

**The Architecture of Memory:
Creating Personal Memory Within the Collective**

by

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Submitted in partial fulfilment of the requirements
for the degree of Master of Architecture

at

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DALHOUSIE UNIVERSITY
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Abstract

This thesis explores the theoretical, psychological, and phenomenological notions of the singular personal memory and the collective memory through civic architecture. The main design guidelines are inspired by the ancient teachings on the mnemonics of rhetoric and the phenomenology of the imagination.

This thesis uses architecture and space as a medium to be an interpretive tool of narrating the sequential event of the Halifax Explosion of 1917. Architecture as an art form can deliberately be created to mimic, represent, and express key moments of an event, which when experienced individually through the duality between body, memory, and light, the personal memory becomes the primary mode of story-telling. The civic collective memory is always changing dependent on time and intentional involvement. These processes are recorded through theoretical texts, drawings, and physical models that serve as interpretive tools for the haptic dialectics of memory, imagination, phenomenology, and the play on atmospheric emotions.

Acknowledgements

This thesis is dedicated to all the victims of the Halifax Explosion – the 2,000 lives that were lost instantly, and all the survivors who lived on to tell their personal stories which makes up history as we know it today. May your memories continue to be retold and preserved in every generation, and that Halifax and the world will commemorate the tragedy that occurred even after 100 years.

Many great thanks to Susan Molesky and Robert Collins for your continual insight, direction and wisdom.

Thank you:

To the Lord for all the blessings He has given unto me.

To my family Samuel, Vivian, Nixon, and Petrie for your unfailing love, support, patience, and encouragement throughout these 10 years seeing my dream come true.

To all my dear friends for your understanding and loyal friendships.

To Mark, for your heart. Thank you for always believing in me.

Chapter 1: Introduction

Thesis Question

What is the meaning of memory in architecture? In what ways can architecture be created as a mode to recall architectural experiences and emotions of both the personal and collective memory?

Theoretical Context and Precedent

Civic Architecture: Tragedy and Disaster

The 21st century has seen a rise in a new genre of architecture that focus on the theme of tragedy and disaster. These new buildings have become a tool for education and a container for memories of a historical past. According to Aristotle, tragedy differs from history in the sense that history deals with something that has happened, whereas tragedy deals with interpretation. In *The Tragic in Architecture*, Richard Patterson describes tragedy as:

The mechanical, inevitable result of actions based on human error and illusion. It is not simply the fact of death that is tragic, but its impact in a defined poetic context. Tragedy occupies the threshold between what is really going on but is unnoticed, and symbolic representation.¹

The tragic leaves out a substantial amount of realistic detail and is not, in fact, a representation of the world as it actually is but is of certain events or actions presented in terms of their significance for a particular subject.²

1 Richard Patterson, *The Tragic in Architecture; Architectural Design* 147 (London, England: Wiley-Academy, 2000), 38.

2 Ibid., 7.

Civic architecture is different from public architecture in that it is concerned with the sense of social responsibility and an aim to commemorate or express human tragedies through social inclusion. Within the realm of civic architecture, the tragic as a genre deals with significance and cultural thought over form and style; it can be expressive to inspire and saturate the observer with an emotion. Civic architecture bring people together as one and becomes a shared collective experience that must be memorialised and eternalised.

Buildings and memorials dedicated to World War II and the Holocaust are two of the most prominent examples of tragedy in architecture. Three examples that explore tragedy as an extreme form of representation and narrative in architecture include:

Peter Eisenman's Memorial to the Murdered Jews of Europe (Berlin, Germany), Daniel Libeskind's Jewish Museum (Berlin, Germany) and Maya Lin's Vietnam Veterans Memorial (Washington, USA).

