper activity.

Line of sight became a calculated percentage of survival as was weighing the need to keep on the move to survive. The fabric of the city began to wrap itself around the people as they tried to isolate themselves as much as possible. Lebbeus Woods, in his Re-imagining of a Postwar Sarajevo engulfed damaged building with left over and detritus. However, this also extends to the people of Sarajevo and the tunnels they built out of the left-overs of the city itself. The city began wrapping itself around the paths of flow to guard the people against the dangers of being out in the open (Woods, 2011). Streets became sheltered by broken shards of metal that were once functional transportation but now guarded the transportation of the people. If they were outdoors, their existence became incredibly binary with moments of safety interspersed with intense danger, though it was always dangerous to be out.



Fig 5.2 - 3 Simultaneous running to distract sniper from focusing on one target.



Fig 5.2 - 4 Man made tunnel using cars as protection.



Fig 5.2 - 5 Stacked cars obscuring views for snipers.



Fig 5.2 - 6 U.N. soldiers acting as shields for the pedestrians.



Olympic Village - Bob Sleigh & Luge Track

The olympic village located on the top of Trebevic mountain overlooks the city of Sarajevo and was built for the 1984 Winter Olympics. The Olympic elements represent the national identity that was successfully distributed to the rest of the world and at the time of the war was one of the familiar ways in which to remember Sarajevo. Due to this, a large amount of violence was committed against places showcasing this national identity. The podium used to declare the final medalists of the Olympics was used to murder captured BiH troops and the luge track became a site of which to fire from, acting as a concrete trench.

The inversion here being that the luge track was used as a tunnel in which Olympians would speed through. And during the war, the soldiers would create holes which to fire from using sniper and automatic rifles. The luge track and the sniper rifle are heavily calibrated to create as much speed as possible and under the control of people, a type of accuracy that could determine the loss of life. The luge track becomes a tunnel on grade and represents one of the aspects that will be focused on in this thesis when designing the building form.

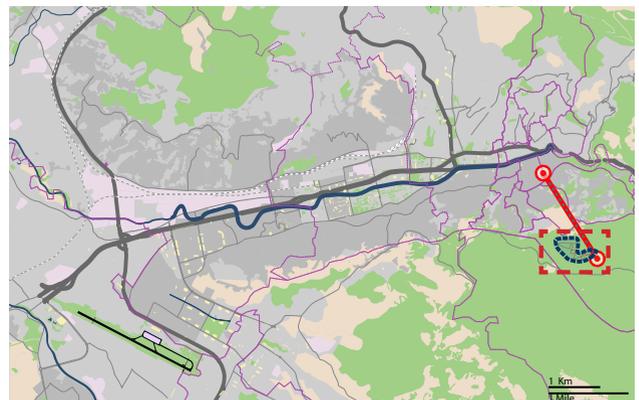
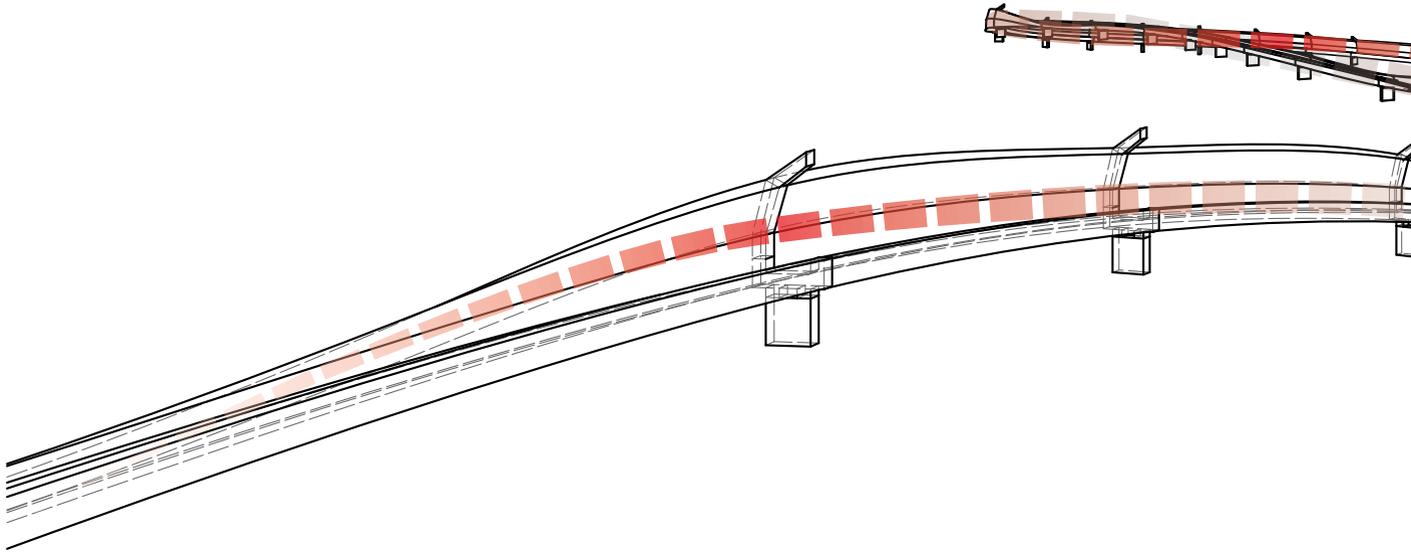


Fig 5.3 - 1 Olympic Village location map.



Fig 5.3 - 2 Olympic Podium used for executing prisoners of war.



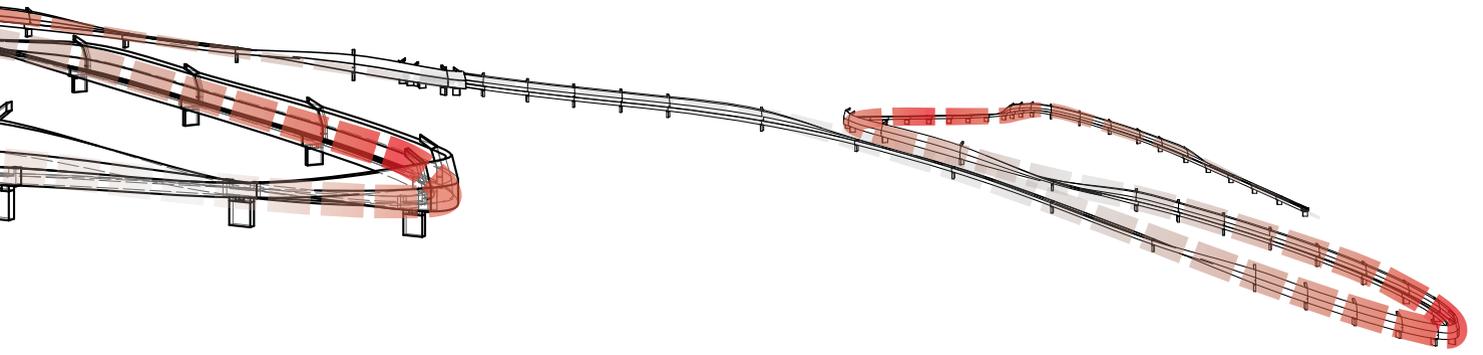


Fig 5.3 - 3 Velocity Diagram of the luge track in Sarajevo.

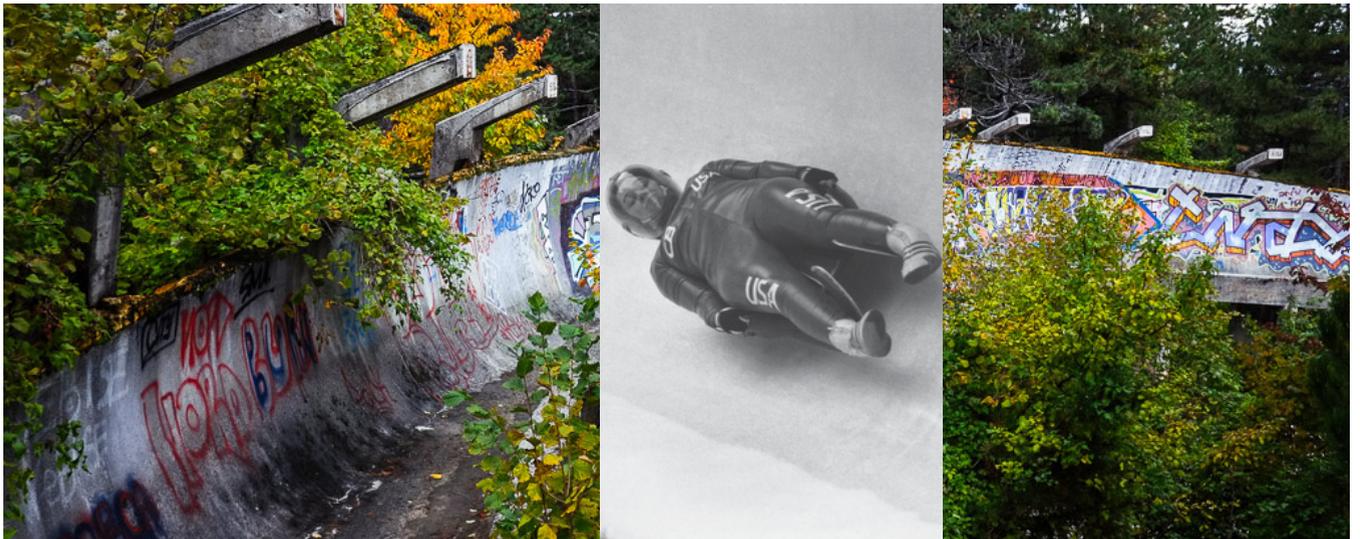


Fig 5.3 - 4 Before and After images of the Olympic tracks representing tunnels at different calibrations.



Olympic Village - Cable Car System

The cable car system in Sarajevo was the first of its kind in Europe and was built in 1959 connecting Sarajevo to the Trebevic Mountain. There was a simple observation deck attached to a restaurant when it was first opened for the locals and tourists. As the Olympics were running in Sarajevo, the cable car system represented one of the best ways for people to get to the mountain to view the winter activities there. The Olympic village was also built on top of Mount Trebevic and it would take approximately 12 minutes to reach the top from the base.

During the war, the cable car tracks were destroyed and the observation deck that was used for enjoying the views of the city became an outpost for both snipers and reconnaissance. By having the view of the basin of the city, the VRS was able to communicate with their artillery along the perimeter of the front lines in which direction and location to attack. The Bosnian army knew about this position and it became a key fighting ground between the two forces trying to control the vantage points. During the war crimes tribunal, it was mentioned at the trial of the Serb generals as they were charged with "ordering the relentless shelling, sniping

and indiscriminate terror in Sarajevo during the 44-month siege. The artillery position on Trebevic was one of the deadliest" (Sarajevans outraged, 2008). It was also deduced, by UN investigations into the crimes, that the shells that caused the Markale massacre were fired from the slopes of Mt. Trebevic by the UN investigations into the crimes.

The Cable Car represents an above ground tunnel, where the passengers are locked into a single spot but traversing through space with views all around them. This is symbolic as it also represents the fortification the Serb forces took on the observation platform at the last stop of the Trebevic Cable Car. In this case, the snipers are completely hidden and fortified from above while having free reign on their targets below. Part of the design will include this idea of being seen and seeing, as it plays an important aspect of the way people lived and thus forming memories of a type of existence prevailed by living while not being seen.

One of the major offensives that BiH took into VRS territory was towards the Olympic village on top of the



Fig 5.4 - 1 Historic tourist pictures depicting the observation post, restaurant and cable car system.

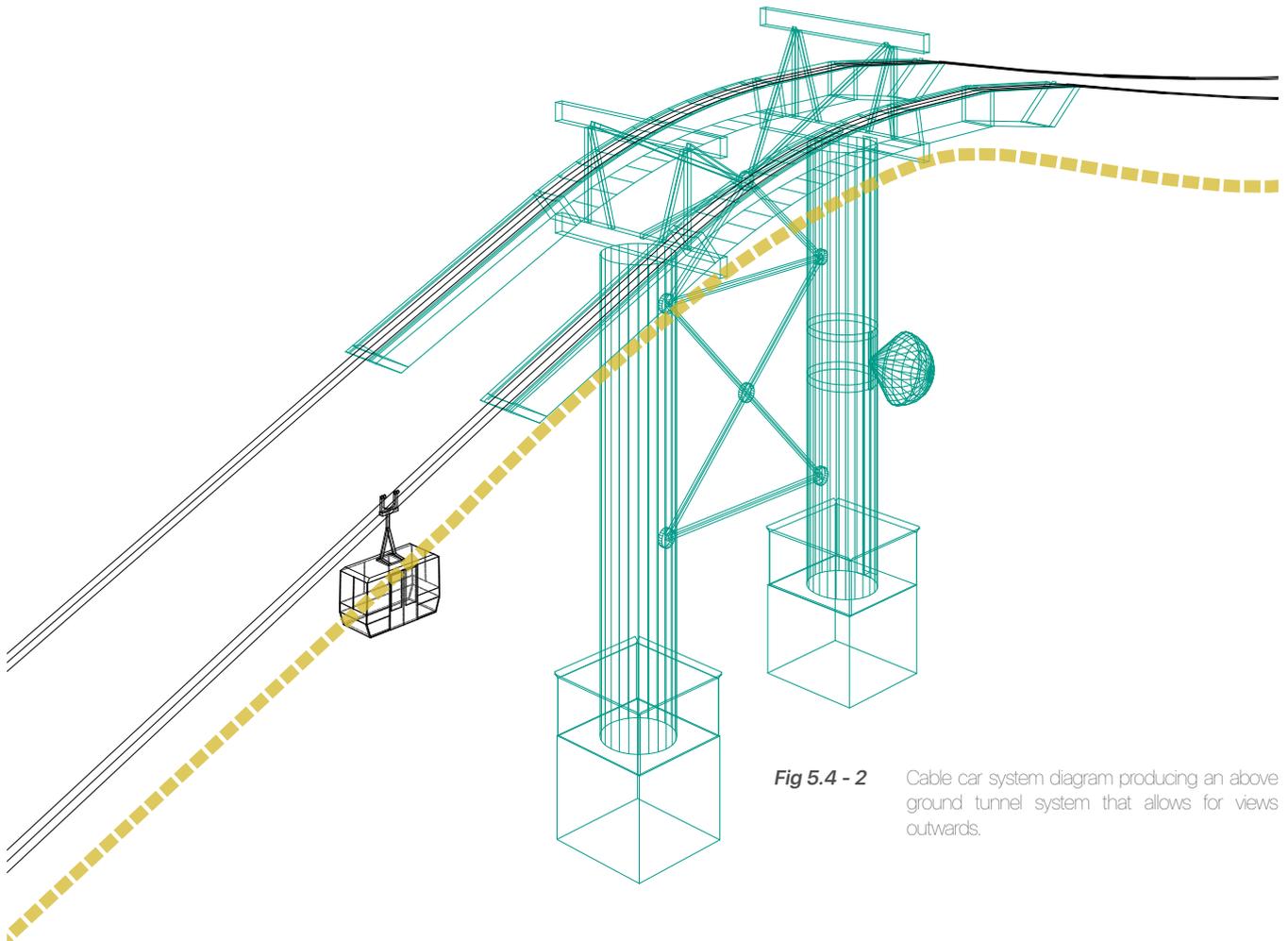


Fig 5.4 - 2 Cable car system diagram producing an above ground tunnel system that allows for views outwards.

Trebevic Mountain to push back the sniping and artillery positions away from the city. The fighting that took place within the Luge Track and the buildings is evident on the facades and the structural degradation. Many of the roofs have been blown away by mortar fire as well which has knocked down beams and columns. (See Appendix A for investigations into the Olympic Village)



Fig 5.4 - 3 View from a former sniper position on Mountain Trebevic.

Fig 5.4 - 4 Vantage point to the city at a height of 1164 Meters.





Fig 5.4 - 5 Derelict restaurant / observation post at the top of the Trebevic Mountain.

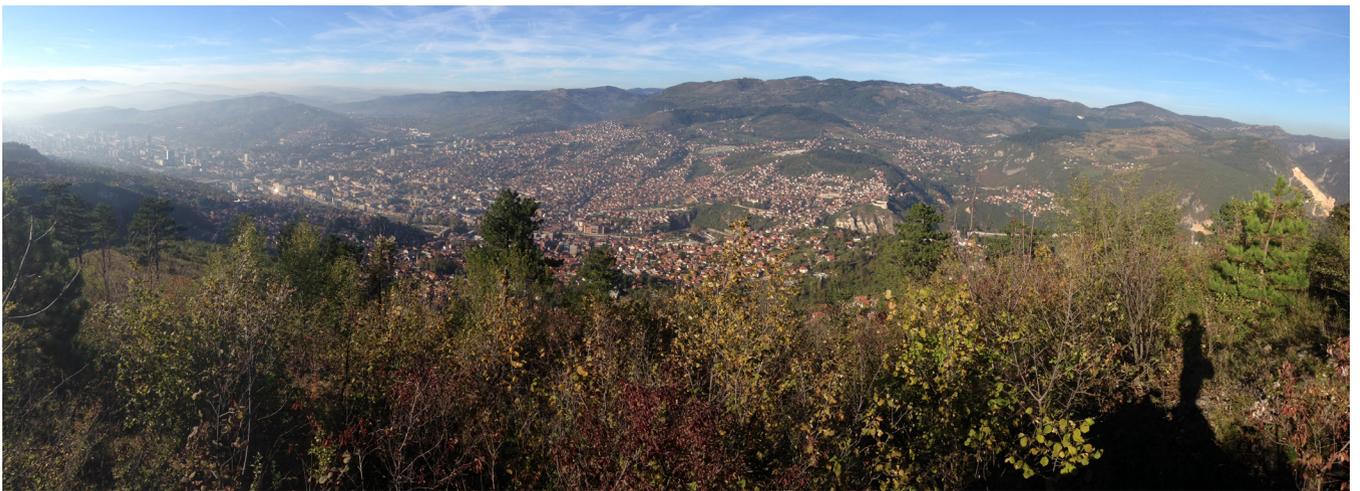


Fig 5.4 - 6 Vantage point of the city at the observation post.

6.0 Design Project

Compiling all the observations about the sites of conflict in Sarajevo has led to the following diagram (Figure 6.0-2) displaying the sites, materials and elements involved. These ideas all contribute to the three main areas of focus that should be evident in the design; Identity, Memory and the concept of Inverted Geometry.

The object of the design will be to show the change in the state of mind, moving from one space to another, much like in a conflict zone where the state of mind changes through different events. This is a type of evolutionary change where the mind once moved past a conflict can never recover its innocence. Sarajevo has a past that it can never erase, however it can build on it, towards an understanding that there is a fundamental collectiveness amongst the people that can build bonds to both place (architecture) and each other (culture).

The project will be located in an area of intersection between cultures and additionally represents different times of construction within the old town in Sarajevo, representing the Austro-Hungarian and Ottoman elements and influences.

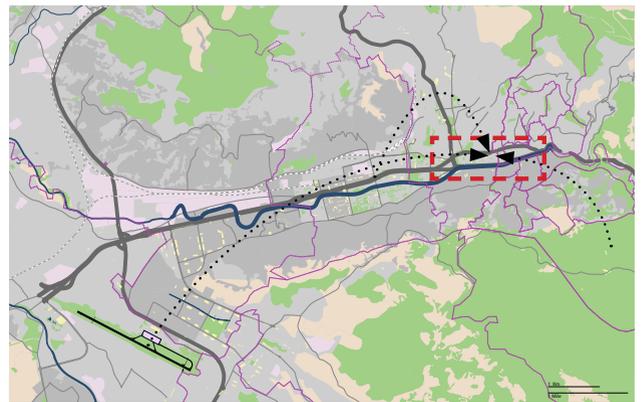
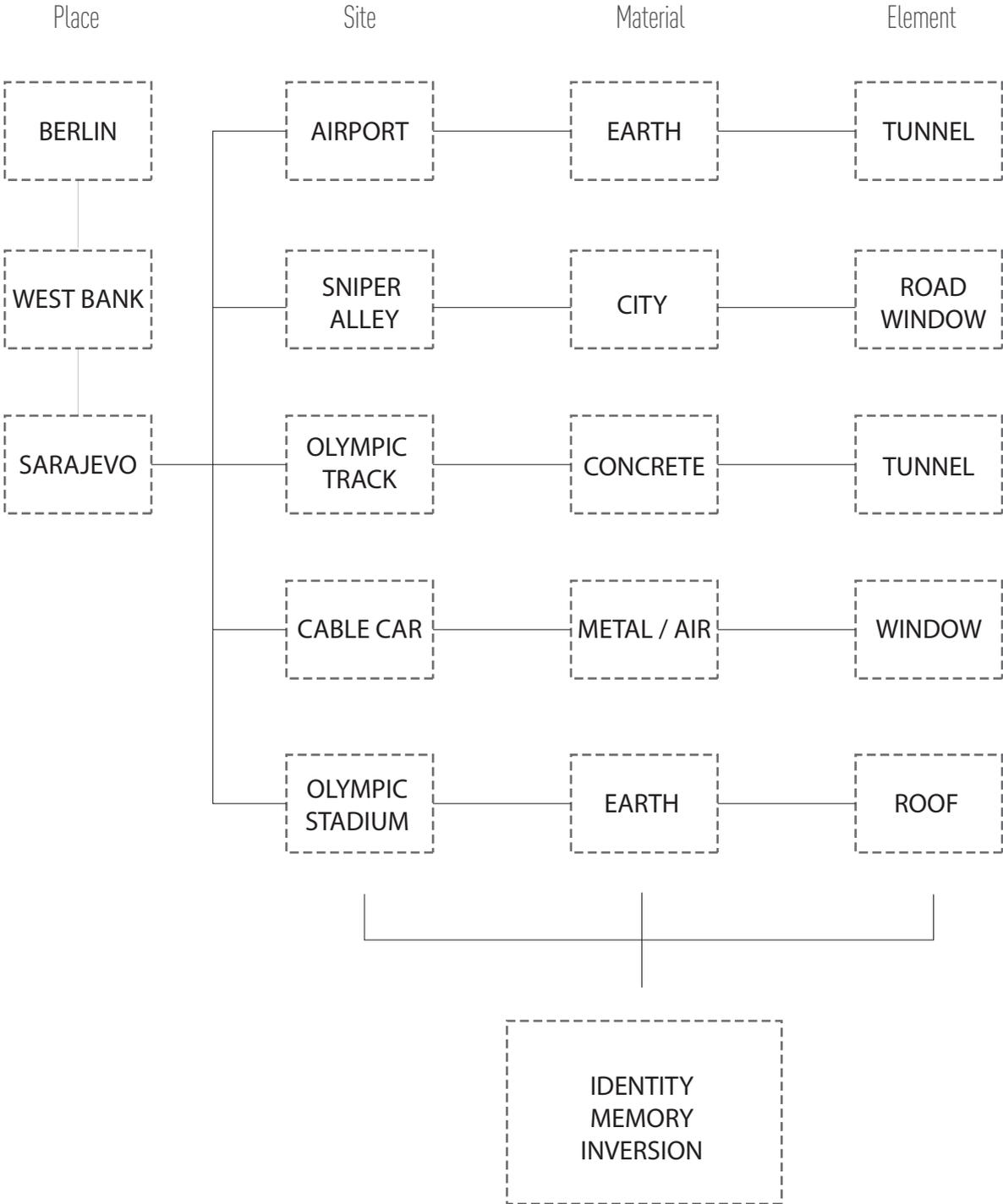


Fig 6.0 - 1 Location map for site.

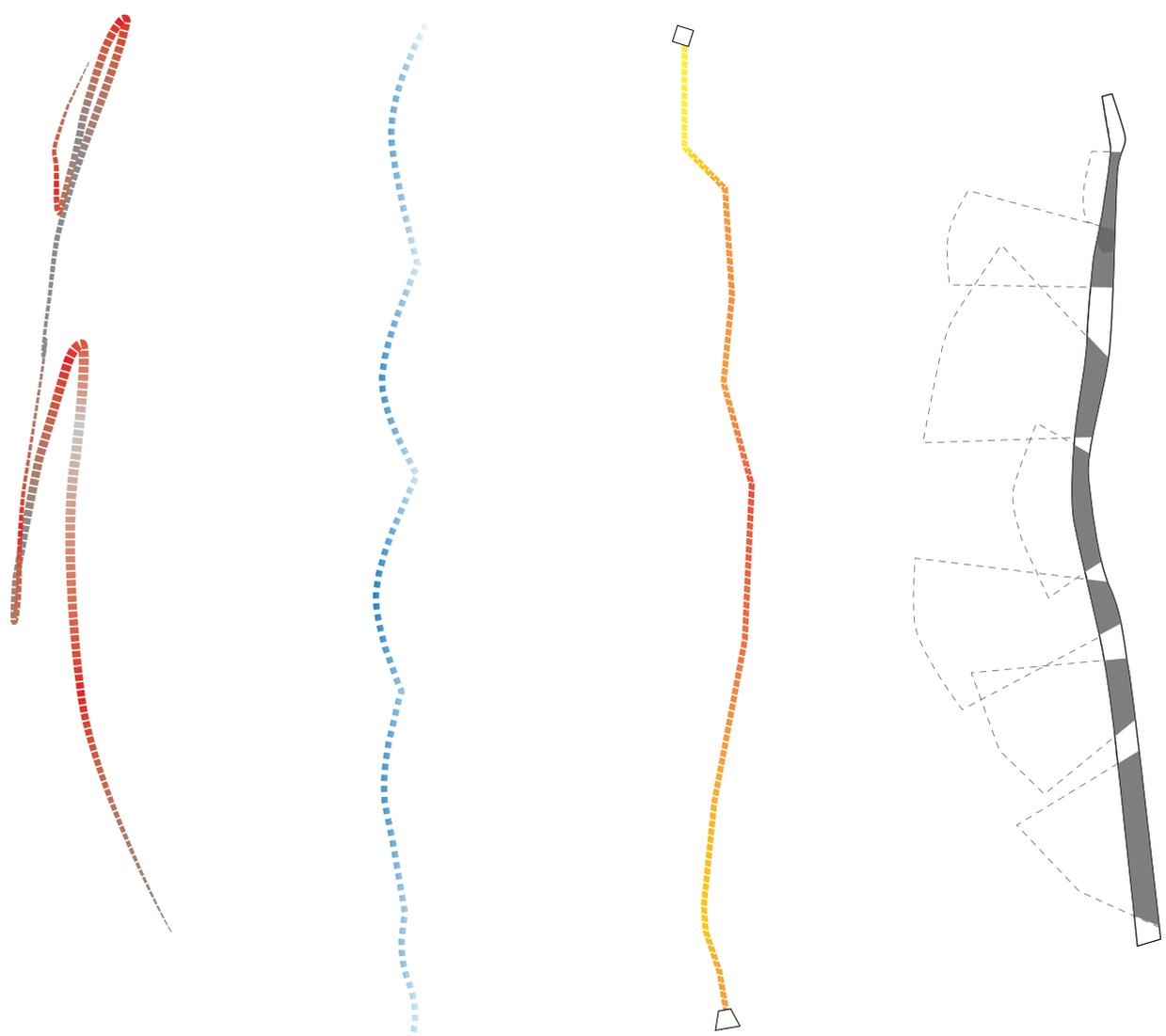
Fig 6.0 - 2 Project elements breakdown.



Tunnel Observation Diagram

The observations taken from the previous chart have been organized in a linear format as seen in Figure 6.0-3. This organization allows for simplifying the materials, place and the path of the tunnel activity to compare and contrast the diverging conditions. These conditions will be introduced throughout the design of the *spacial container* being proposed within Sarajevo.

Fig 6.0 - 3 Spatial Tunnel Overview.



Luge Track
Concrete



Cable Car
Metal



Airport Tunnel
Earth



Sniper Alley
City

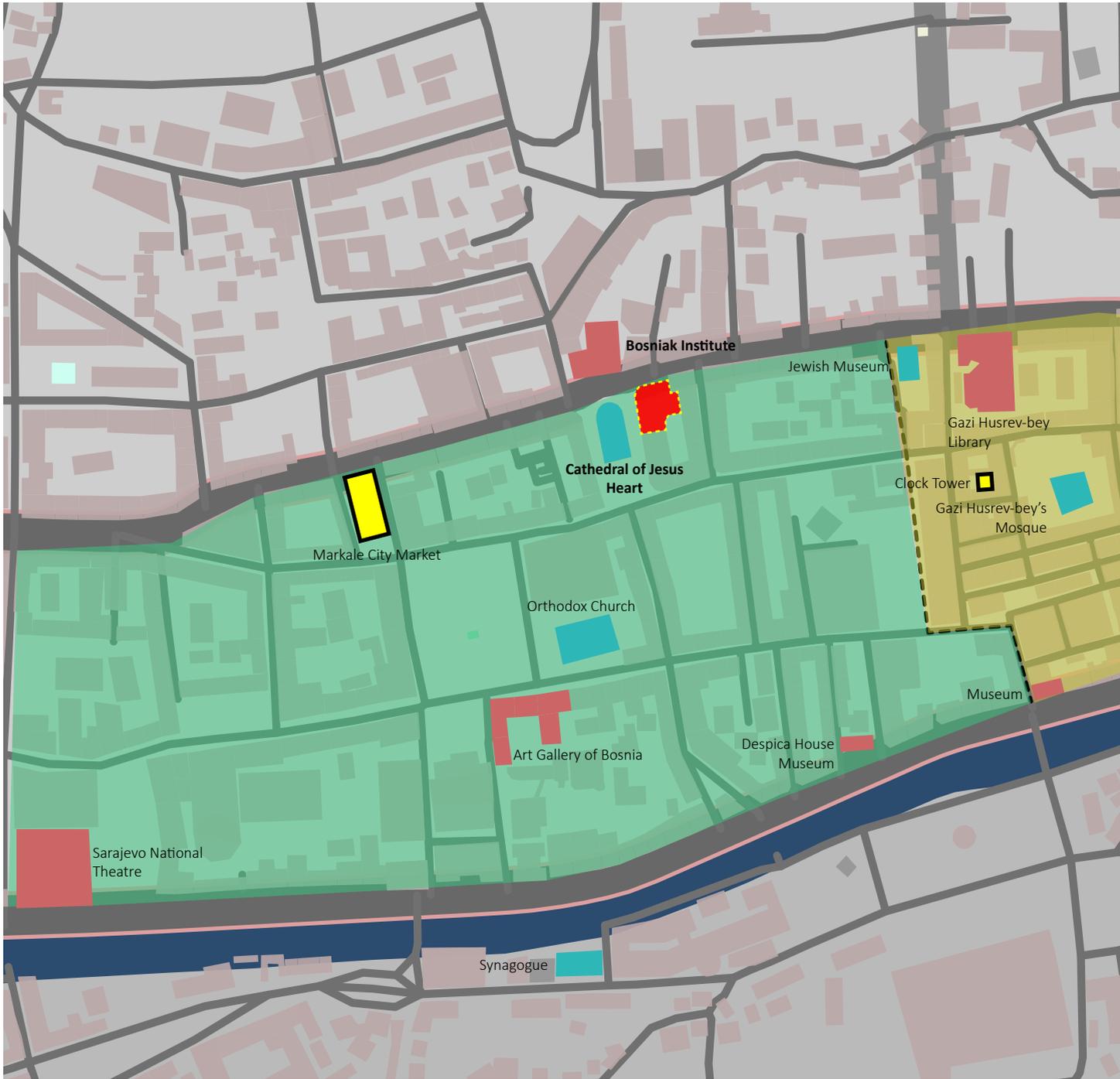


Fig 6.0 - 3 Sarajevo old town map with important buildings located.

Austro-Hungarian Influenced Area ■

Project Location ■

Ottoman Influenced Area ■



The cultural center of Sarajevo is focused on the dashed line in Figure 6.0-3 representing a "Meeting of Cultures" and allows for a transition between two major architectural models which also has the impact of time and memory associated with it. The site of interest is located within an open square next to one of the most important cathedrals within Sarajevo. The proximity of the site to other culturally significant buildings establishes a space of heightened importance; architecturally, religiously and politically. (See Figure 6.0-5) The space is charged with the Srebrenica genocide memorial displaying stories of tragic human loss during the same period of time when Sarajevo itself was under siege in another part of Bosnia and Herzegovina. The Bosniak institute to the north of the site holds significant cultural importance to the majority of Sarajevo, acting as a cultural center displaying the arts, culture and traditions of the Bosniaks. This building is focused on celebrating those who are of the Islamic faith within the region and directly south of it is one of the major Cathedrals celebrating another major religion in the area.

Fig 6.0 - 4 Sarajevo digital site model.

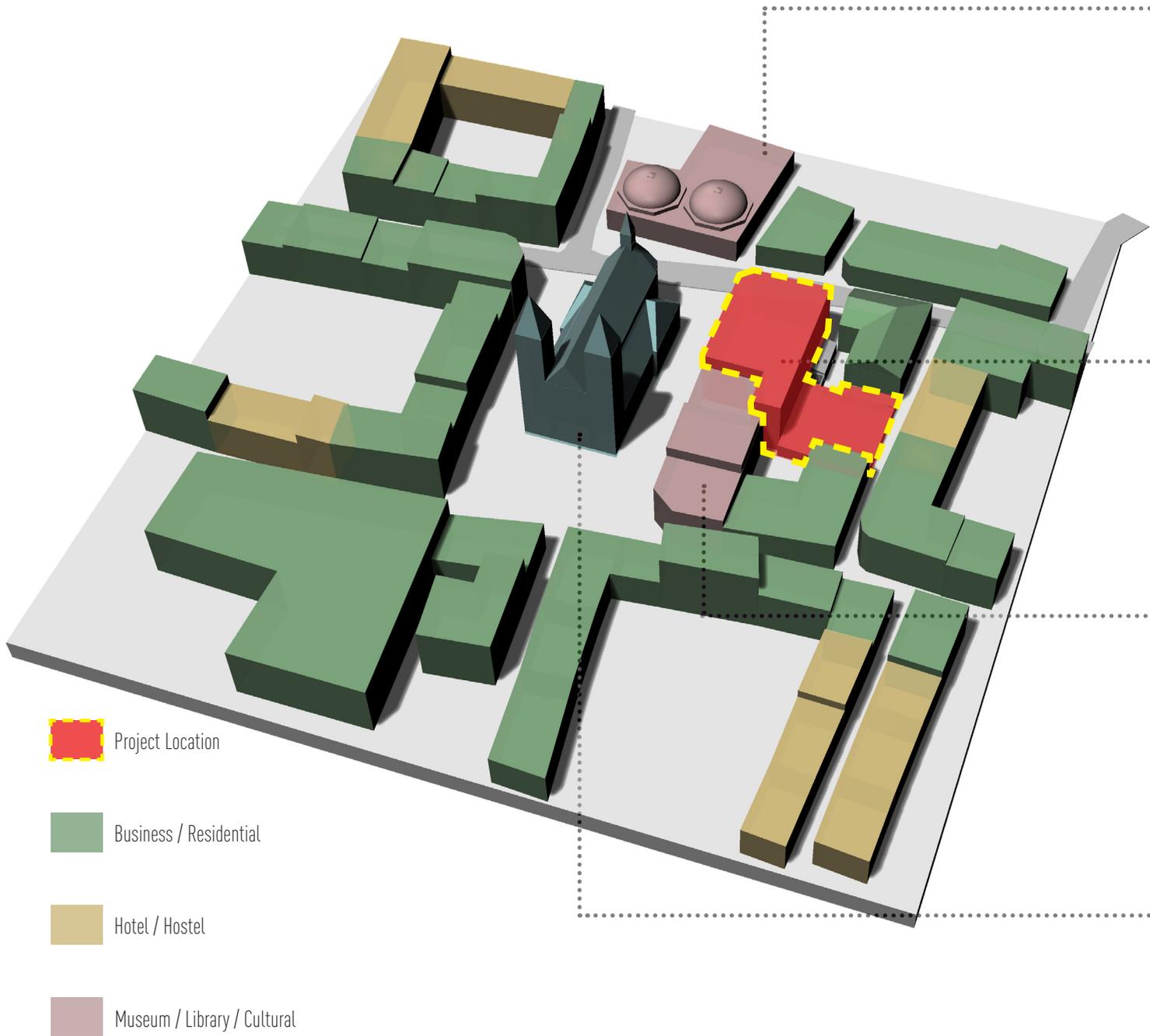


Fig 6.0 - 5 Site buildings of importance.



Bosniak Institute



Project Location - Derelict Building



Srebrenica Genocide Museum



Jesus Heart Cathedral

Tunnel Entrance

The entrance will be located in front of the Jesus Heart Cathedral which contains a Sarajevo Rose. To memorialize these events in which violence was committed by exploding mortars that have killed numerous people, red resin was used to infill these blast sites throughout Sarajevo. (Figure 6.1-2) One major site is directly in front of the Jesus Cathedral which shall be used as the point of entry to the initial tunnel.

The intention is to bring visitors into the "now" by removing them from the city by pulling them underground. Allowing them to experience the additional set of the spaces through a transition, moving away from the common and typical sights of the old town square. The program elements borrow from much from the investigation into the conflict in Sarajevo, particularly the following: - Airport Tunnel - Concrete - Derelict Material. - Inversion.

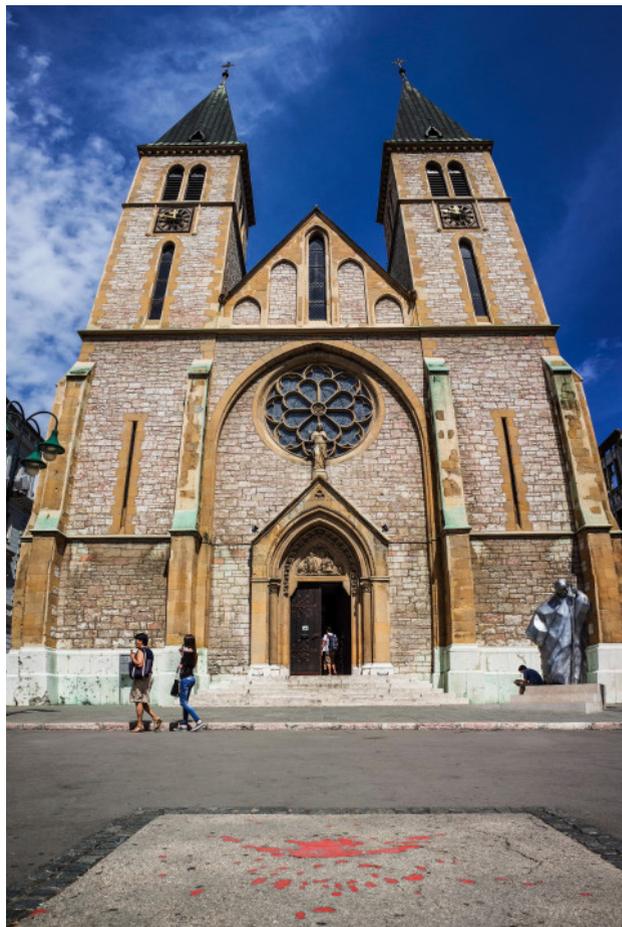
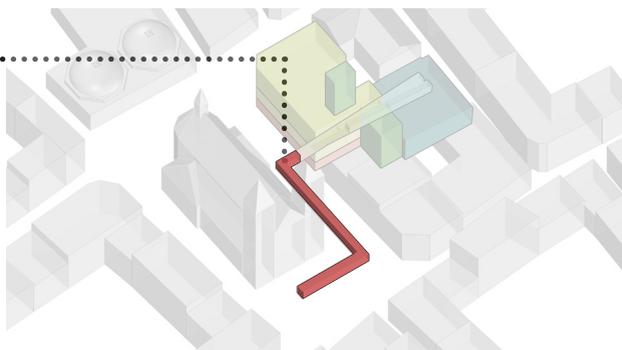


Fig 6.1 - 2 Sarajevo Rose in front of church.



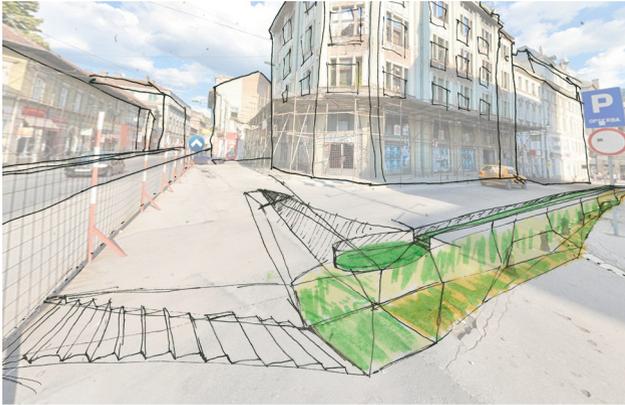
Program Elements

Fig 6.1 - 2 Program elements and tunnel location map.



Schematic Showing Tunnel Path

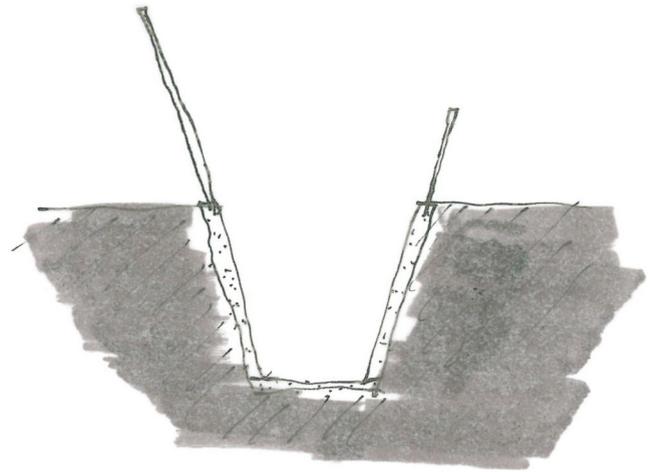
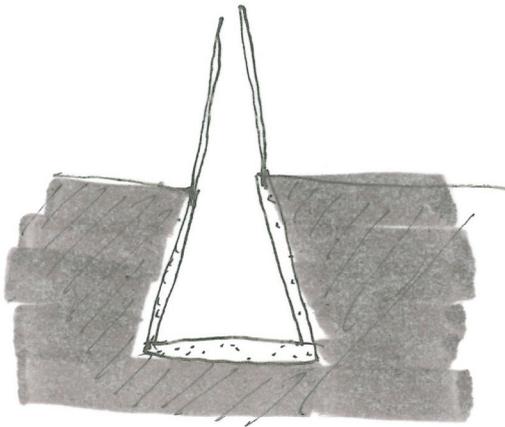
Fig 6.1 - 3 Developing ideas through sketches for the entrance tunnel.



Initial Design Ideation of Tunnel Type



Initial Design Ideation of Tunnel Type



Section Sketch of Proposed Tunnel



Design Sketch of Proposed Tunnel - Underground



Design Sketch of Proposed Tunnel - Shard Condition



Fig 6.1 - 4 Entrance rendering

By placing the entrance in front of a church, the significance is that the tunnel begins to submerge into the ground past the point of violence which is juxtaposed against the church. The church seeks to provide salvation by pulling the gaze vertically towards the ceiling, while the tunnel seeks to provide refuge by tunneling and pulling individuals into the ground.

The tunnel uses a combination of investigation spaces; combining the Freedom Tunnel (Figure 5.1-2) with the urban tunnels found throughout the city to protect

the people from snipers. (Figures 5.2-2 to 6) The shards become a foreign landscape with limited views of the surrounding buildings. One of the major intentions of design is to remove the entry of a building through the front doors. This compromises the person from fully comprehending the types of spaces they will be walking into. Allowing one to enter an unknown space brings them further into experiencing the present given the uncertainty involved which parallels the initial emotional state as individuals enter or are forced into a conflict zone.



Fig 6.1 - 5 Site plan displaying the tunnel.

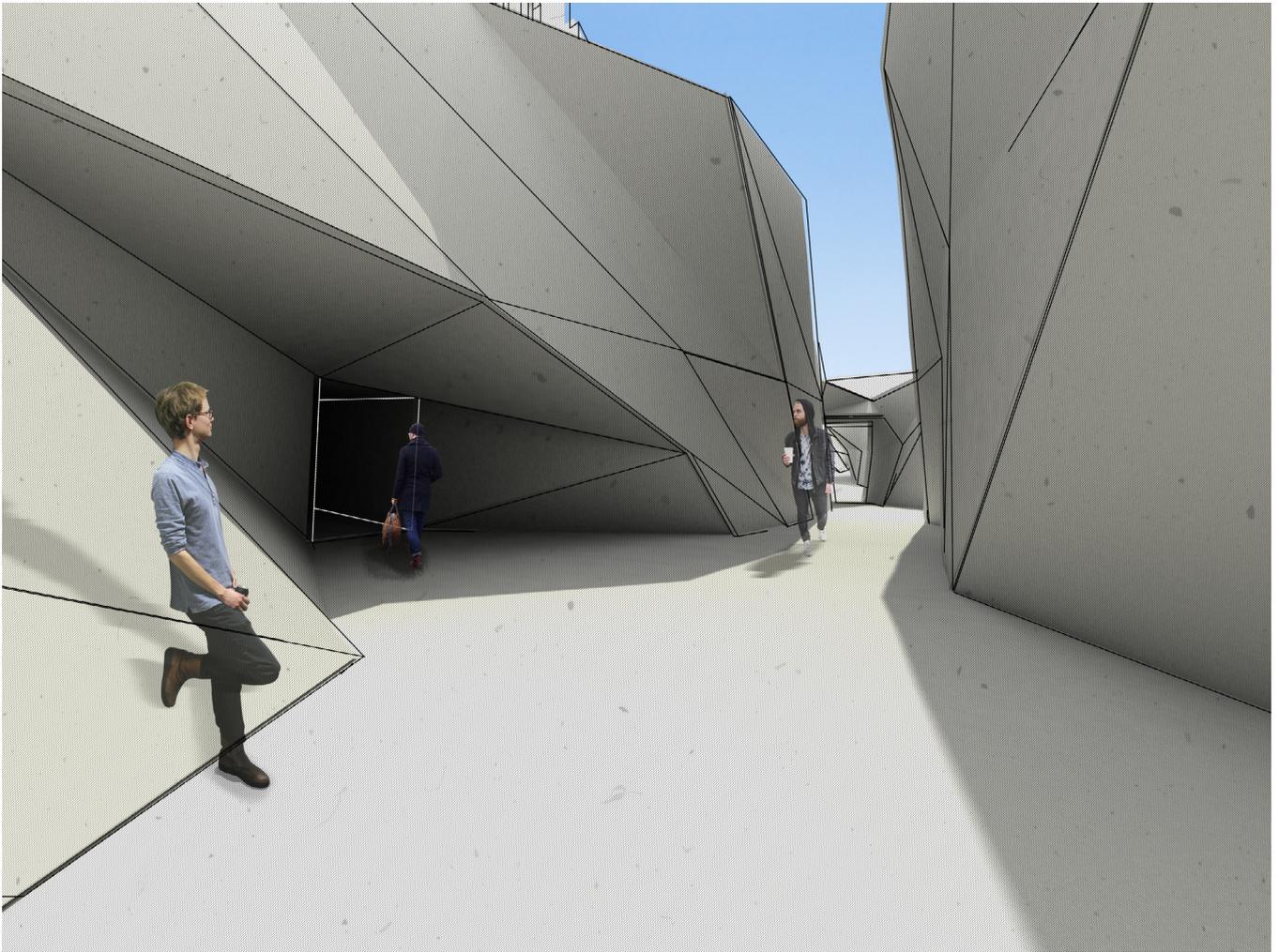


Fig 6.1 - 6 Rendering of the exit of the entrance tunnel.



Fig 6.1 - 7 Comparison to the man made tunnel using cars.

Concrete Ramped Tunnel

The second tunnel is a combination of both the airport tunnel and the deconstruction of the luge track. Throughout the luge track, there is violence inflicted upon it in with holes created to provide space for weapons to penetrate through. Experiences in conflict zones especially in urban conditions under constant barrage where one could deem that the act of urbicide has been levied against a city forms a multitude of porous bullet-ridden walls. This becomes space in which people seek refuge, areas in darkness so not to be seen by the outside yet lit by the spaces bullets leave behind. (Figure 6.2-2)

The main programmatic elements involved in this part of the design take aspects from the following:

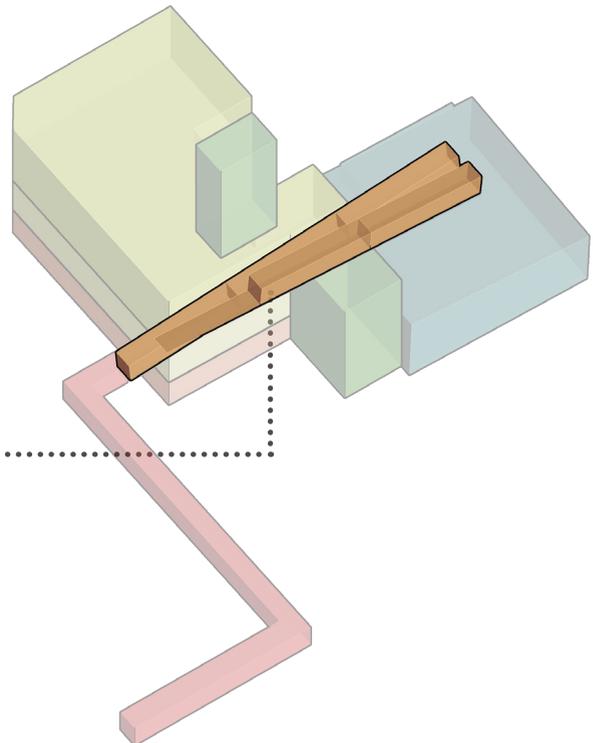
- The Airport Tunnel
- Concrete of the Luge Track
- Earth and Moisture
- Bullet holes and Gun Ports from the Olympic Village
- The Bob Sled Track



Program Elements

Fig 6.2 - 1 Program elements and tunnel location map.

The form of the tunnel meanders as it ramps up from below the ground, making views of the entire path hard to gauge. By minimizing the overall visual length of the path, it allows the visitor to take in moments as they walk through as opposed to taking in the entire length of the path. This progression reflects the ability to set specific moments that influence the experience in an instant without expectation. Yet there are elements of foreshadowing; elements such as vertical girders puncturing through the center of the pathway and water dripping into the space from the waterfall above the tunnel creating for a microclimate that allows for the light rays to become a dynamic and active space that people move through and interact with.



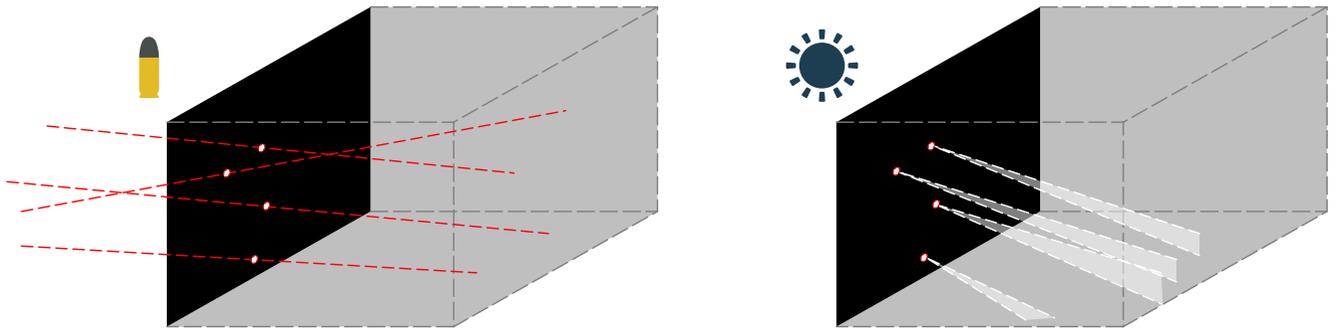


Fig 6.2 - 2 Bullet hole and Light ray Diagram.