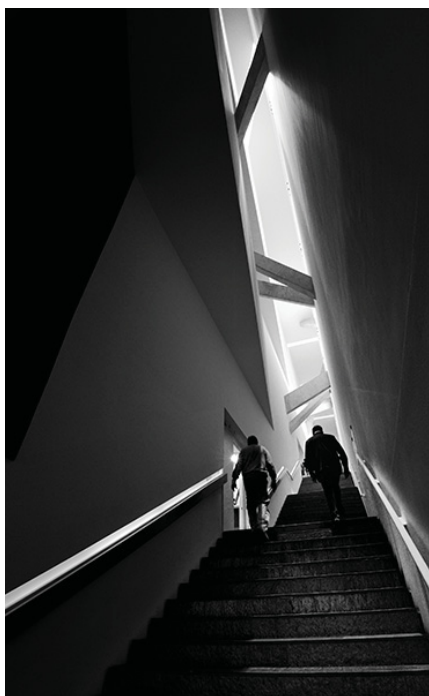


Peter Eisenman's Memorial to the Murdered Jews of Europe. Berlin, Germany. Source: Mauritzen/Maufoto, Brian Jagd, *Tangible Information*.

Eisenman's memorial consists of 2,711 concrete slabs that represent the six million murdered Jews. Arranged in a grid pattern on a large sloping field, each slab varies in height of 0.2 to 4.8m dwarfing the human. Despite the controversial design of the memorial, Eisenman's intention was to generate an uneasy, disorienting and disturbing atmosphere. The multitude of slabs symbolizes a supposedly ordered system that has lost touch with human reason. Eisenman has successfully created the haptic atmosphere through his design by using the external

phenomena of sunlight, form and shadows. On the contrary, his abstract form of representation was not positively interpreted with the same perception as the public with most people were appalled as they saw the slabs as an imitation of coffins. The memorial allows a group of people to participate but produces individual personal experiences, opinions and perceptions. Eisenman says, "It stands there, silent, the one who has to talk is you."³

Libeskind's museum focuses on the narrative memory of Berlin as a city. The narrative begins as an underground route with three pathways, each of which tells a different story. Libeskind designed larger spaces within the building for exhibiting the collection of information, as well as spaces that focus on the individual personal experience. He uses architecture to initiate emotional responses by focusing on the human senses and bodily movement. There are four spaces that serve as examples in his building. Firstly, the visitor must climb the long passage up the Stair of Continuity that emphasize the continuum of history. In this space, Libeskind engages the body and focuses on the passage of light within the staircase. Secondly, the Memory Void is the only void in the building that can be entered. It is filled with Menashe Kadishman's Fallen Leaves Installation⁴ containing 10,000 coarse



Rooms within the Jewish Museum: Stair of Continuity; The Fallen Leaves installation. Berlin, Germany. Source: *Daniel Libeskind Studio*.

³ Jon Brunberg, *Holocaust Memorial: Architect Peter Eisenman*, Berlin (website), 2005 (retrieved June 8, 2012), available from <http://www.war-memorial.net/Holocaust-Memorial--Architect-Peter-Eisenman,-Berlin-2005-2.66>.

⁴ *Daniel Libeskind Studio* (web site), 2011 (retrieved June 7, 2012), available from <http://www.daniellibeskind.com>.

iron faces that represent all the murdered Jews and victims of violence and war. Visitors are invited to walk on the faces and listen to the sounds and echoes created by the metal sheets hitting against one another. Thirdly, the Garden of Exile and Emigration symbolize the remembrance of those who were forced to leave Berlin. Atop the 49 pillars grows oleasters (Russian olives) that symbolize hope. The fourth space leads to a dead end in the Holocaust Tower. The 24 meter vertical concrete void is neither heated nor cooled but has a single slit on the roof to let in light. It is an empty space that expresses human hopelessness. Within these four spaces, Libeskind has created experiential situations through architectural narration with the intention of conveying a certain message through architectural form and spaces. Even though each visitor will experience the building and interpret the spaces in their own personal manner, the larger encompassing message is clear.



Rooms within the Jewish Museum: The Garden of Exile and Emigration; Holocaust Tower. Berlin, Germany. Source: *Daniel Libeskind Studio*.

Lin's memorial to the Vietnam veterans consist of two black granite walls placed below grade with the names of the veterans engraved in chronological order. At the apex of the meeting of the two walls are the two dates marking the beginning and the end of the war, representing the closing of the time span. Lin's concept for the memorial was to create an open wound in the earth to symbolize the loss of the soldiers. The design raised many political discussions and became very controversial as it was an unconventional and non-traditional design for a war memorial in America. The black polished granite walls were sourced from India and were chosen for



Vietnam Veterans Memorial.
Source: Dellanira Castandea,
Hello World: Maya Lin.



A veteran at the memorial wall.
Source: Crystal Cavin, *Milpages:
Traveling Vietnam Veterans
Memorials Bring The Wall To
Everyone.*



The orator and his 'eye of
imagination'.
Source: Frances A. Yates, *The Art of
Memory*, image 16

their incredible reflective quality. The idea that a returning veteran can find his or her own time upon the wall and see their own reflection against a list of names has made each person's experience of the memorial very personal and individual while being an icon for history and the state.⁵ Over time, people have brought with them personal tokens to leave at the wall in the memory of their loved ones. Now the memorial has become a place of pilgrimage for relatives and friends of the American casualties.

The Art of Memory

What is memory? Memory is the faculty in the mind that recalls what has happened. When we return to a place after a considerable absence, we not merely recognize the place itself but remember the things we did there and recall the persons who we met and even remember the unuttered thoughts which passed through our minds when we were there before.⁶

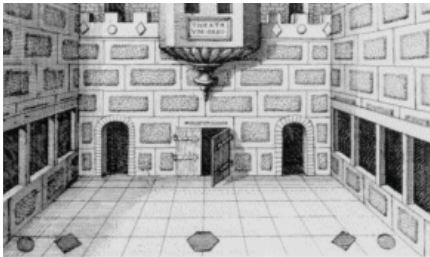
The Art of Memory (in Latin, *ars memorativa*) was created during the first millennium BCE in ancient Greece. This art form was believed to be given to the Greeks by their goddess mnemosyne (Memory – mother of the Muses). The first and original memory treaty was written in Latin by an unknown Greek author. Marcus Tullius Cicero (circa 86-82 BCE) rewrote the treaty, made additions to it and entitled it 'Ad Herennium'. Over time, the original treaty became lost and Cicero's version is the only remaining trace

5 *Maya Lin Studio* (web site), 2012 (retrieved June 8, 2012), available from <http://www.mayalin.com>.

6 Frances A. Yates, *The Art of Memory* (London: Random House, 1992), 37.

of the oldest surviving Latin book on rhetoric.

Memory was associated as a method with training in rhetoric and logic. Until the invention of the printing press in the 14th century, the main form of acquiring and sharing information was by word of mouth since most people were unable to read or write. Once, after one has seen a play or heard a story, the only way to remember it was to store it in the memory. In ancient Greece, crowds would gather daily to hear one man speak at public assemblies. This man, the orator, appeared to be ordained with a god-given special talent of speaking but in fact, he was trained in the development of an art form with specific techniques that involved the faculty of memory. This new art form was called 'artificial memory'. The techniques involved creating a series of 'places' and 'images' in the mind so that the orator was able to deliver long speeches from memory with unflinching accuracy. Using his imagination, the orator would construct a mnemonic place system using architecture. He moved through his artificial memory building while he was making his speech, drawing from the memorized places and images he had placed on them. This method ensured that the points were remembered in the right order, since the order is fixed by the sequence of places in the building. Thus, a set of mnemonic principles and techniques was invented as a system of organization for the recalling of memory.