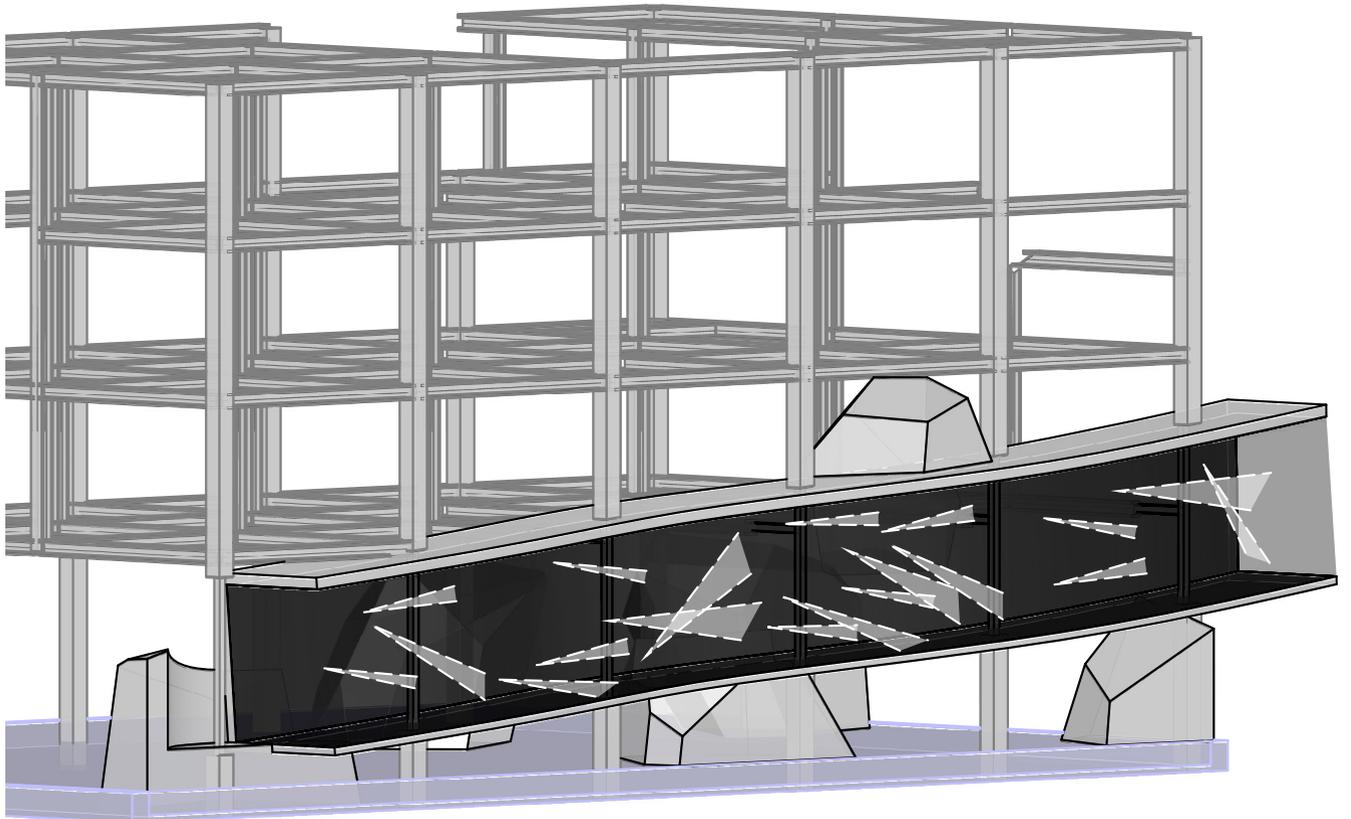


Fig 6.2 - 3 Light rays in tunnelschematic.

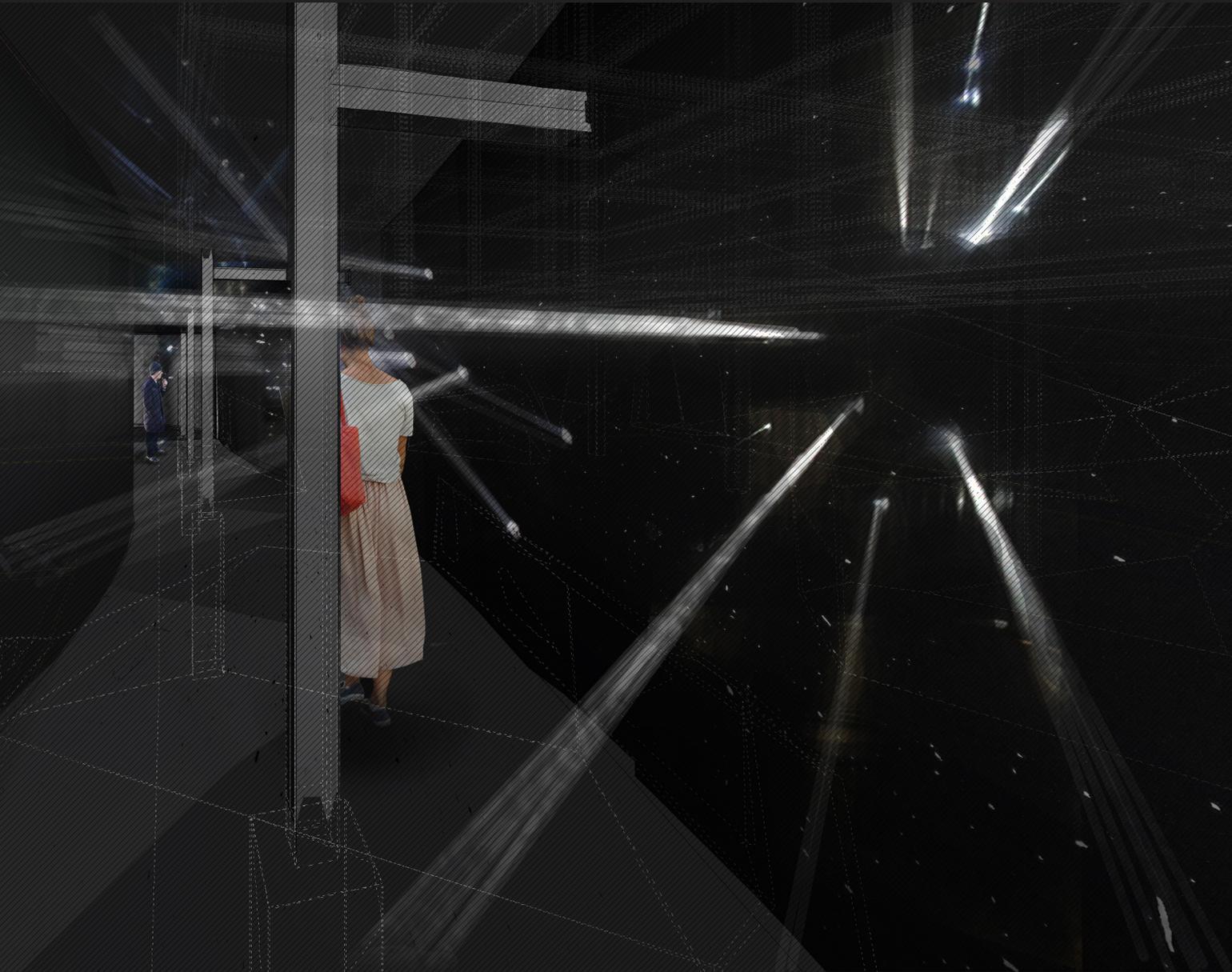
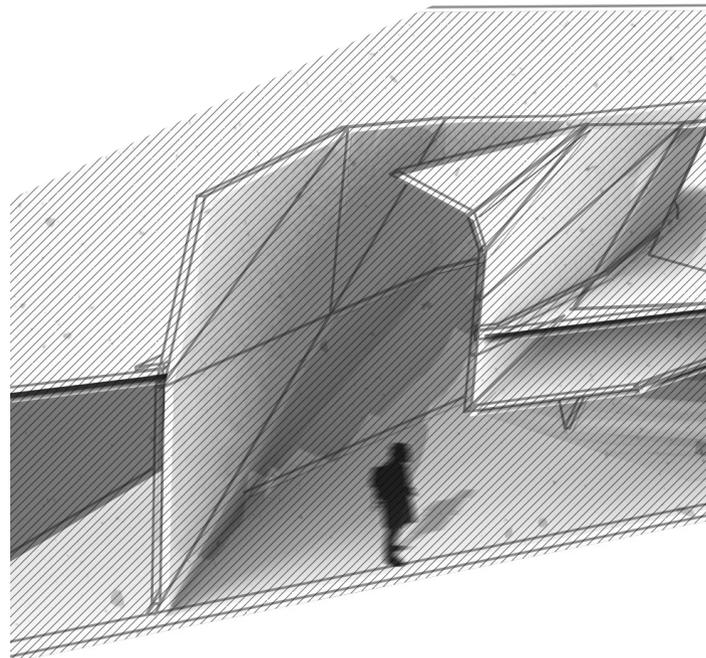


Fig 6.2 - 4 Light rays in tunnel rendering.

The girders that split the path are part of the interconnectedness of the experience relating to the work dealing with the rhizome by Deleuze and Guttari and how it is applied to conflict spaces and time. The visitor will by experiencing different elements of the entire spatial container slowly form a fuller picture of the different elements as they combine in the different spaces. The building section gives a glimpse into the movement a person would go from below ground to the second floor.

2nd Floor - Inverted Geometry

The second floor of the building utilizes design through the spatial inversion of the existing floor and wall construction. Throughout conflict, exploding shells and bombs create voids throughout the urban fabric, allowing the exposing of those hidden elements such as rebar, concrete pouring, wooden joists and many smaller elements typically invisible in a properly constructed setting. In the process of using this specific building, it is the intention to allow its fabric to be revealed to the visitor by producing voids through them, specifically the floors and walls. Therefore a new floor has been created to bring the existing floor to the height of an average person's hip, and the voids have been crafted in a way to create a continuous open space that gives form to a path.



Section Cut Location

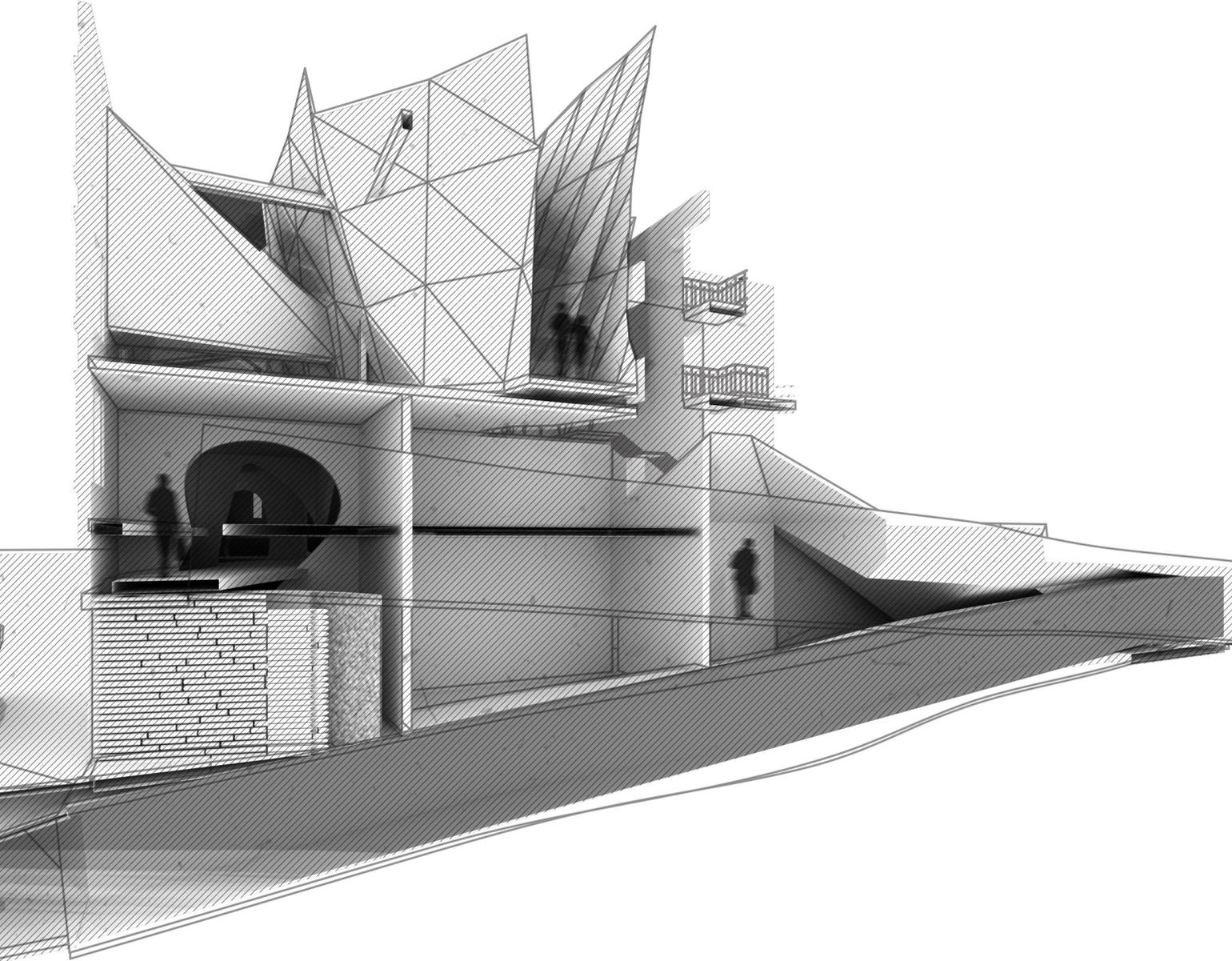
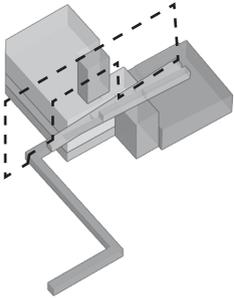
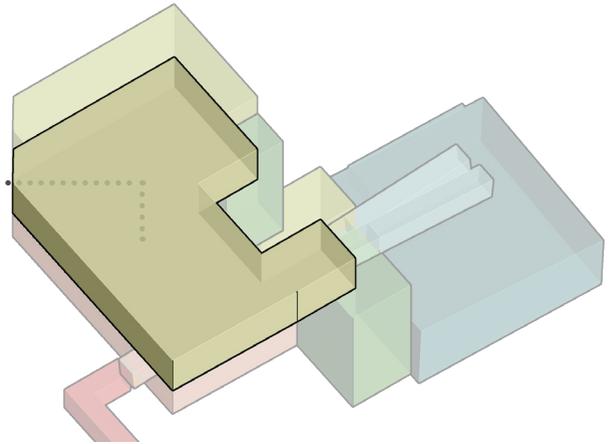


Fig 6.2 - 5 Perspective Section.

Fig 6.3 - 1 Program elements and location map.



Through the investigations of designing spaces using voids, it was possible to apply the same method to the existing form of the building. The investigations involved introducing volumes of space into solid forms, a type of Boolean subtraction operand. (Figure 6.3-2) In doing so, it allows a designer to design spaces from a new perspective and is at its most appropriate in this section of the existing building.

The windows have been left boarded up as they have been since the conflict. This is so that the only light that comes into the space is from natural daylight through the large oculus in the center which reveals the shard wall above on the next floor level. This is a reveal that relates to the prior section of the interconnectedness of the spaces allowing for a type of foreshadowing without fully comprehending the upcoming space. The floor in red drawn in the Axonometric Building Section reveals the new floor as the voided existing walls and floors constrain the path of the visitor into a guided passageway. (Figure 6.3-3)

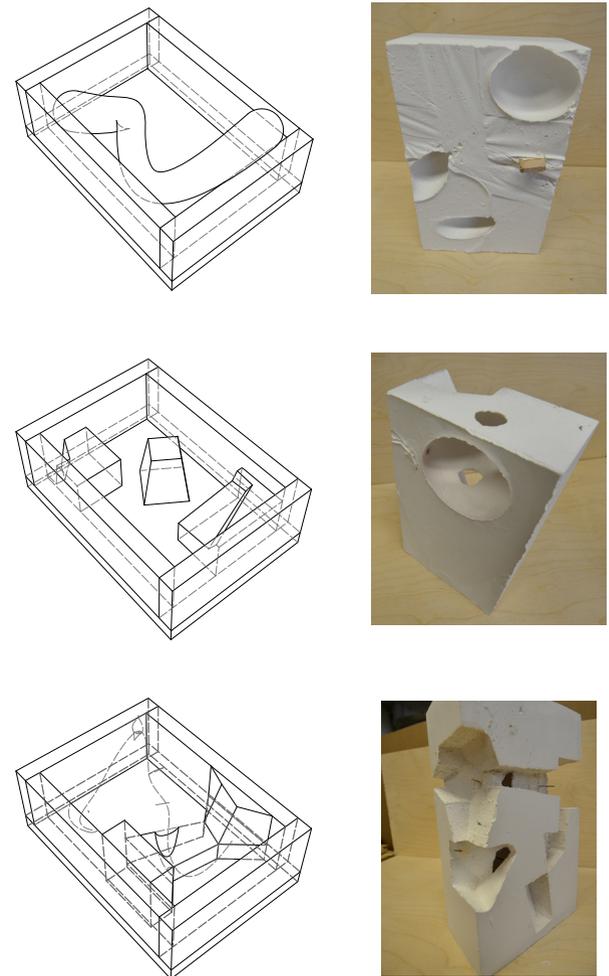
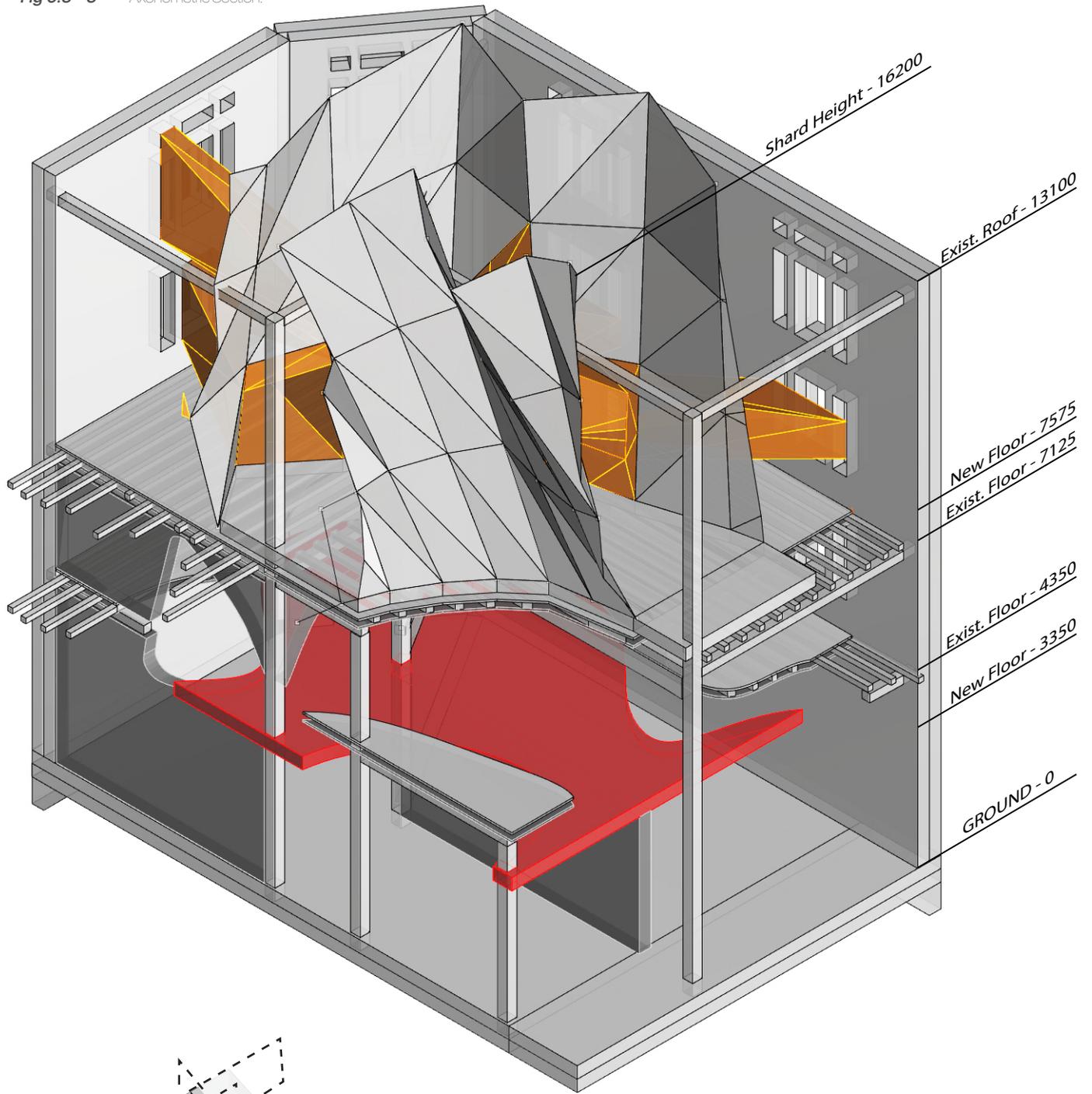


Fig 6.3 - 2 Design through voids.

Fig 6.3 - 3 Axonometric Section.



Section Cut Location

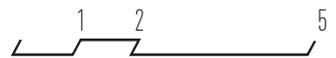
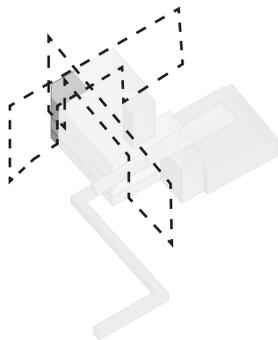
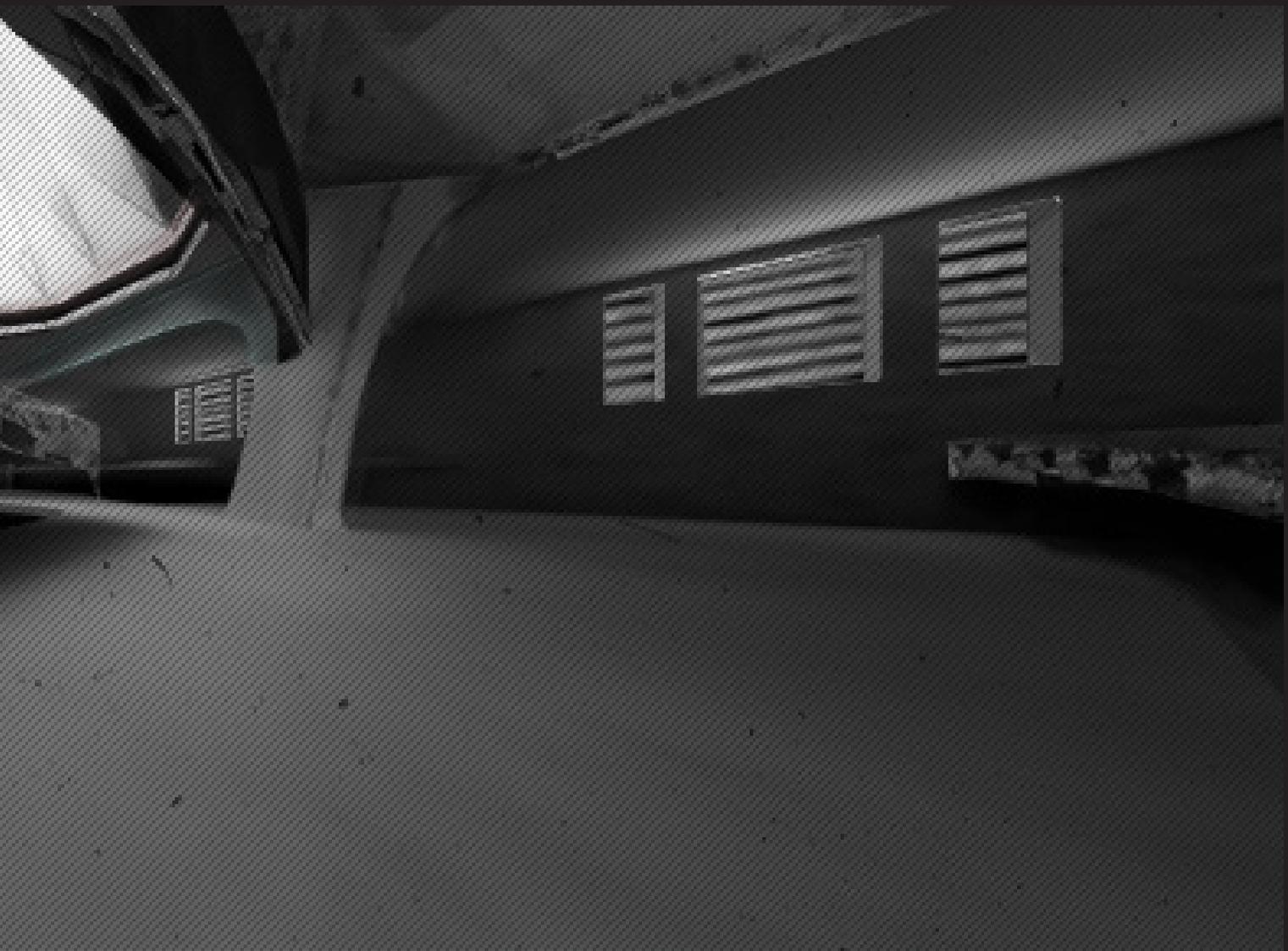




Fig 6.3 - 4 Inverted Geometry Rendering.



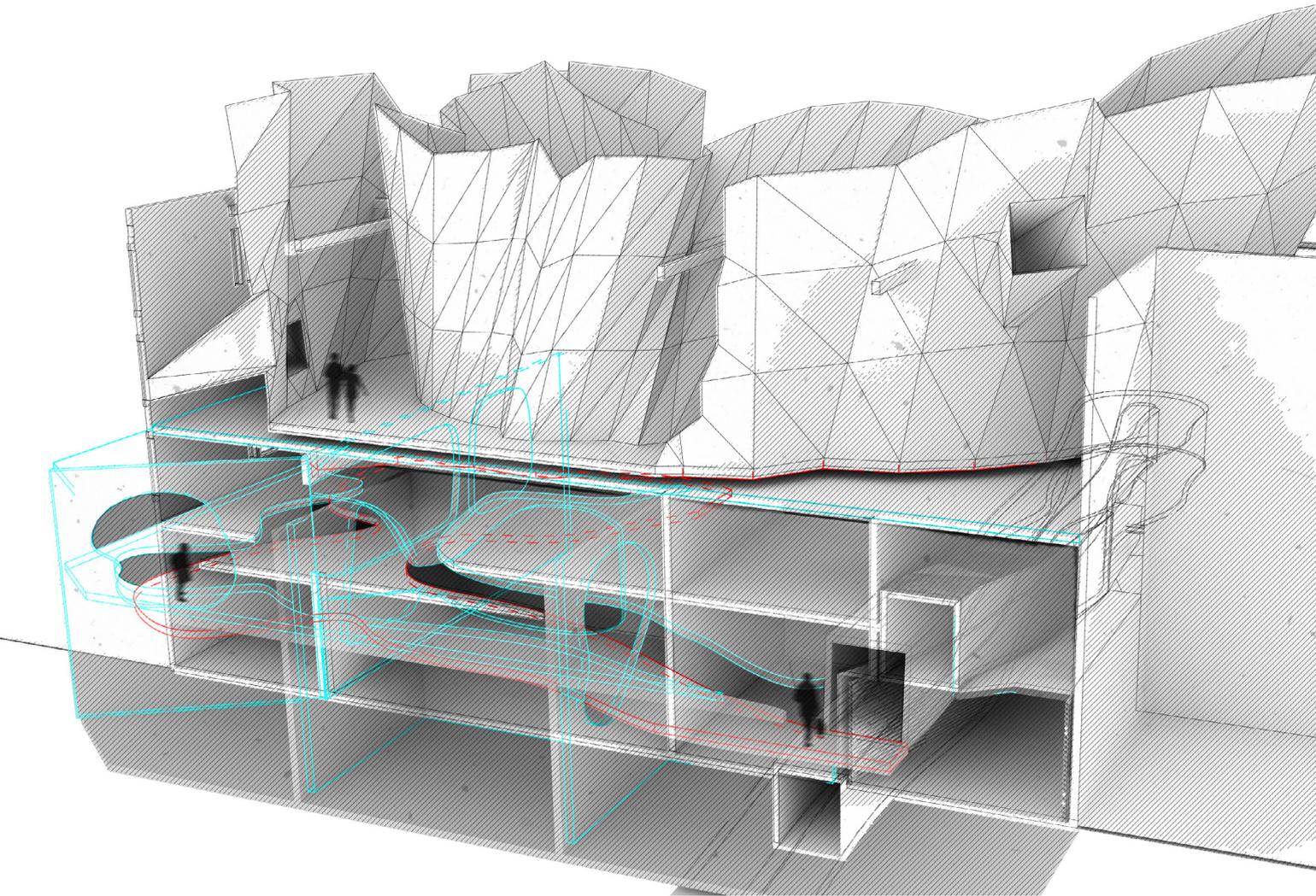
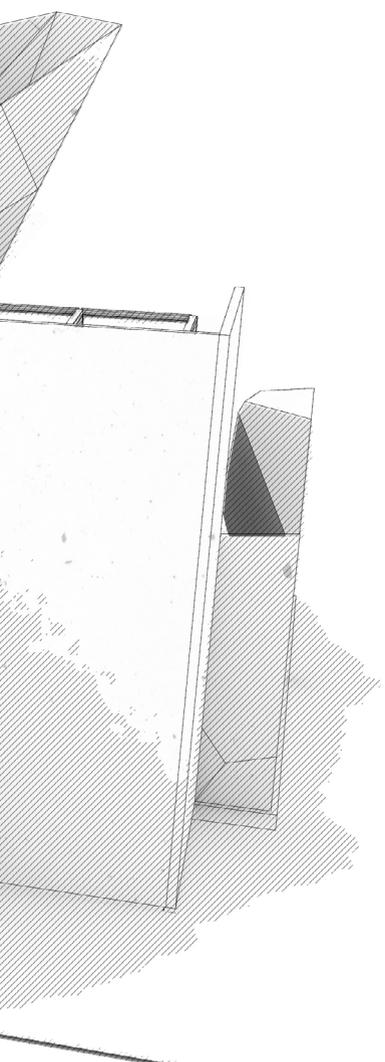
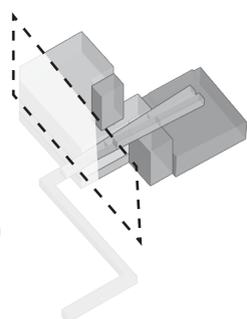


Fig 6.3 - 5 Perspective Section.



Section Cut Location



Roof Shard

The idea of the Panopticon City is extremely relevant in conflict spaces, and more so in the city of Sarajevo, where the inverse is true. The city being completely surrounded produced a space that was constantly under surveillance by the outside. The image of Sarajevo through the scope of a sniper re-identified the city as a target of conflict. The inversion of this condition then manifested in the building as viewports that were used in the space to provide certain framing of views outwards towards other Sarajevo Landmarks, to re-identify them not as targets, but as the urban fabric that when brought together, collectively forms the city of Sarajevo.

The shard and the viewports borrow the same material as the barrel of a sniper rifle, to juxtapose the two conditions, one meant for violence and the other to reveal certain characteristics of the city. It is in this instance, that at the first opportunity the visitor can formulate an idea of their location, for it is the first view out into the world where they can now attempt to connect themselves within Sarajevo, for it was until this point that the visitor was being removed them from the urban fabric of the city. Thus the space borrows heavily from the following elements:

- Metal
- The Cable Car System
- The Re-identification of Sniper City

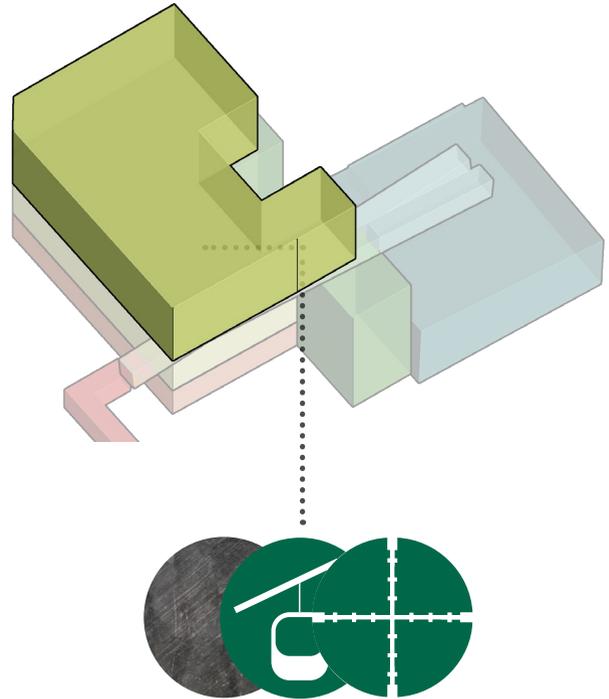


Fig 6.4 - 1 Program elements and location map.

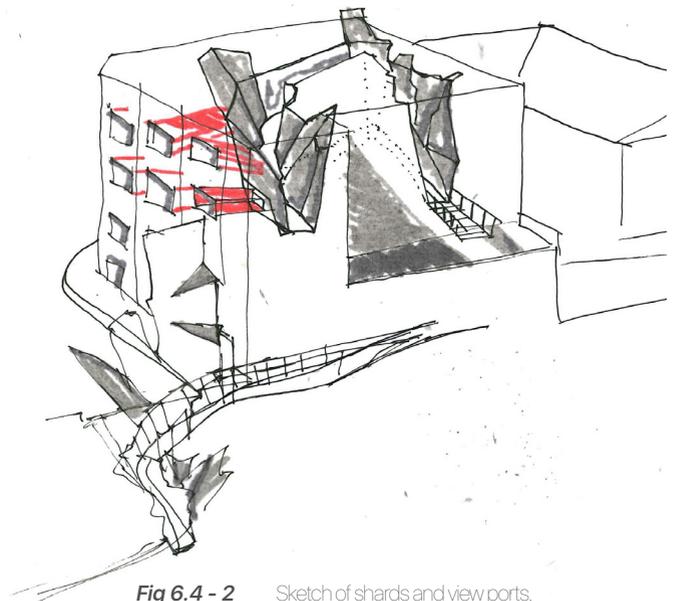
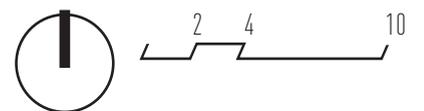
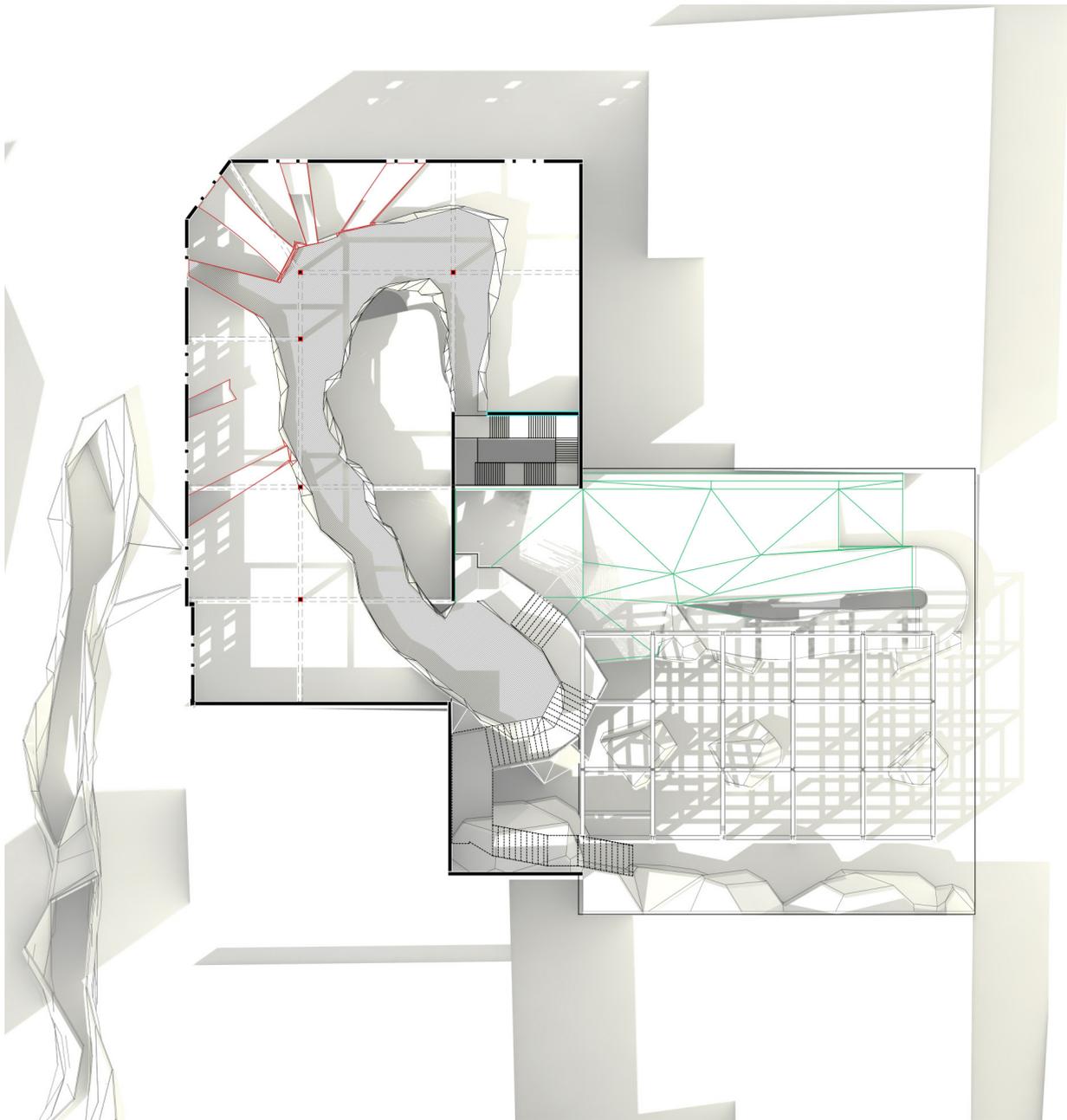


Fig 6.4 - 2 Sketch of shards and view ports.

Fig 6.4 - 3 Plan of roof shard area.



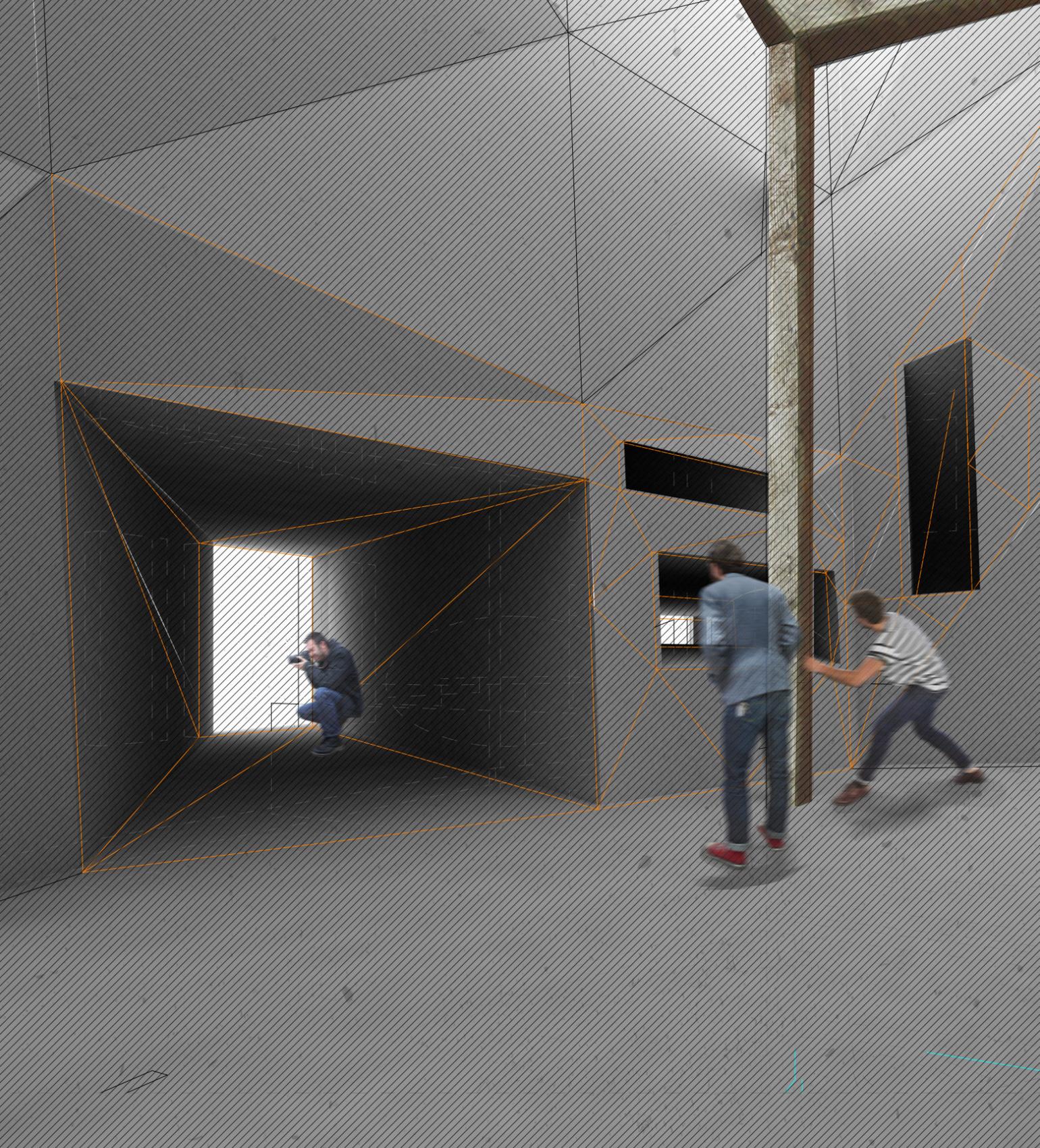
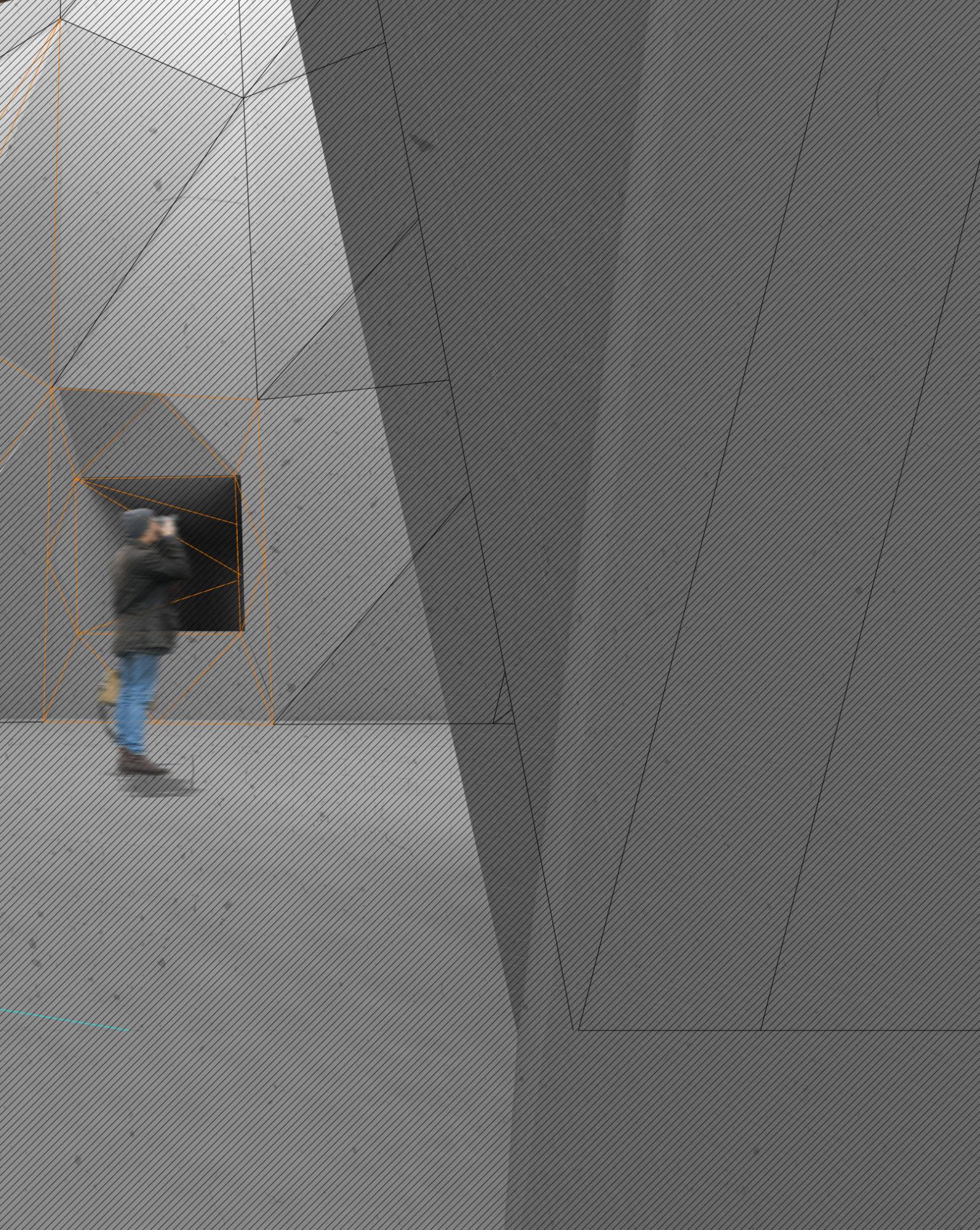
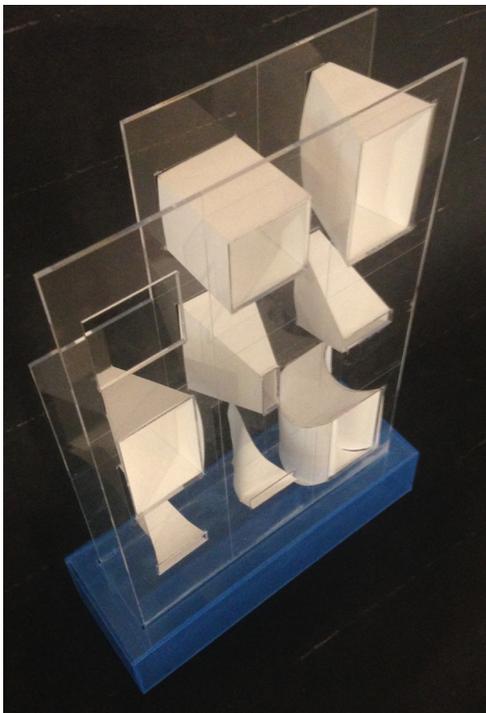
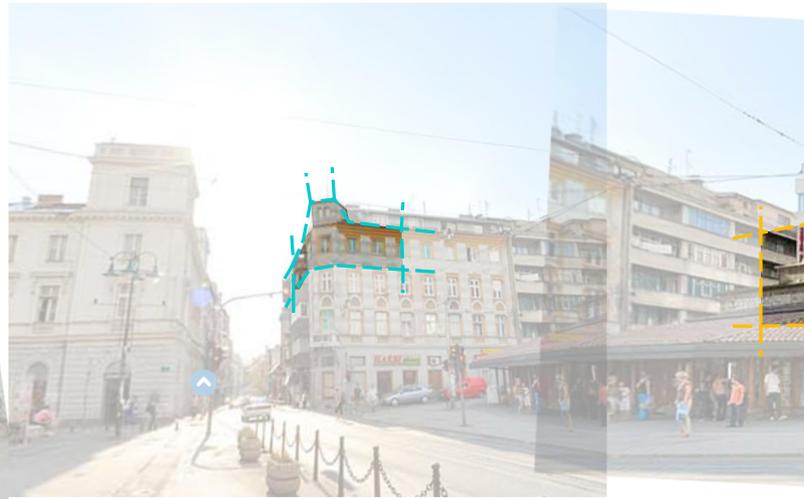
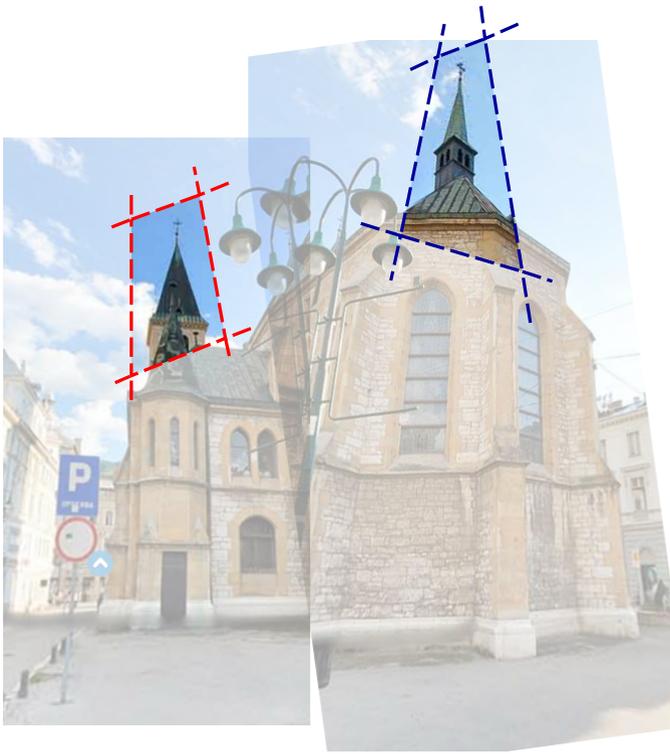


Fig 6.4 - 4 Roof shard rendering.





The upper stories of the building have for the most part been completely flattened by the conflict. All that remains in the investigation are the wood beams and columns which are used as a matrix to support the proposed shard. There are two viewports that are specifically made to provide a view to the material of the exterior wall and reveal the violence committed to the building from within, in this way providing a contrasting view of the buildings that have been repaired to the existing building that has remained derelict since the war. The white and black dashed arrows in the Viewport Schematic demonstrate these viewports. Each viewport is varied and has been designed a specific way to provide an alternate view outwards towards neighboring landmarks.

Fig 6.4 - 6 Viewports exploration model.

Fig 6.4 - 5 Surrounding site panorama.