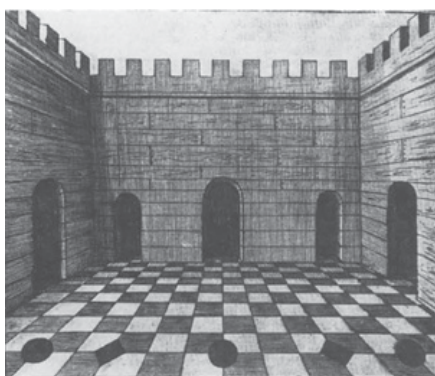
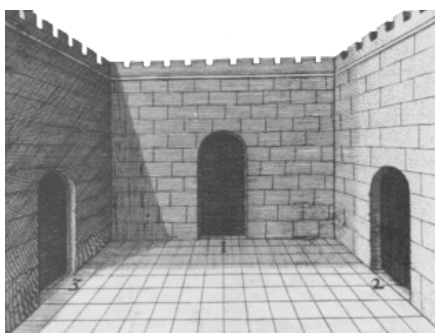
'The Theatre' as a memory place system for the memory of words and memory of things.

Source: Frances A. Yates, *The Art of Memory*, image 18.

Place ('loci') and Signs

In *The Art of Memory*, there are two main principles for creating artificial memory. Cicero denotes the

invention of an artificial memory system that involves the use of architecture and spaces. Firstly, a place (or 'loci') is required, either real or imaginary, to imprint on the memory. The human psyche knows from experience of being in the loci that the loci call up associations to the memory.⁷ Secondly, images or object must be invented as a form of representation to designate the facts themselves, thus, the advantages of artificial memory is that the multiple loci's are required to preserve the order of facts. *The Art of Memory* describes techniques which depend on visual impressions on an incredible intensity, that when one thinks of the place, sees the object, the mind would immediately see a vision that would bring thoughts to a speech.



'The Secondary Theatres' are subsidiary theatres to the main theatre. They are used as memory rooms.

Source: Frances A. Yates, *The Art of Memory*, image 19a and 19b.

Cicero writes:

Individuals who wish to train this faculty must select places and form mental images of the things they wish to remember and store those images in the places, so that the order of the place will preserve the order of the things, and the images of the things will denote the things themselves, and we shall employ the places and images respectively as a wax writing-tablet and the letters written on it.⁸

Signs are arranged as follows: first sign is placed in the forecourt; second in the atrium; and the remainder placed in order all around the impluvium, committed not only to bedrooms but to parlours and even to statues. This done, when it is required to revive the memory, one begins in the first place to run through all, one will be reminded by the image.⁹

The *Art of Memory* denotes two important elements to emphasize: association and order. Image or object

⁷ Ibid., 38.

⁸ Ibid., 49.

⁹ Ibid., 38.

association must be something similar, or contrary, or closely connected with what we are seeking¹⁰ so that we shall come upon it when recalling memory. We should seek to recover an order of events or impressions which will lead us to the object of our search, for the movements of recollection follow the same order as the original events.¹¹ The things easiest to remember are those which have an order (ie. math equations).

Image Creation

To create memory images in the mind, Cicero describes that the loci and signs must be well defined and clear. The object should not be ambiguous or banal or hidden in a dark place, but be lit with the right amount of light and set out in a clear order so that the mind's eye can identify them immediately.

One must employ a large number of places which must be well-lighted, clearly set out in order, at moderate intervals apart, and images which are active, which are sharply defined, unusual, and which have the power of speedily encountering and penetrating the mind.¹²

It is most curious that some images in the mind are incredibly strong and sharp while others are weak and feeble that hardly stimulates or trigger memory. According to *The Art of Memory*, there are four rules to create memory images:

1. Everyday things that are petty, ordinary, banal, we generally fail to remember them because the mind is not being stirred by anything novel or marvellous. However, if we see or hear something exceptional, dishonourable, unusual,