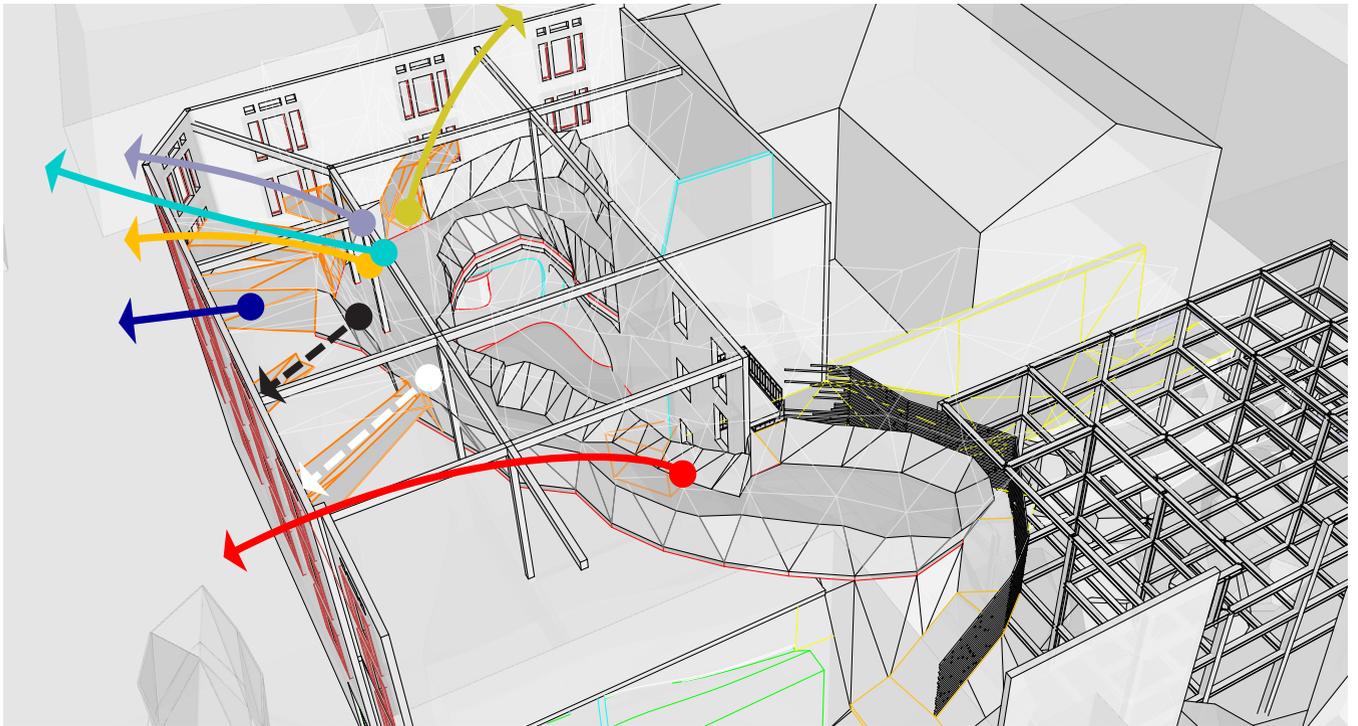


Fig 6.4 - 7 Roof shard with viewport vectors schematic.

Cascading Waterfall

Once the visitor reaches this point in the journey, the element of water (both the sound of it and the sight) is intended to ease the visitor out of the conflict spaces. This is a type of mental break as this introduction embodies the ending of the conflict. Water at its essence has many representational meanings of life, rebirth, the start of a new journey, etc. It is not so much the representation, but rather the presence of the water which provides a microclimate that completely changes the user's relationship with the building. The existing balconies are used as a way for transporting both the people and the water. The upper floor which has been rendered useless as there is no floorspace will be used as the jet for the water fountain. (Figure 6.5-1)

Below the third storey balcony is another set of jets that release water which flows above the concrete ramped tunnel; which is used to provide an internal microclimate conducive for providing light rays through space. (Figure 6.5-2) The water cascades downwards through the alley and fills the open square below to become a shallow reflective pond.

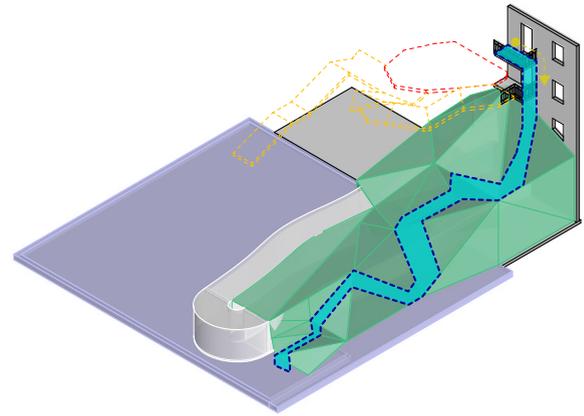


Fig 6.5 - 1 Waterfall from upper balcony.

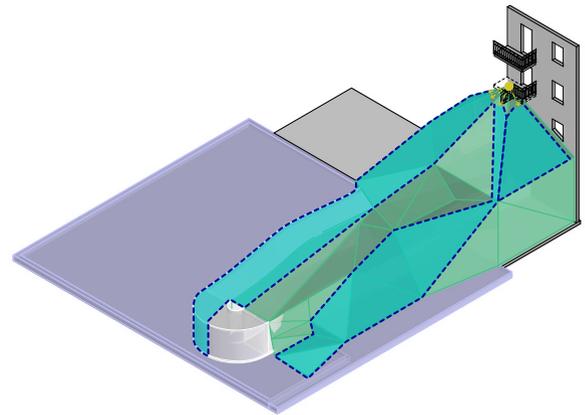


Fig 6.5 - 2 Cascading waterfall from triangulated mass.

Fig 6.5 - 3

Waterfall perspective from balcony.

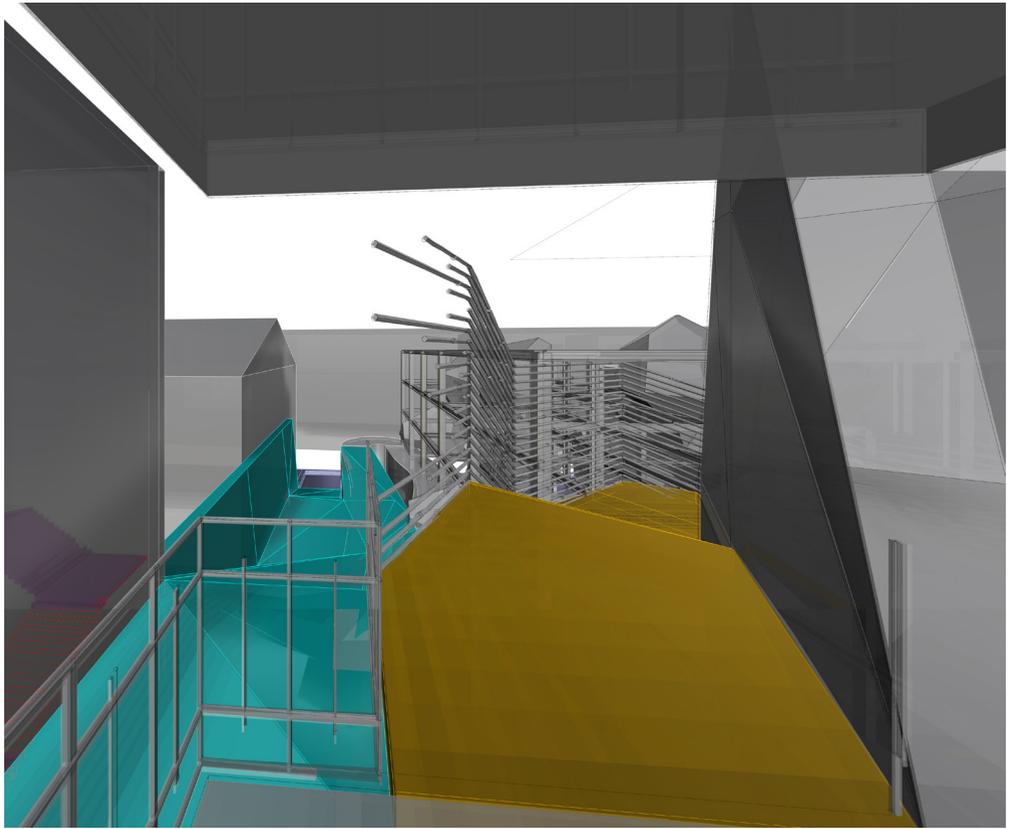
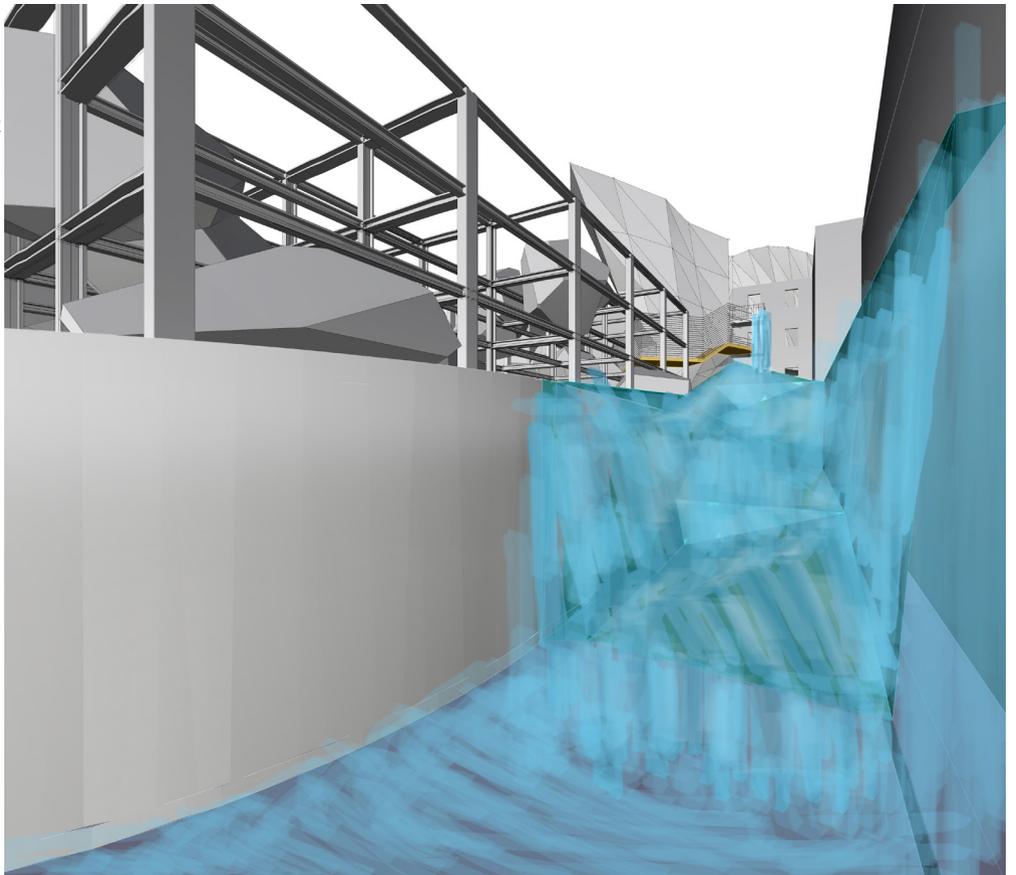


Fig 6.5 - 4

Waterfall perspective from alleyway.



Memory Matrix

Climbing down the stairs towards the ground brings the visitor through scaffolded space. Scaffolding in this configuration allows for the idea of temporary permanence, to signify that at any point this process could be completely changed or finished. By allowing an open end, it presents the next phase to the individuals not as a solid conclusion but as an open ended vector.

Reaching the base, the visitor is faced with journeying into a shallow reflective pool with a lattice of girders supporting boulders above. The boulders are representative of the burden of memory, and questions how a people move forward with the memory of the conflict. Throughout the various conflicts that have been looked at, they have had very different outcomes of moving forward; some of them have chosen to forget the memory entirely, some have rebuilt with the intention of focusing on the future, and others have allowed the memory to remain in their desecrated forms untouched. The point of this thesis is not to judge, nor to condone an option that states which method is most suitable, however leaves that open to the visitor as they determine whether the memory of conflict should be retained, whether the collective memory that forms the identity requires the gradual eradication of the violent past or to consolidate it within the future re-identification of a people and their communal space. (Figure 6.6-4)

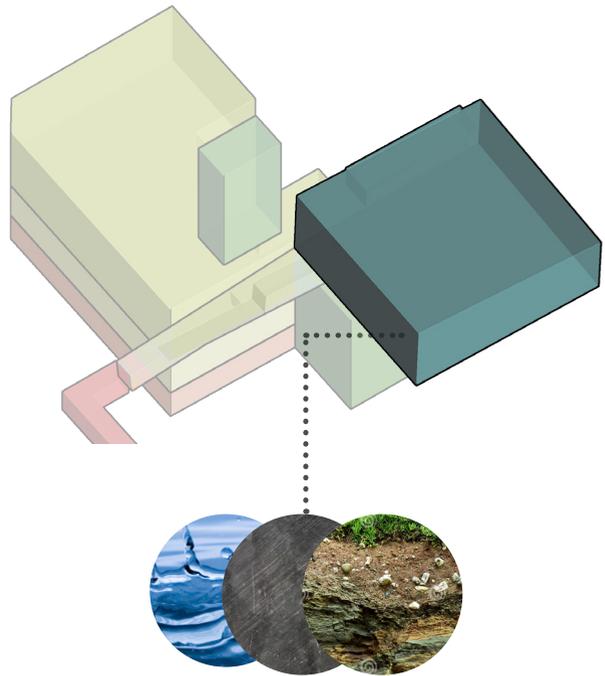


Fig 6.6 - 1 Program elements and location map.



Fig 6.6 - 2 3-D printed model view of the rear.

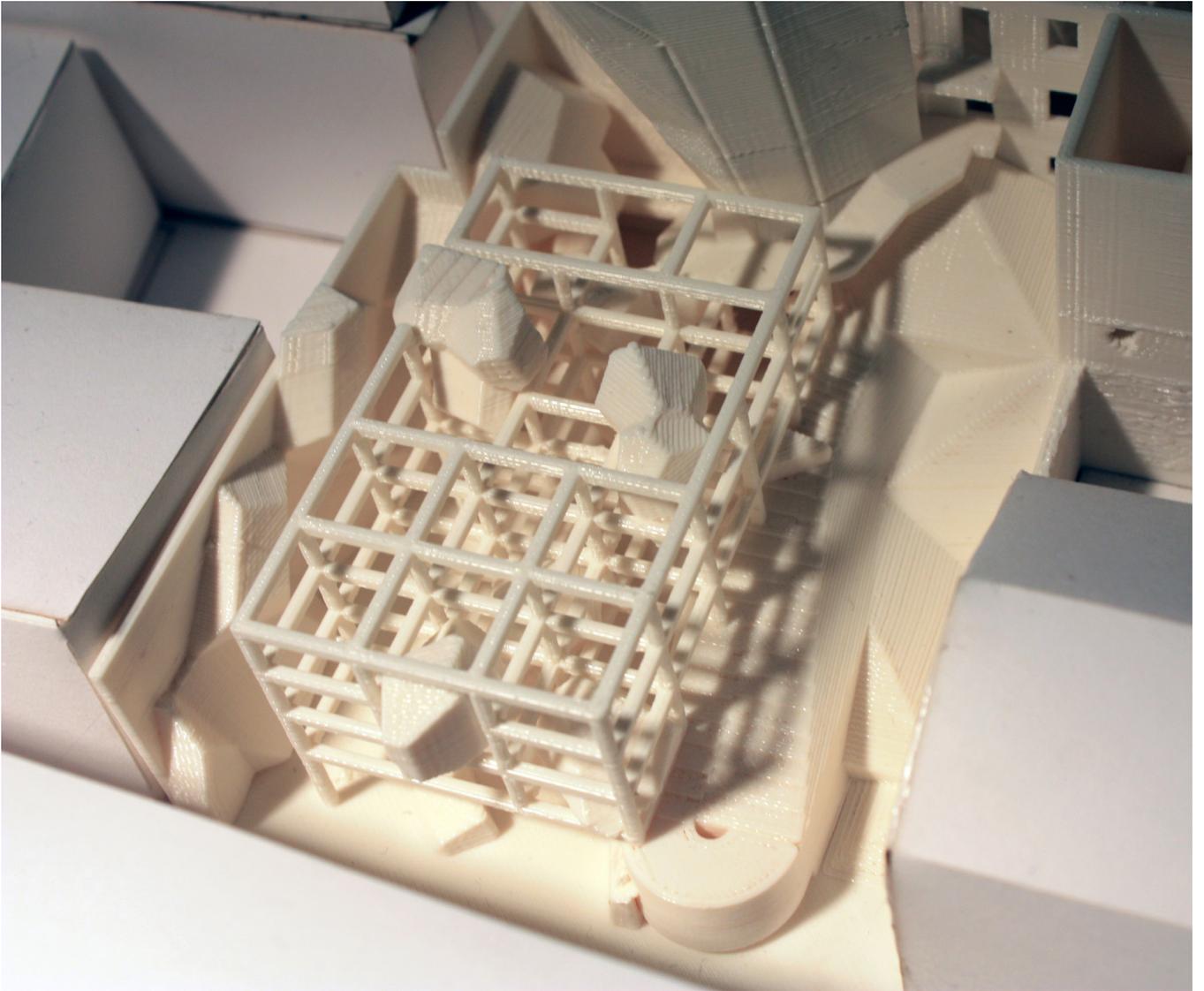
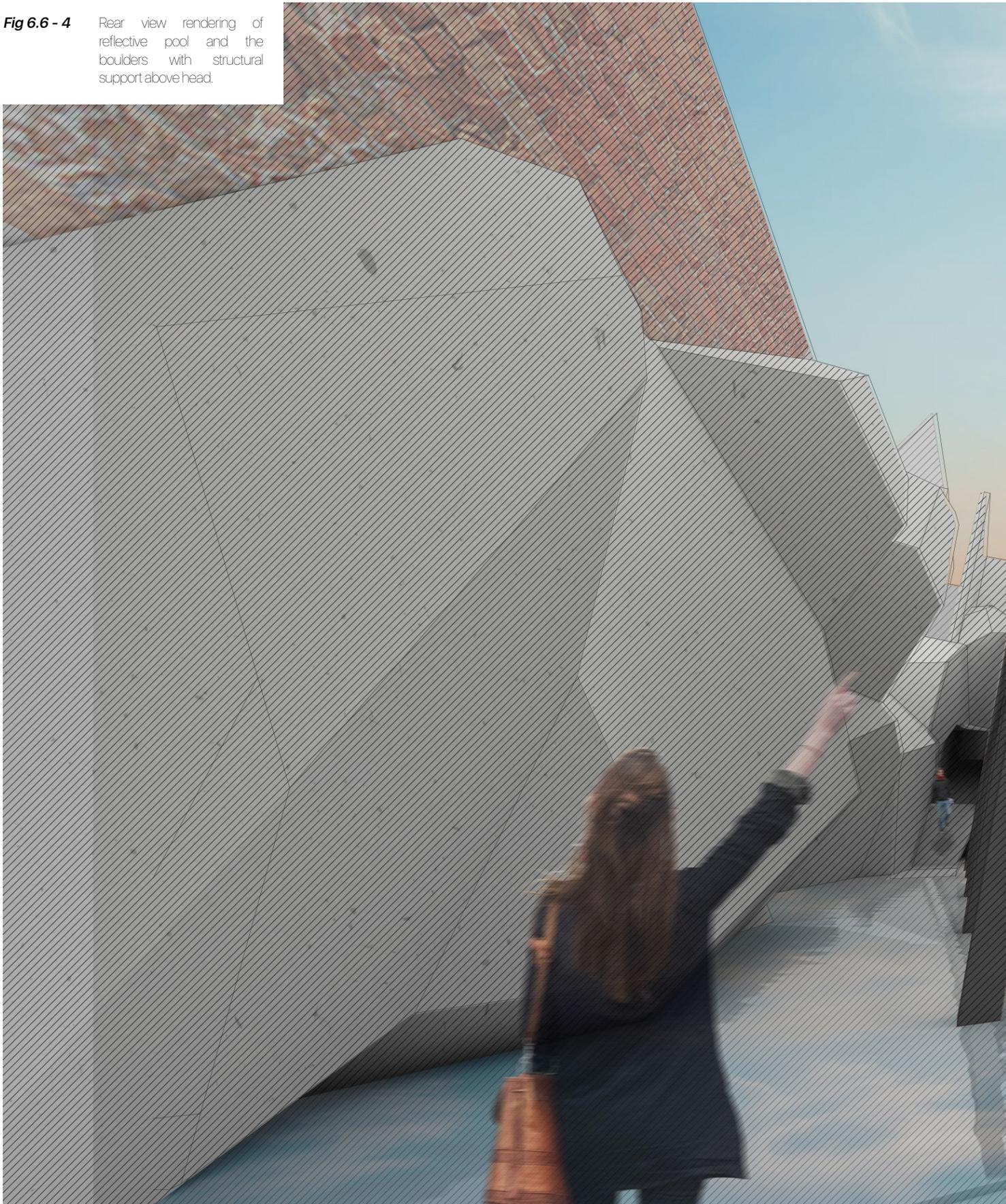


Fig 6.6 - 3 3-D printed model view from above.

Fig 6.6 - 4 Rear view rendering of reflective pool and the boulders with structural support above head.



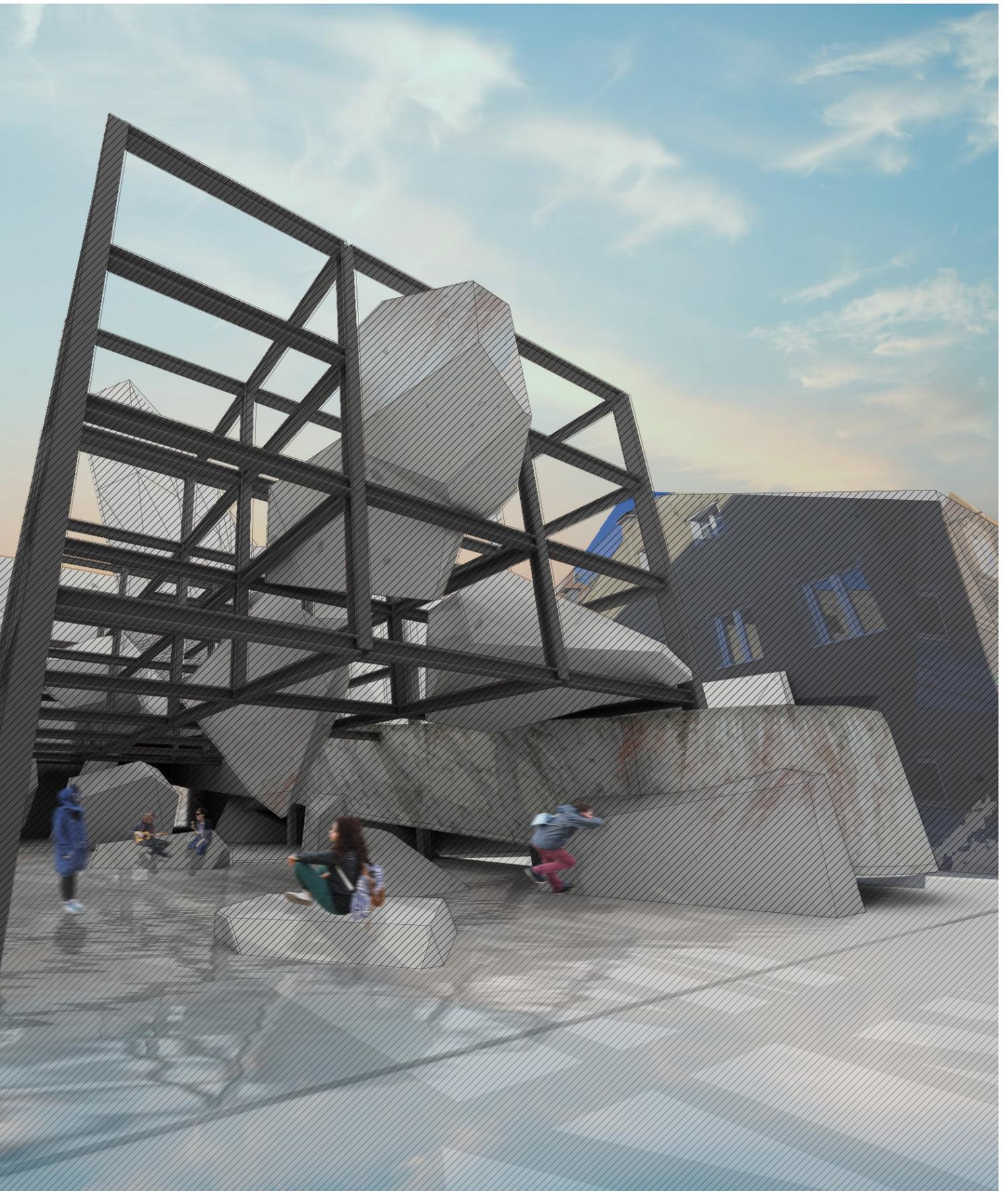
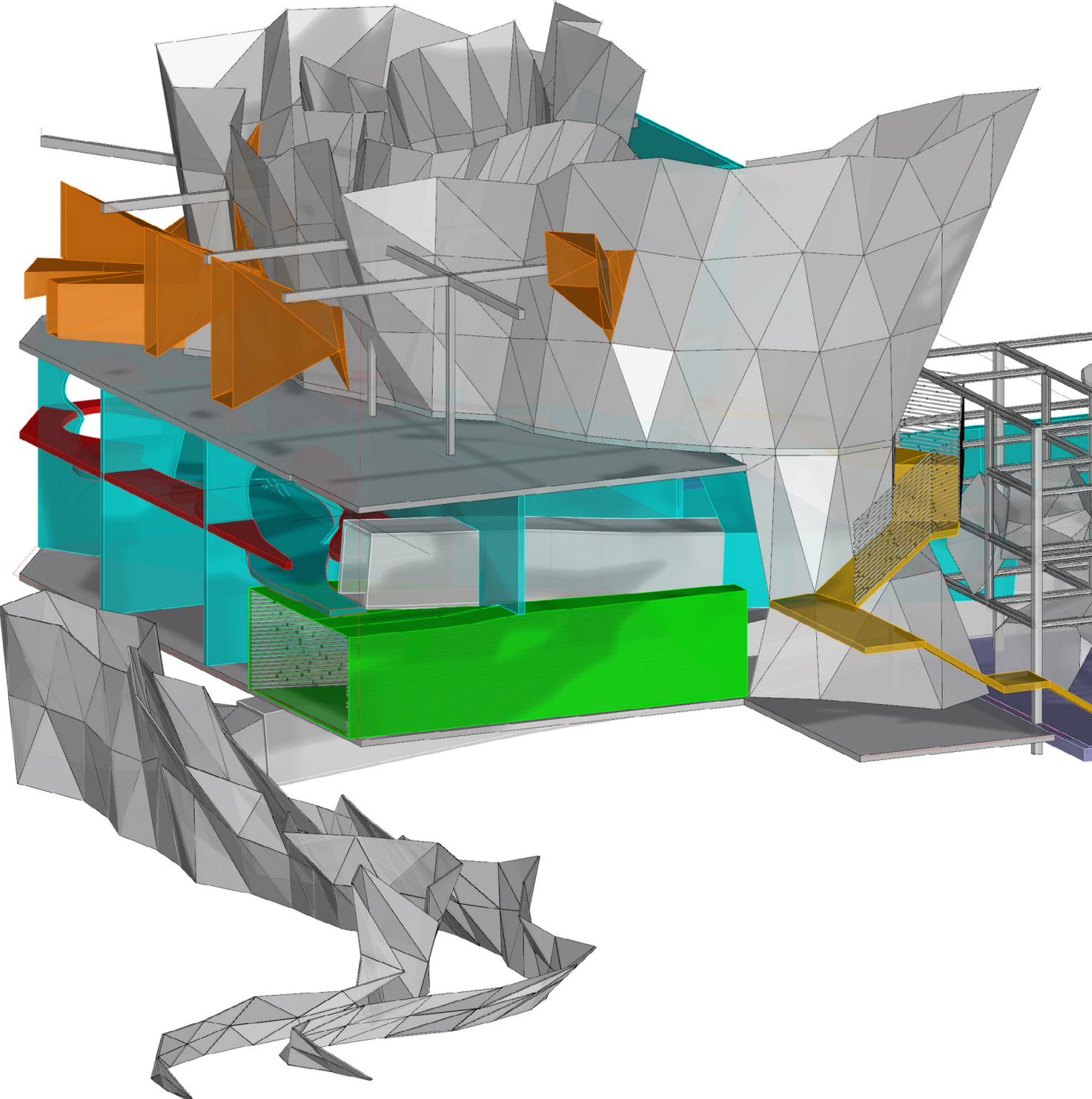
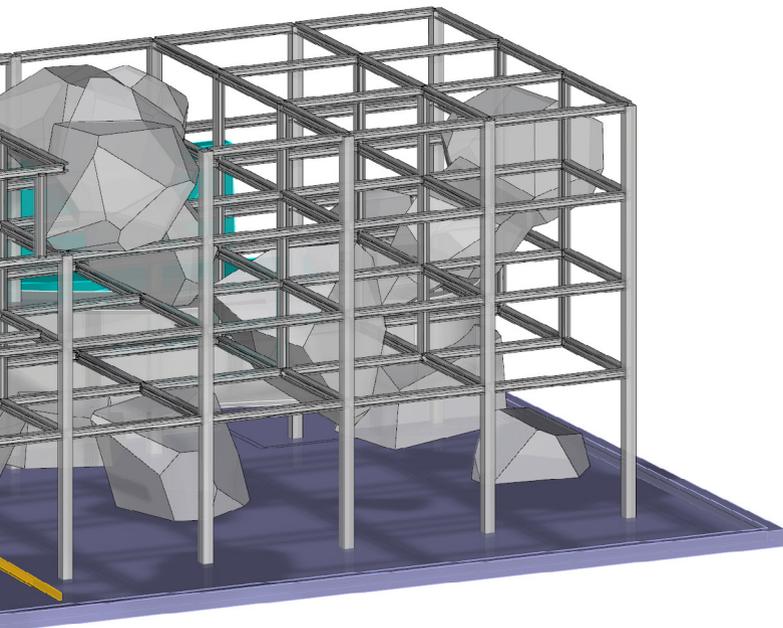


Fig 6.6 - 5 Overall Scheme of the Thesis.



Journey's End

Leaving the site, the visitor travels through narrow alleyways leading them back to the main streets which allows them to comprehend their location within the city as they are able to step back into the open square. More significantly, when they initially walked through the entrance tunnel, the visitor consequently lost their identity of Sarajevo, and now walking back into it, they are able to re-identify both themselves within the city, and the city of Sarajevo. They are now able to reflect on the journey they just underwent. The hope is that in walking through the tunnels, it provides the visitor with a perspective that has radically changed the way they view the urban spaces of Sarajevo. Whether they carry that burden with them depends entirely on the individual. Much like how any individual that is affected by going through a conflict, there are many avenues for which to reclaim an identity that has undergone a liminal state, however, is eventually defined by the collective memory that is constituted by the overall reshaping of the city.



Appendix A

Conflict Study - Sarajevo

Exploratory Model: BiH Offensive towards Serbian reconnaissance positions on Mount Trebevic consisting of the Olympic Village. June 16, 1995.

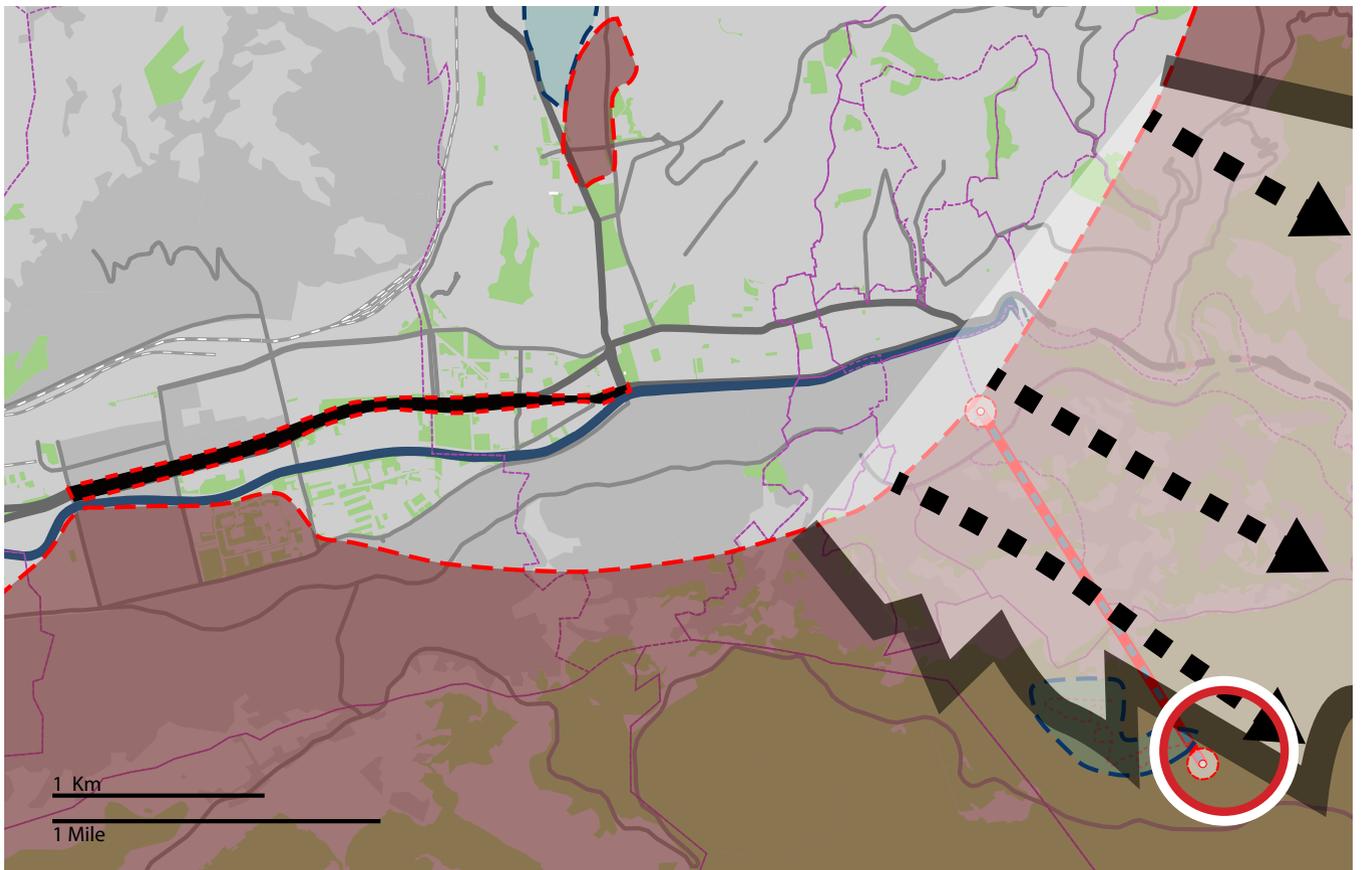


Fig A.0 - 1 BiH Offensive into VRS Territory - Aerial Map of Incursion.



Fig A.0 - 2 BiH Offensive into VRS Territory

Conflict Study - Sarajevo

Exploring the damage on the Olympic Village house and forensically restoring it, determining the structural elements and the possibilities of weapons used on certain parts of the building.



Fig A.0 - 3 Olympic Village house used as an example for forensic study.



Fig A.0 - 4 Olympic Village house used as an example for forensic study.

Conflict Study - Sarajevo

Case Study 1, Redesigning the Damaged House



Fig A.1 - 1 Olympic Village house used as an example for forensic study.

Concept 1



Concept 2



Concept 3



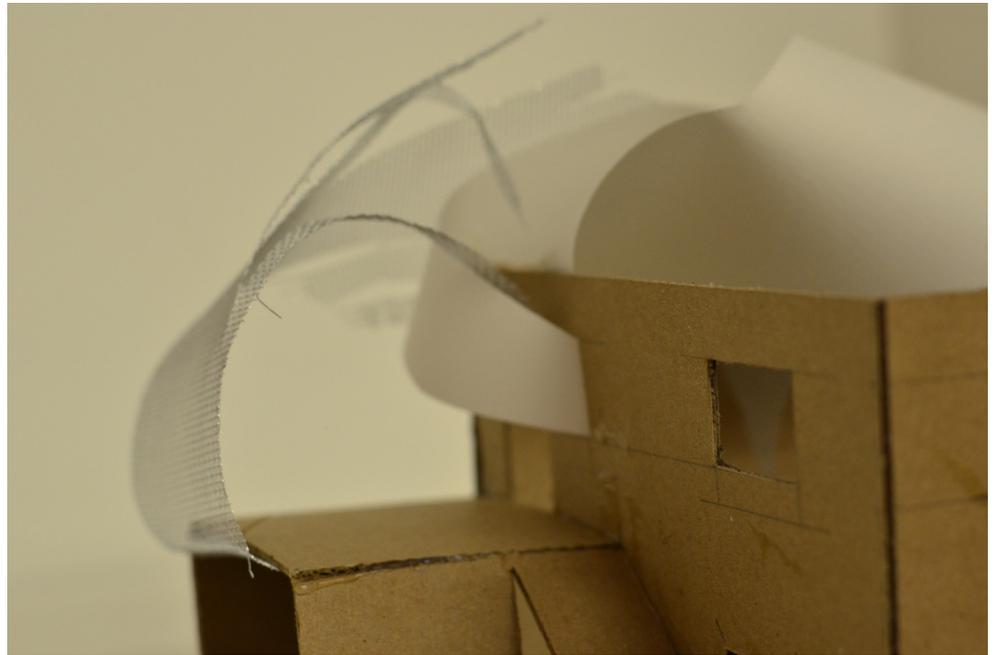
Fig A.1 - 2 1:100 Scale Models of the Olympic Village House for the purposes of redesigning.

Conflict Study - Sarajevo

Concept #1: Ideation of producing defensive architecture that allows for damage to be contained, and for it to occur away from essential structural elements.



Entrance Way



Window Cover

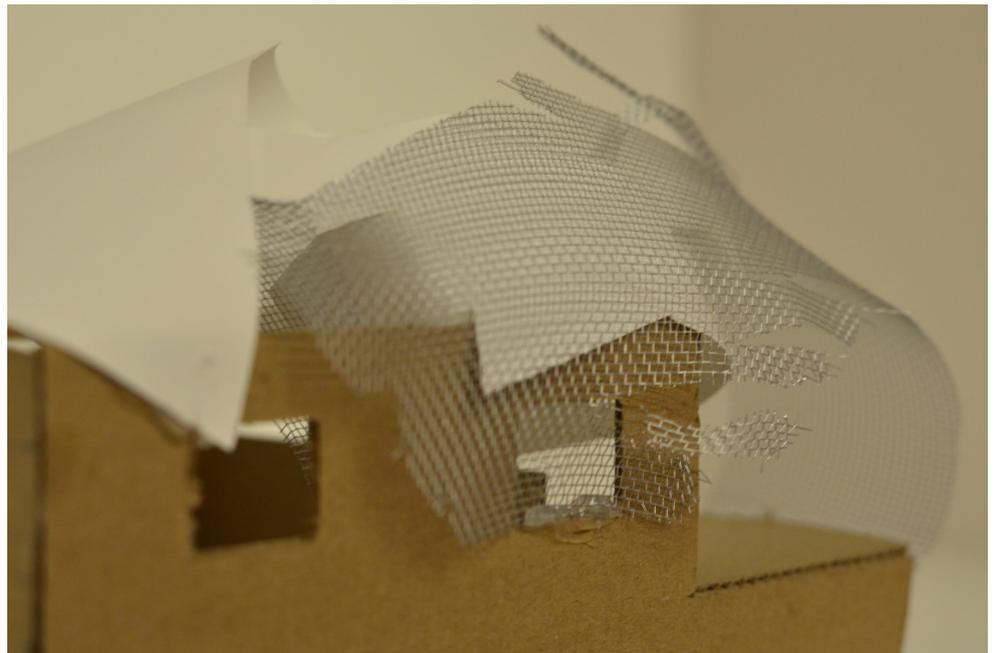
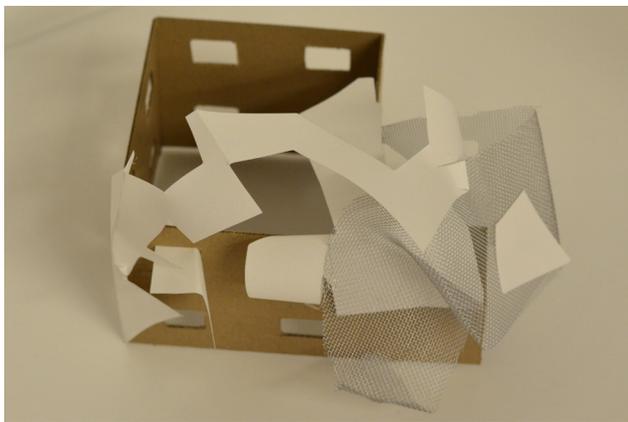
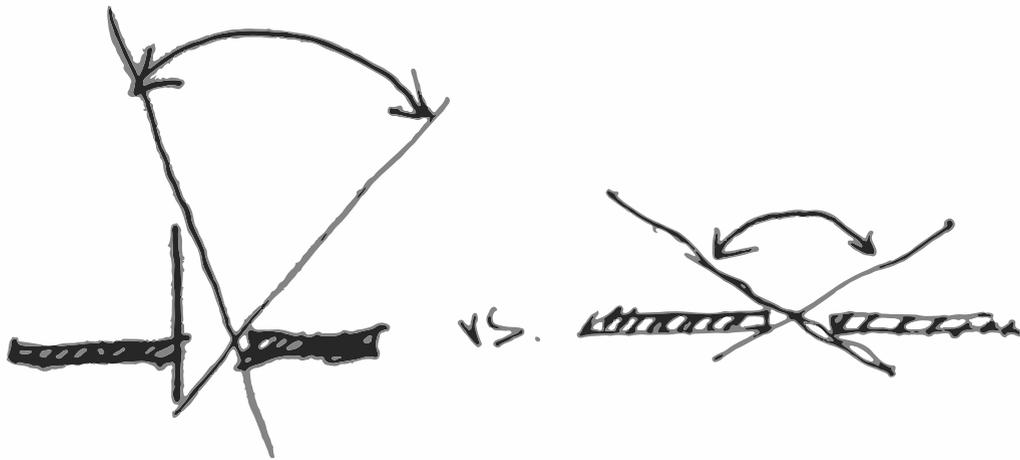


Fig A.1 - 3 1:100 Scale Models of the Olympic Village House Concept #1

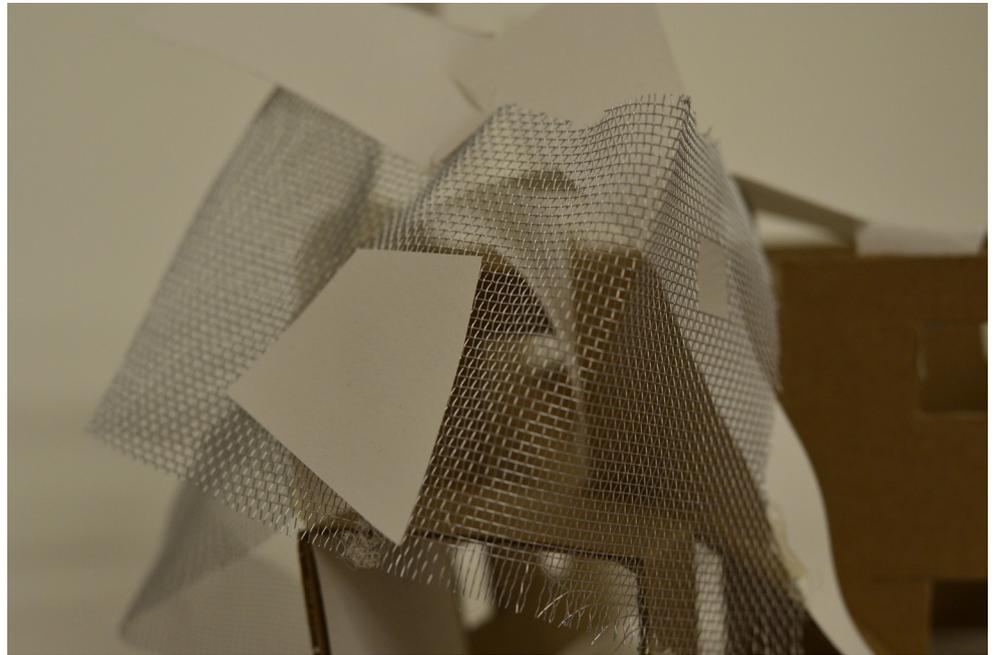
Conflict Study - Sarajevo

Concept #2: Attempting to narrow angles of sight, allowing for the reduction of views from the outside.



Concept 2

Entrance Way



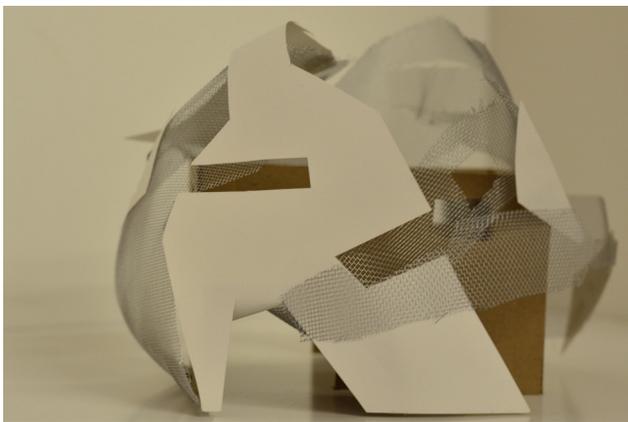
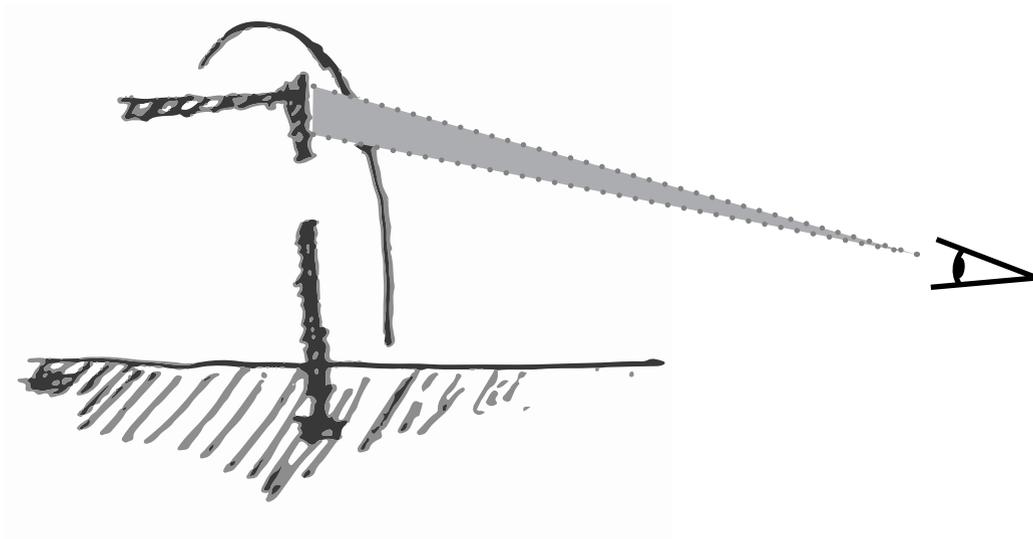
Window Cover



Fig A.1 - 4 1:100 Scale Models of the Olympic Village House Concept #2

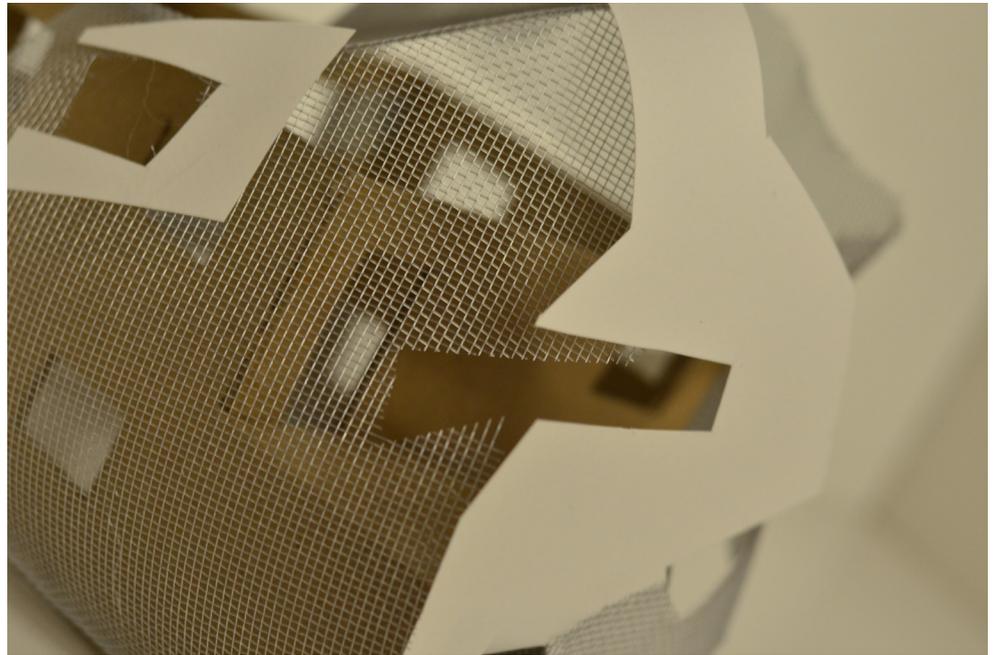
Conflict Study - Sarajevo

Concept #2: Blurring the envelope, allowing for targeting the important parts to be more difficult.



Concept 3

Entrance Way



Window Cover

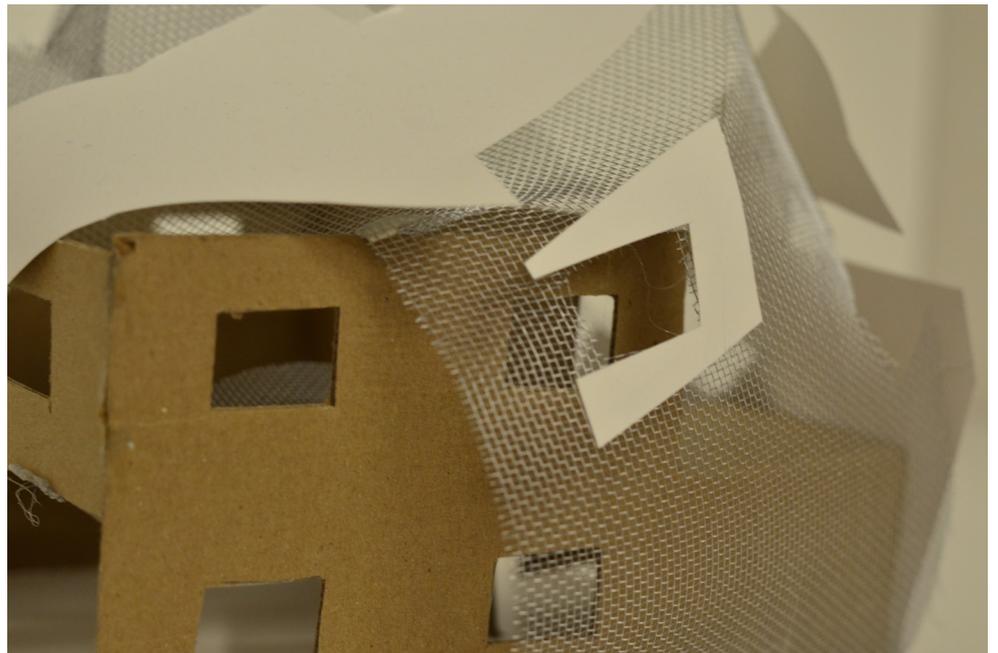


Fig A.1 - 5 1:100 Scale Models of the Olympic Village House Concept #3

Appendix B

Exploratory Models: Designing Voids

Exploratory Models: Designing form and space through the use of voids. This direction comes from the aspect of conflict changing architecture and urban space through the use of destruction/deconstruction.