10 Ibid.

11 Ibid., 48.

12 Ibid., 38.

great, unbelievable, or ridiculous, we are likely to remember for a long time.¹³

2. Things immediate to our eyes or ears we commonly forget, yet incidents of our childhood we often remember best. Ordinary things slip from the mind but the striking and novel stay longer (e.g. lunar eclipses are a source of wonder because they rarely occur compared to solar eclipses, and then compared even to sunrises).¹⁴

3. We should set up images of a kind that can adhere longest in memory and establish similitudes as striking as possible; images that are not many or vague, but active; assign them exceptional beauty or ugliness; disfigure them so that its form is more striking. This will ensure our remembering them more easily. Things should not be too familiar because we wonder more at unfamiliar things and we hold on to them more strongly.¹⁵

4. The idea of helping memory by arousing emotional effects through striking and usual images, beautiful or hideous, comic or obscene.¹⁶ We must choose striking and unusual images as being the most likely to stick in memory. Places should be chosen in deserted regions because the crowding and passing to and from of people confuse and weaken the impression of the image while solitude keeps their outlines sharp.¹⁷

Memory and the Imagination

The five human senses are perceived first through our bodily impressions then treated or worked upon by the faculty of the imagination. Images from these senses form within the mind and become retained by the intellectual faculty. Similarly to the function of art, the imagination set the mind in motion to perceive the world in a different way. Imagination is the intermediary between perception and thought, from which all knowledge is derived from

13 Ibid., 25.

14 Ibid.

15 Ibid.

16 Ibid., 26.

17 Ibid., 86.

sense impressions.¹⁸ It is the image-making part of the soul which processes the thought and makes it possible to remember. Hence, “the soul never thinks without a mental picture.”¹⁹ Just as memory belongs to the same part of the soul as the imagination, memory is a collection of mental pictures from sense impressions but with a time element added, for the mental images of memory are not from perceptions of things in the present but of things in the past.

Phenomenology of the Imagination: The Poetics of Space

In Bachelard’s *Poetics of Space*, the reality of space is understood only through a poetic process involving the phenomenology of the imagination. The house encompasses the full spectrum of private memories both in reality and includes all the daydreams of the mind.

Bachelard utilizes ‘the house’ as a phenomenological study of the intimate values of inside space. The house is the very first space encountered by every individual, with the attic and the cellar being the two most vivid spaces that every individual remembers. The childhood imagination experiences the polarity of these two spaces consisting of very different perceptions of phenomenology. The imagination is at work when a child ventures into the cellar. The mind begins to wonder about things that are in the dark; the body feels unprotected with the change in temperature; there are sounds of animals scattering

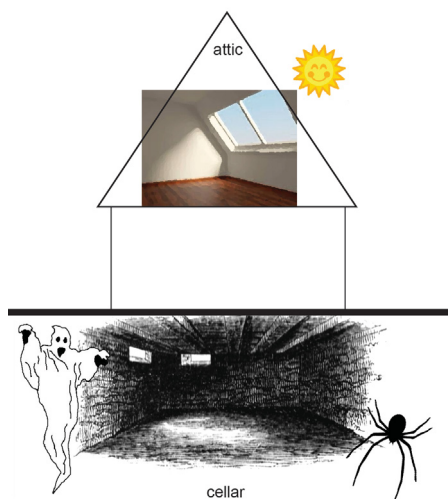


Diagram depicting the phenomenological experiences in the attic and cellar.

¹⁸ Ibid., 46.

¹⁹ Ibid., 47.

even when in reality it is quiet. The imagination creates its own memories, either real or artificial, and form mental images of the cellar and attic, to which at an individual level, are kept entirely private in the recess of the mind. Despite however private, there is a shared imagery that the cellar denotes things below the earth that are dark, damp and mysterious. It is the only part of the house that partakes of subterranean forces, and we dream about the dark entity of the cellar. Our imagination tend to operate at its maximum when there is a lack of clarity. In contrast, the space of the attic where things are lit and above the ground, sunlight shines upon it and the truth is revealed; our thoughts are clear where there is clarity and reality.