Fig B.1 - 1 Plaster "Eggs" created through the use of pouring plaster and water into balloons allowing them to harden which creates voids within solids. This was a precursor to designing voids as these are completely out of control.



Exploratory Models: Designing Voids

Exploratory Models: Constructing solids within a box, then pouring plaster into the box which allows the removal of the solids creating voids and spaces.

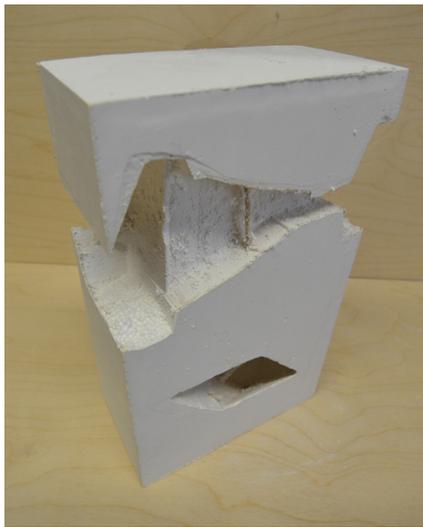


Fig B.1 - 2 Plaster filled boxes with styrofoam geometries that get removed to provide spacial voids within the solid plaster.

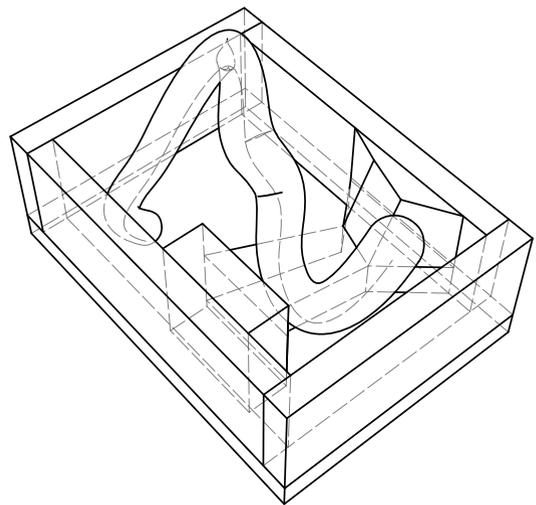


Fig B.1 - 3 Schematic of solids (prior to pouring the plaster) which when removed, becomes the voids.

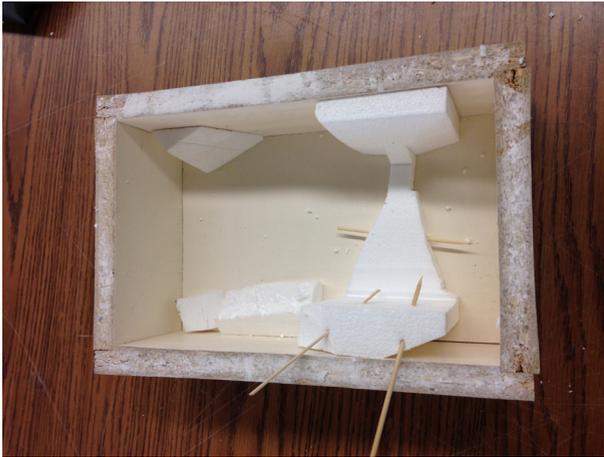


Fig B.1 - 4 Process of producing each plaster pour with designed void spaces.

Exploratory Models: Designing Voids

Exploratory Models: Constructing solids within a box, then pouring plaster into the box which allows the removal of the solids creating voids and spaces.

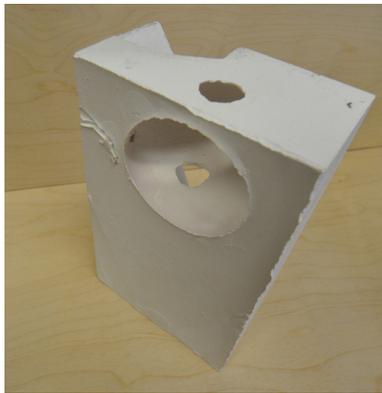


Fig B.1 - 5 Final Product using Water Balloons and Solid Styrofoams to design the voids.

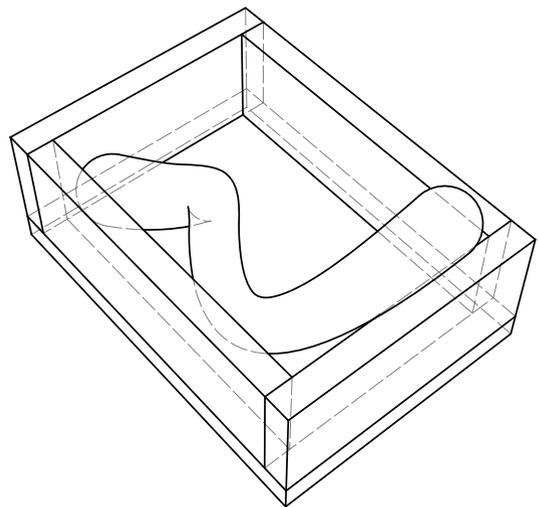
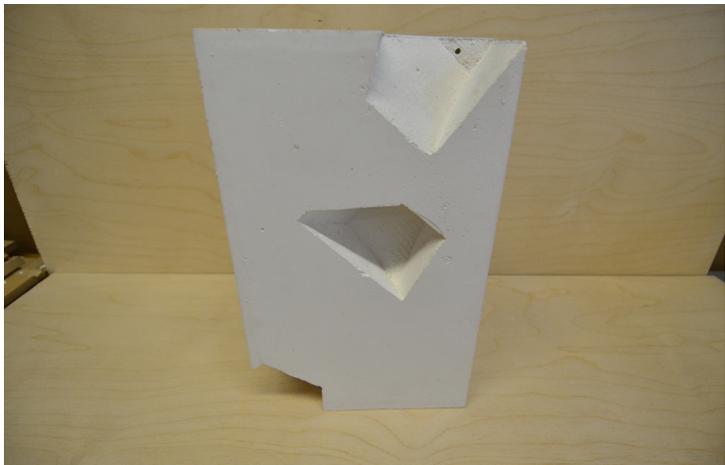


Fig B.1 - 6 Plaster "Eggs" created through the use of pouring plaster and water into balloons allowing them to harden which creates voids within solids. This was a precursor to designing voids as these are completely out of control.



Exploratory Models: Designing Voids

Exploratory Models: Constructing solids within a box, then pouring plaster into the box which allows the removal of the solids creating voids and spaces.

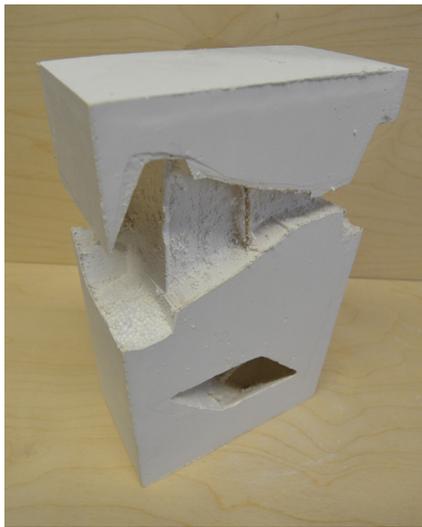


Fig B.1 - 7 Plaster filled boxes with styrofoam geometries that get removed to provide spacial voids within the solid plaster.

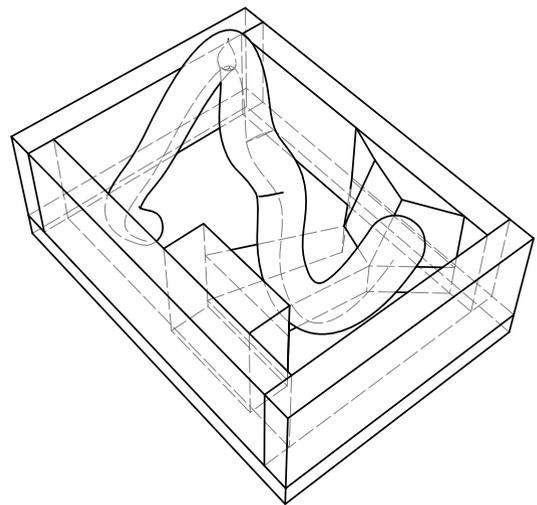


Fig B.1 - 8 Schematic of solids (prior to pouring the plaster) which when removed, becomes the voids.



Exploratory Models: Designing Voids

Exploratory Models: Constructing solids within a box, then pouring plaster into the box which allows the removal of the solids creating voids and spaces.

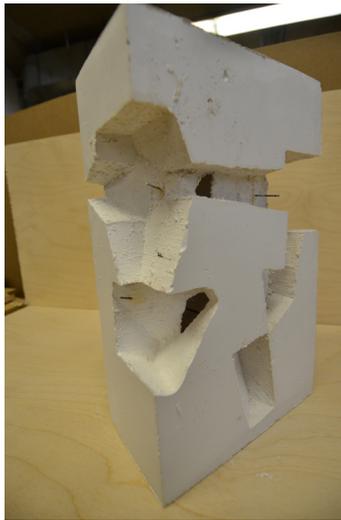


Fig B.1 - 9 Plaster filled boxes with styrofoam geometry's that get removed to provide spacial voids within the solid plaster.

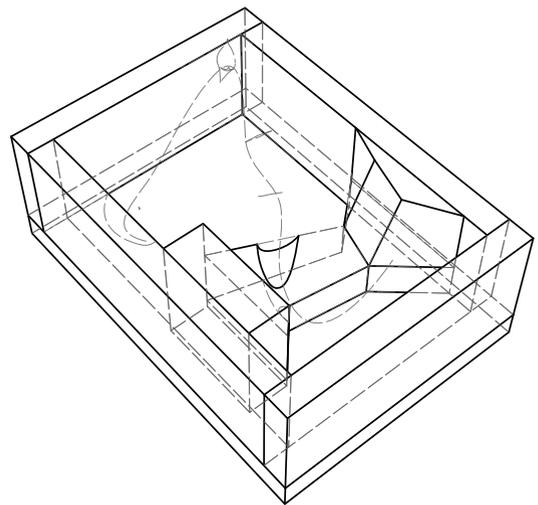
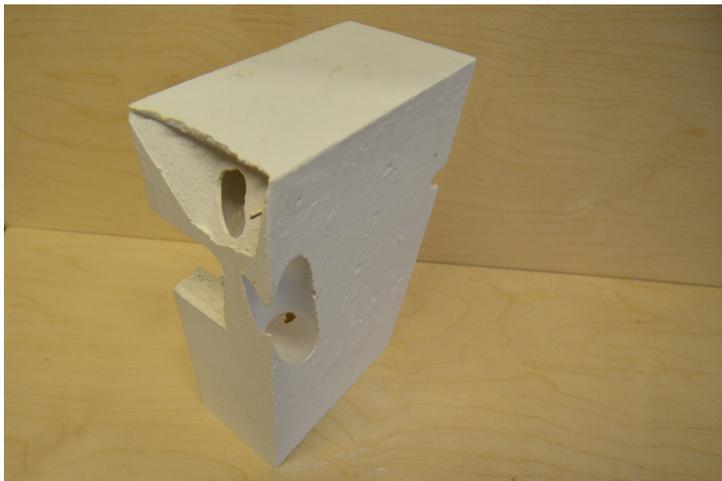


Fig B.1 - 10 Schematic of solids (prior to pouring the plaster) which when removed, becomes the voids.



Appendix C

Inversion Study - Sarajevo

A major site condition that is extremely inverted that is also part of the Olympic heritage of Sarajevo is the Stadium in the central north of Sarajevo that once was used for a national sports purposes, is now used as a graveyard for the dead. The burial site was used during the conflict and during burial ceremonies, mortars were also launched and killed sarajevans observing funerals.



Fig C.1 - 1, 2 Images of the U.N. using the Stadium as a launching station, and the surrounding area being used as a grave yard due to lack of land in the city for all the dead.

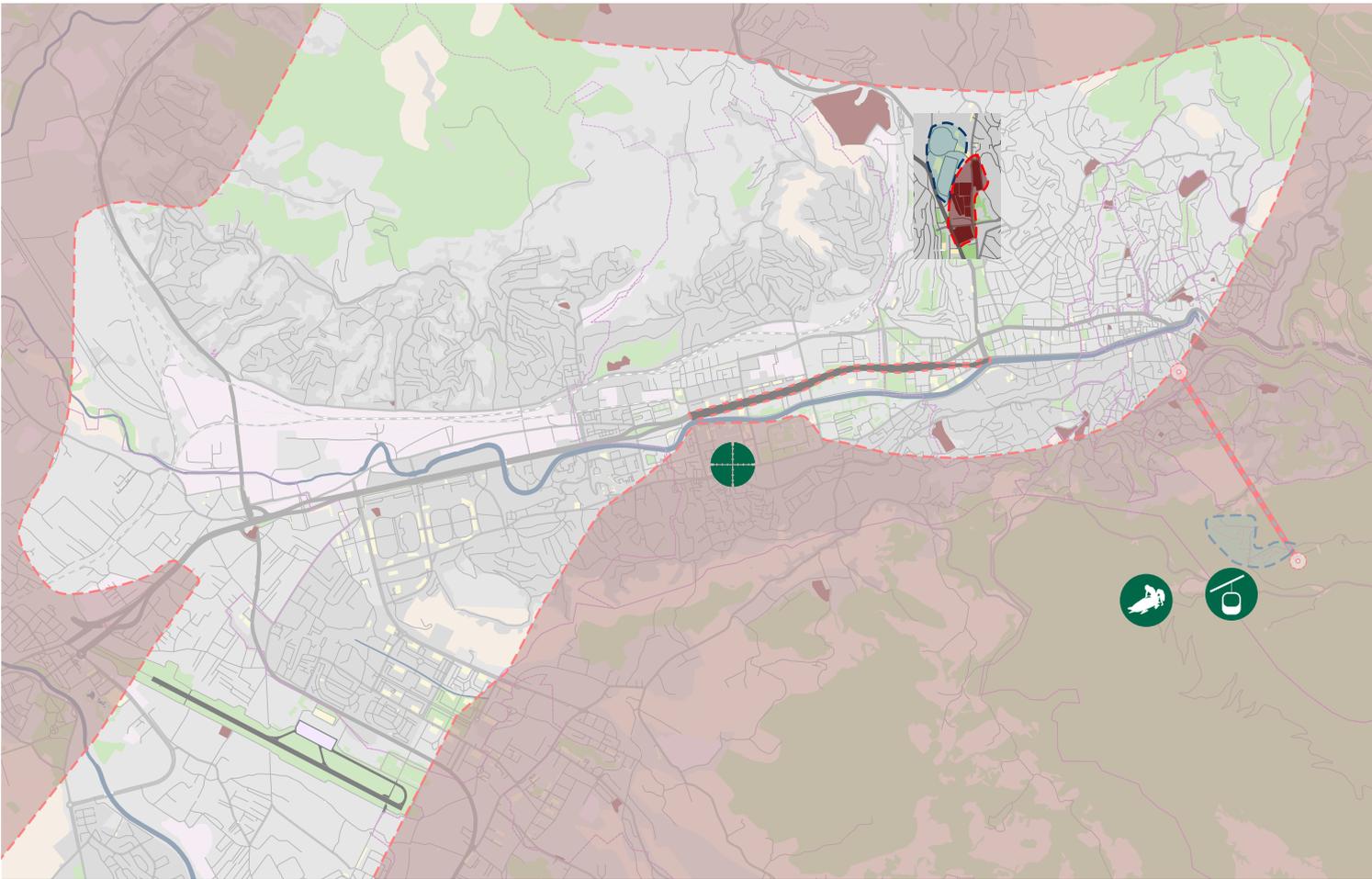


Fig C.1 - 3 Location of the Graveyard and Stadium



Appendix D

Conflict Study - Sniper Alley

Primarily a shadow study, to look at how tunnels were created in space producing a lattice work of hazard versus safe zones of movement for the citizens of Sarajevo. By producing a scaled model of the space, it is possible to look at the sniper's range and reach.



Fig D.1 - 1 1:2000 scale model of the site with 3 sniper towers (2 of them are working when the pictures were taken for the purpose of the book).

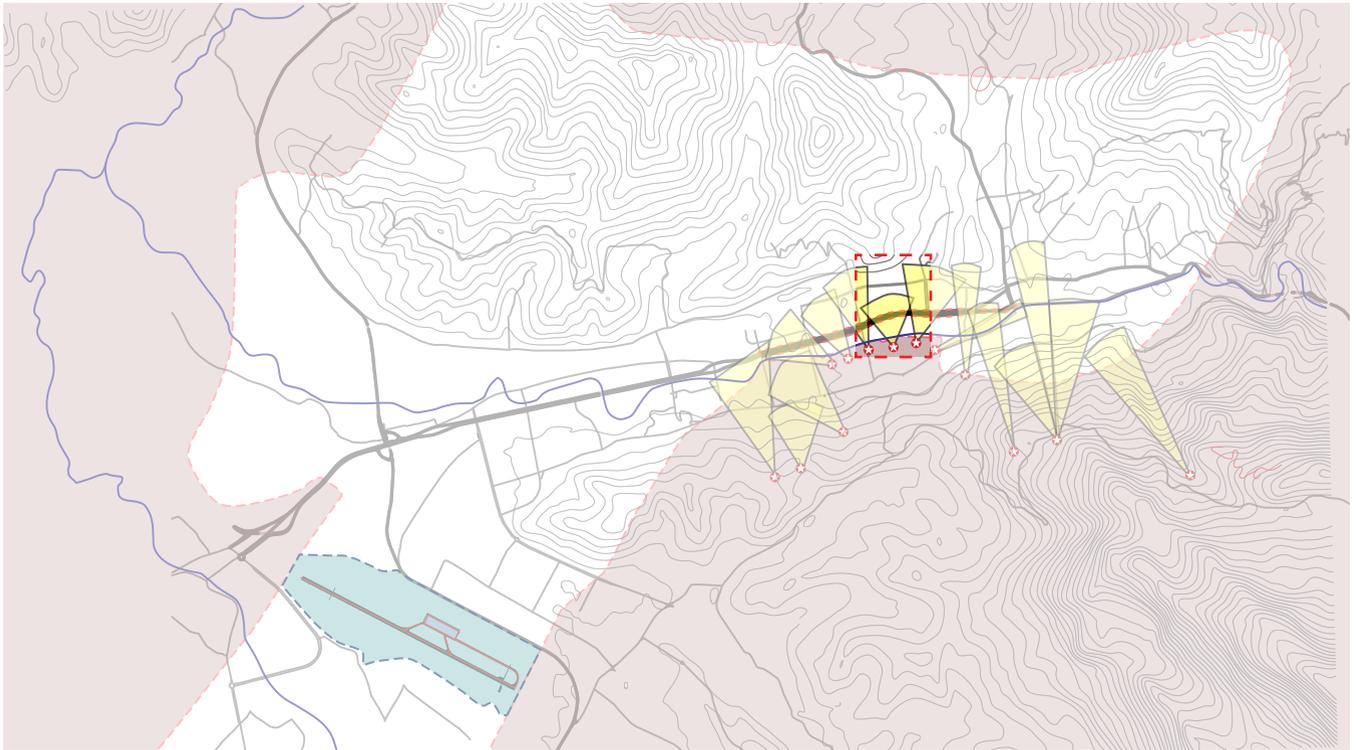


Fig D.1 - 2 Site map showing locations of snipers and their field of fire.

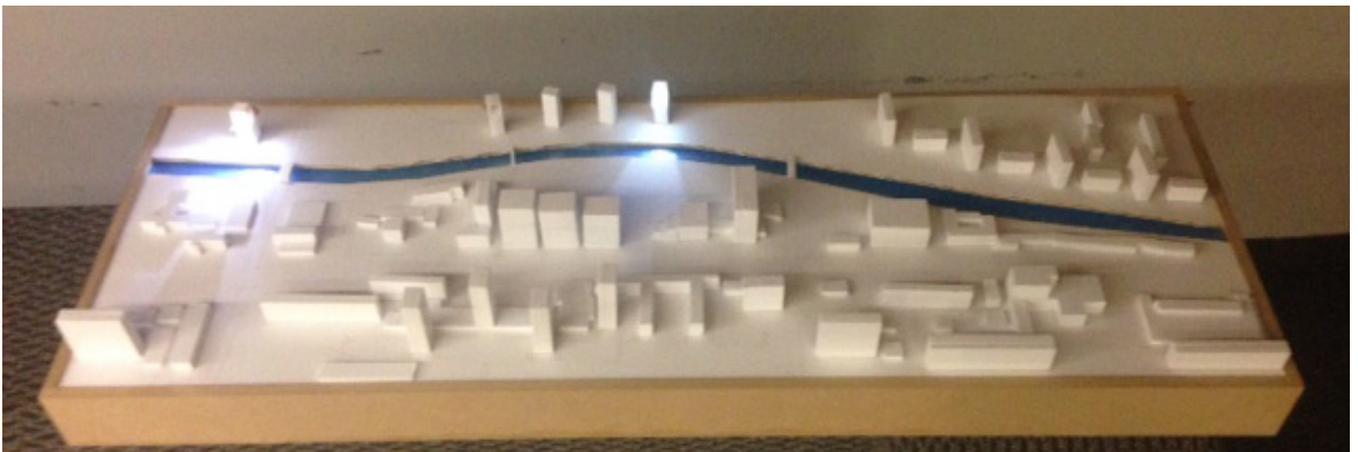


Fig D.1 - 3 1:2000 scale model of the site with 3 sniper towers (2 of them are working when the pictures were taken for the purpose of the book).

Conflict Study - Sniper Alley



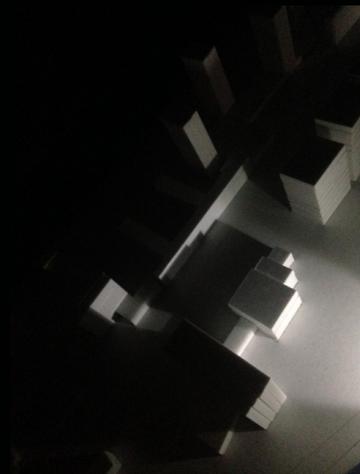
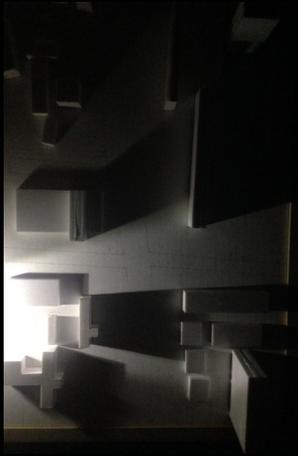


Fig D.1 - 4

Specific Shadow study conditions of the sniper alley displaying the safe spaces being dark while the spaces lit up are considered danger zones.

Architectural Panels

Attempting to make architecture drawing tangible, the process of producing these physical drawings as memories that can exist past the purpose of the thesis. This is about exploring how drawing can become physical and experimenting with material and process to produce architectural objects that are both drawing and sculpture.

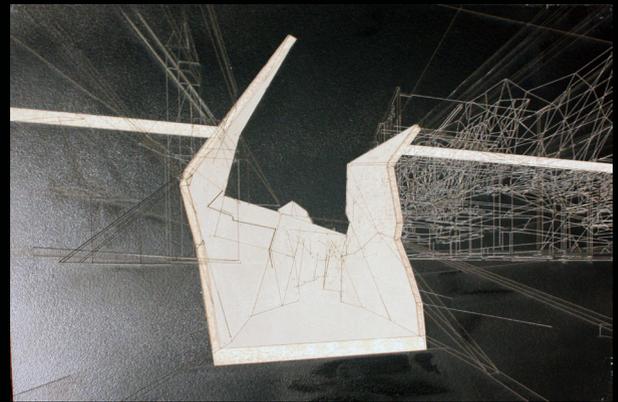
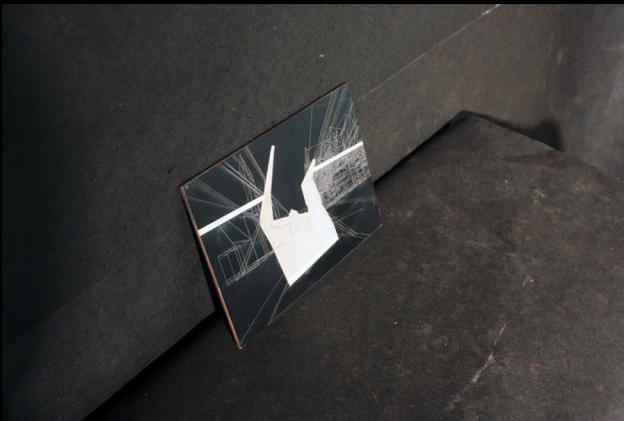


Fig E.1 - 1 Panel #1 produced using samples of Fundermax Exterior Laminate Panels. This panel explores drawing the entrance tunnel as a tangle architectural drawing.



Fig E.1 - 2 Panel #2 produced using samples of Fundermax Exterior Laminate Panels. This panel explores drawing the tunnel that uses holes to produce beams of light rays that visitors walk through.

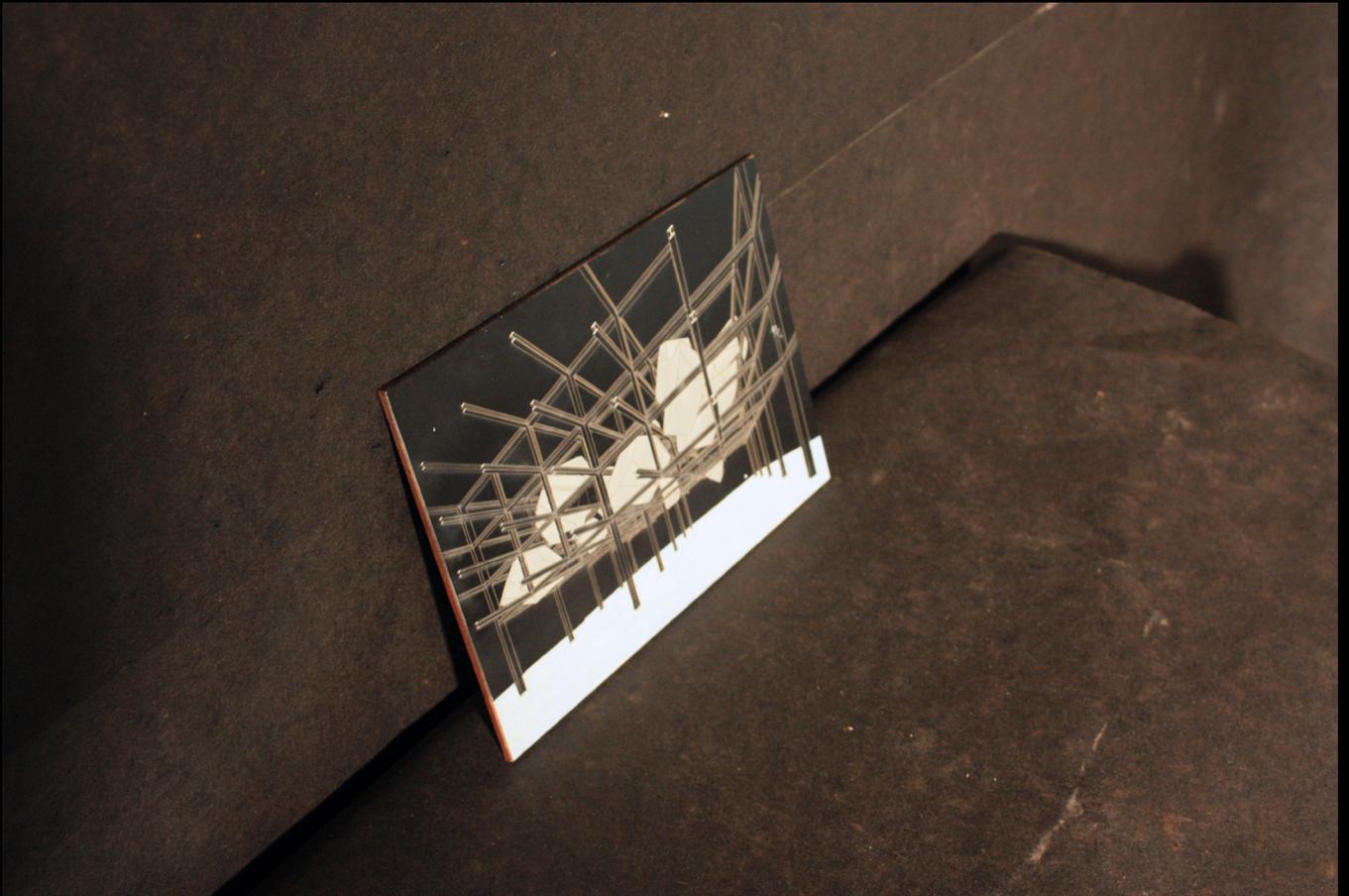


Fig E.1 - 3

Panel #3 produced using samples of Fundermax Exterior Laminate Panels. This panel explores drawing the memory lattice and the reflective pond below. The following page is a close up shot of this panel.





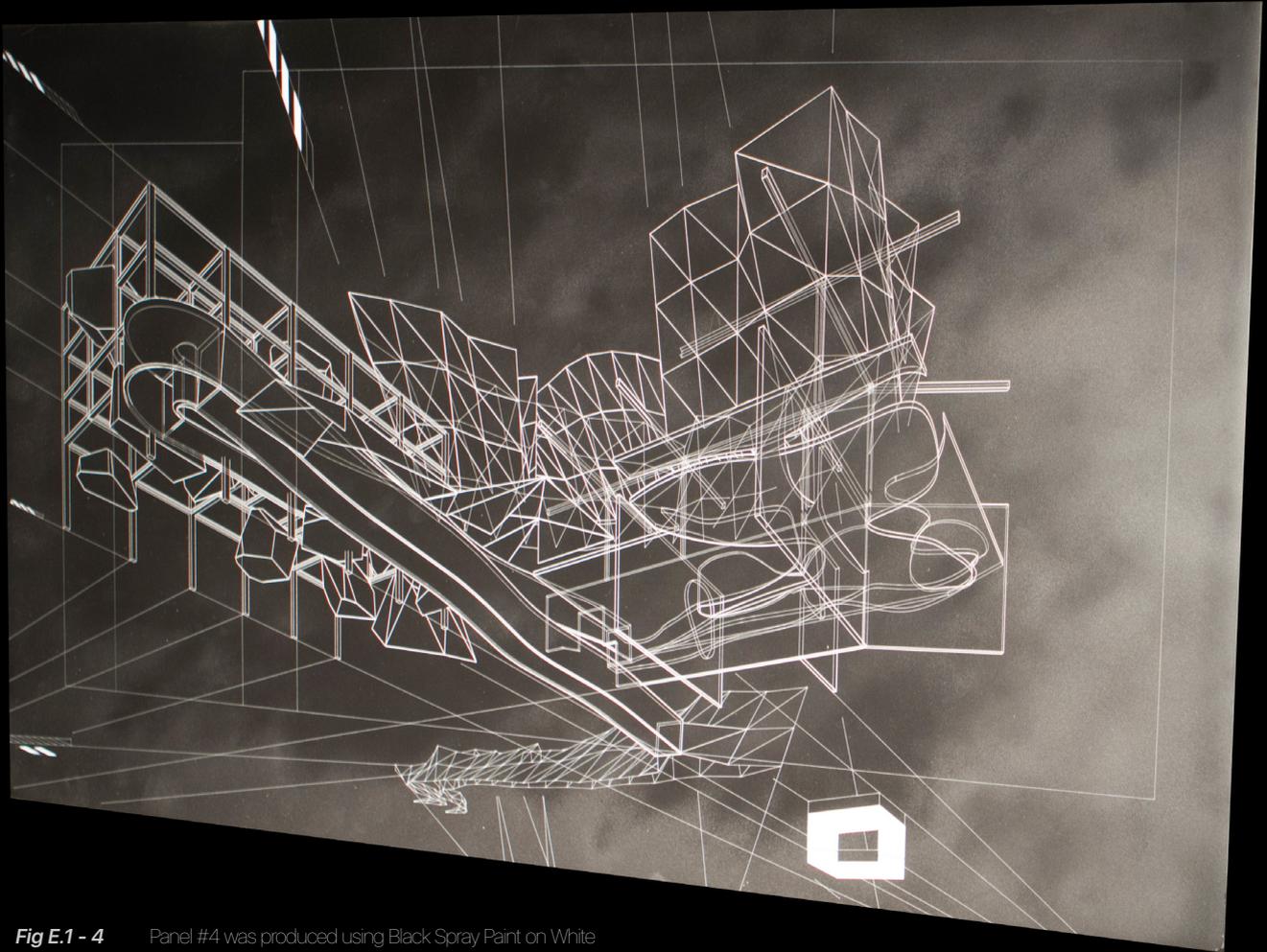


Fig E.1 - 4 Panel #4 was produced using Black Spray Paint on White Corian with laser etched lines. This panel depicts lines of energy depending on the tunnel within the project.

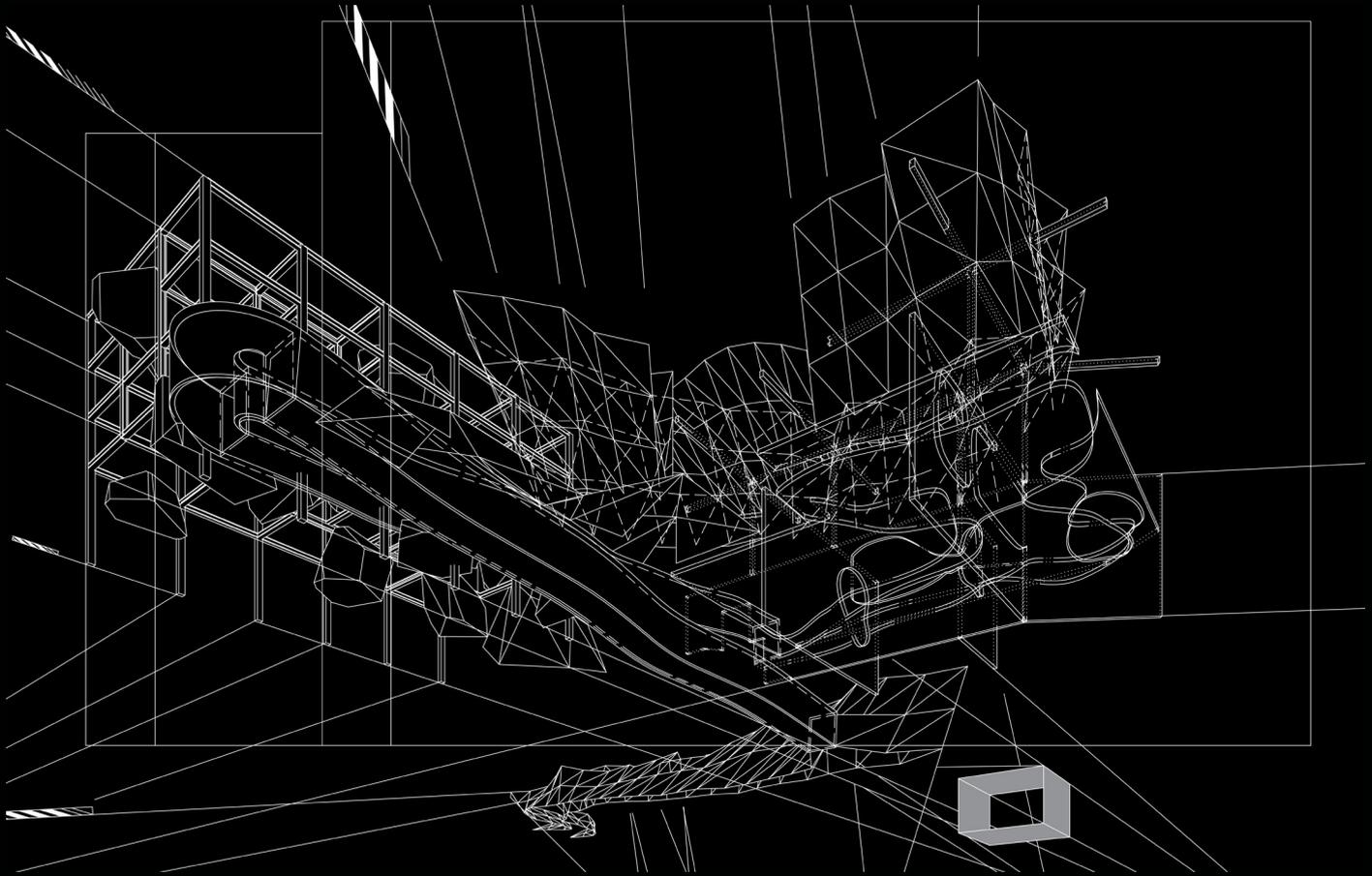


Fig E.1 - 5 The line drawing that the panel is based on. This file was fed into the laser cutter for etching and rastering of the spray painted panel.

1:250 Site Model

Part of the final defence presentation work included a 1:250 scaled site model. The thesis project was 3-D printed with the cladding of the existing building created in such a way that it could be removed to see the building's interior tunnel spaces.

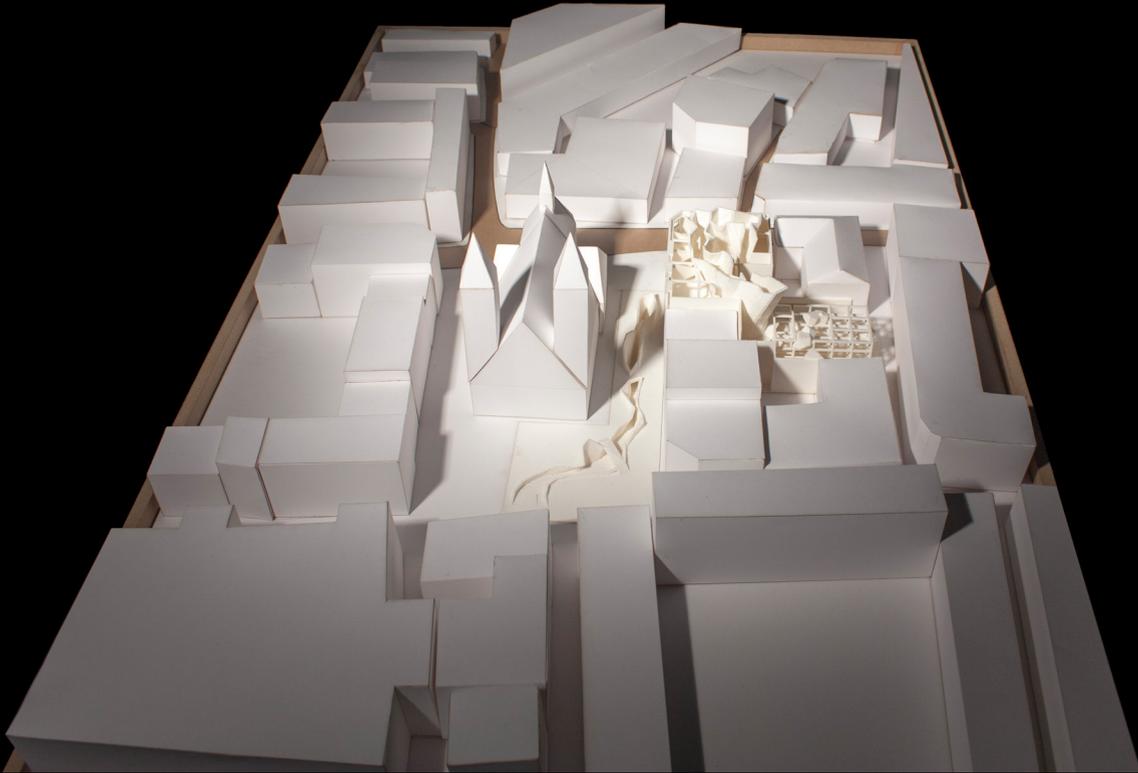




Fig F.1 - 1

Site Model showing the main square and the cathedral right behind the main tunnel entrance. The tunnel and the building were 3-D printed.

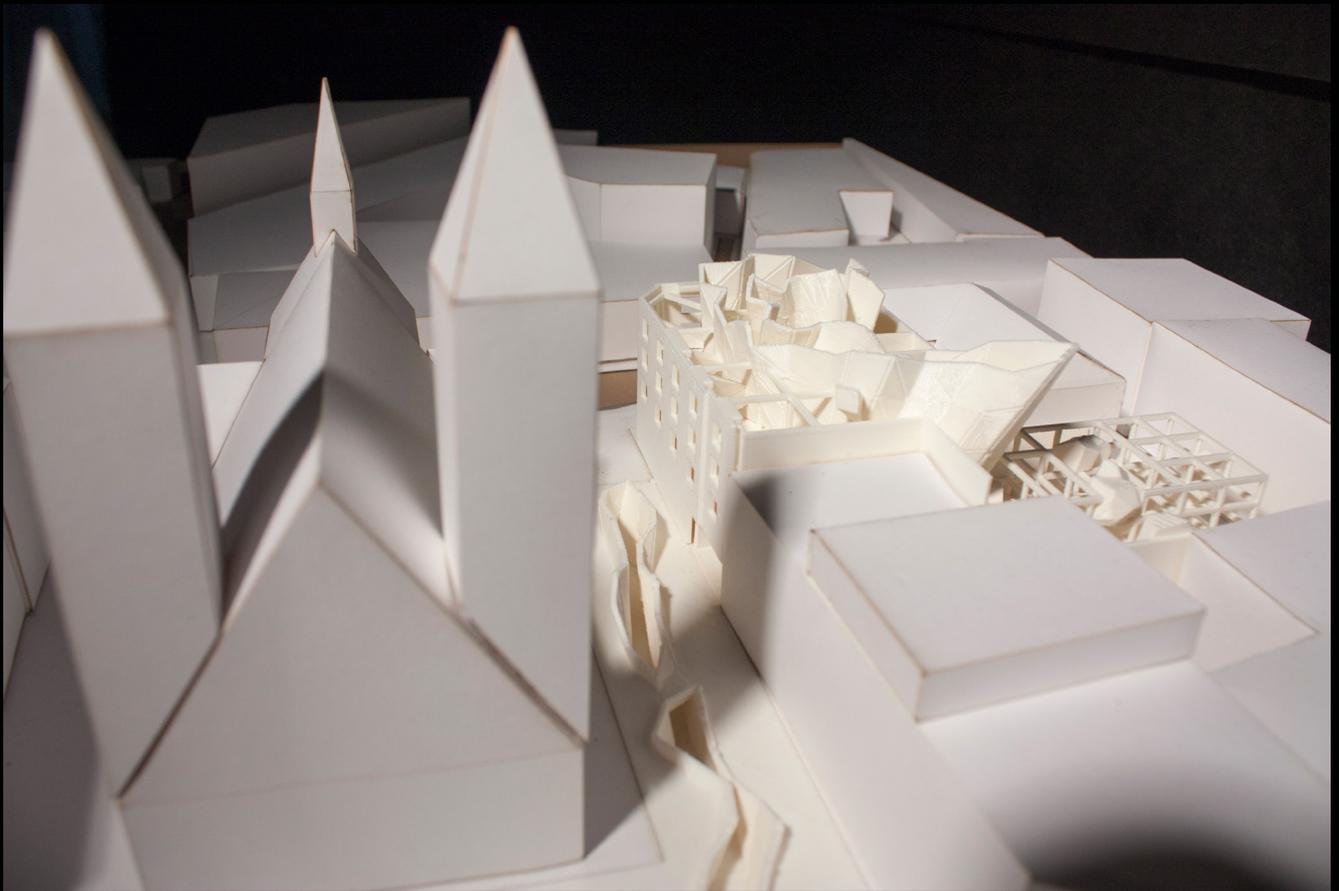


Fig F.1 - 2 View of the underground tunnel leading to the building.



Fig F.1 - 3

View of the outside of the thesis building. Note: The 3-D printed model does not have the second storey windows boarded up as is proposed due to material consideration.



Fig F.1 - 4 Aerial view of the site.



Fig F.1 - 5 Plan view of the roof shard and the memory matrix with the adjoining waterfall area.



Fig F.1 - 6 Rear view of the memory matrix and the waterfall.

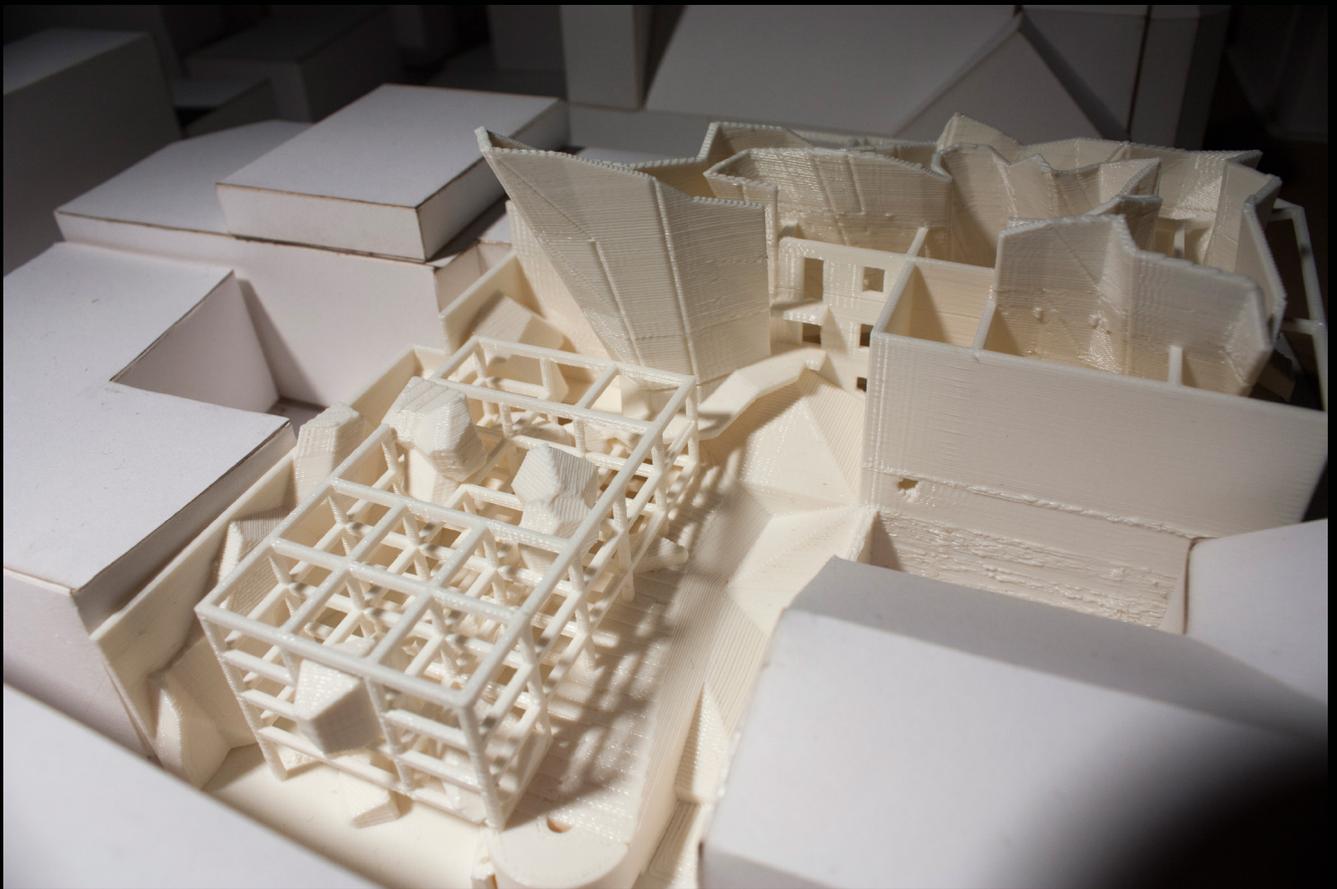


Fig F.1 - 7 Aerial view of the site showing the triangulation of the waterfall area.

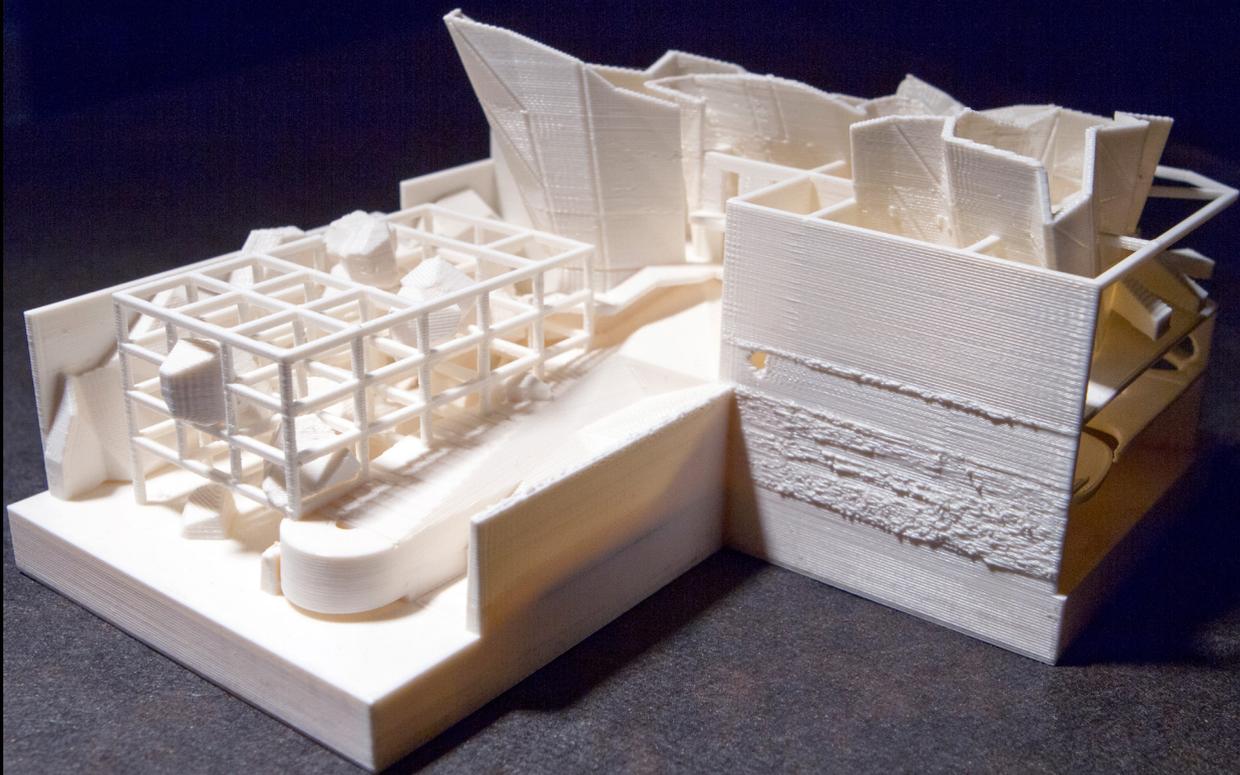


Fig F.1 - 8 View of just the 3-D printed building without the site from the rear.



Fig F.1 - 9 View of the front of the 3-D printed building without the site or the front facade plate.

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