Spaces within our first home have become physically inscribed in us over time. Even as we grow older, the same images and memories of the cellar and the attic remain the same. Spaces contain memories, but memories do not see the passage of time as Bachelard writes,

Space is everything, for time cases to quicken memory. Memory does not record concrete duration. We are unable to relive duration that has been destroyed. We can only think of it, in the line of an abstract time that is deprived of all thickness. Memories are motionless, and the more securely they are fixed in space, the sounder they are.²⁰

When an individual describes a space, the listener begin to naturally use their imagination to recall in their own memory of a similar and familiar space in their past, thus setting off a chain of memories

20 Gaston Bachelard, *The Poetics of Space* (Boston: Beacon Press, 1969), 8.

associated with the space.

It therefore makes sense from the standpoint of a philosophy of literature and poetry to say that we “write a room,” “read of room,” or “read a house”. Thus, very quickly, at the very first word, at the first poetic overture, the reader who is “reading a room” leaves off reading and starts to think of some place in his own past. You would like to tell everything about your room. You would like to interest the reader in yourself, whereas you have unlocked the door to daydreaming. The values of intimacy are so absorbing that the reader has ceased to read your room: he sees his own again. He is already far off, listening to the recollections of a father or a grandmother, of the human being who dominates the corner of his most cherished memories.²¹

Collective Memory

In Aldo Rossi’s *The Architecture of the City*, he states that the soul of the city becomes the city’s history, the sign on the walls of the municipium, the city’s distinctive character is its memory.²² However in this case, what if the soul of the Richmond community no longer exists and can only be found in the remnants/ evidence of the artifacts that prevailed through the tragedy of the Explosion and through the personal memories of the people who survived? Can collective memory still exist if a city is destroyed and most of its inhabitants dead?

Similar to Rossi’s reference to Athens as a mythical city,²³ the community of Richmond is much like recalling a myth, which precedes the memories of this generation. The Halifax Explosion has become an event that we can no longer refrain from speaking

21 Ibid., 14.

22 Aldo Rossi, *The Architecture of the City* (Cambridge, Massachusetts: MIT Press, 1982), 130.

23 Ibid., 134.

about. The reference to the historic past always points towards the new developments that arose after the destruction: the Hydrostone Community, the Bell Tower Memorial and Fort Needham Memorial Park.

Rossi clarifies that collective memory exists in the consciousness of the city and its citizens; the city itself is still the collective memory of its people, just as memory is associated with objects and places.

The city is the locus of the collective memory. This relationship between the locus and the citizenry then becomes the city's predominant image, but of architecture and of landscape, and as certain artifacts become part of its memory, new ones emerge.²⁴

The value of history seen as collective memory, as the relationship of the collective to its place, is that it helps us to grasp the significance of the urban structure, its individuality, and its architecture, which is the form of his individuality. This individuality ultimately is connected to the original artifact. The union between the past and the future exists in the very idea of the city that it flows through in the same way that memory flows through the life of a person.²⁵

In the collective sense, there is an immeasurable value for an individual to share their personal memories with the community. Although one may feel exposed when shared, the memory itself become eternalised and commemorated by future generations.

Architecture as an Interpretive Experience

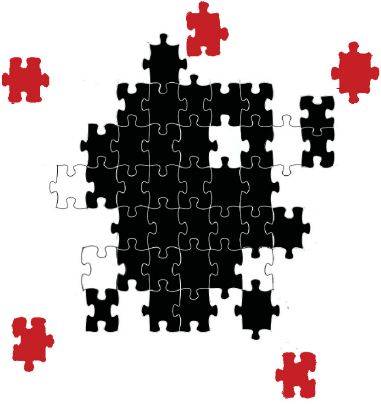
This thesis explores the ways in which architecture can become active spaces that engage the visitor first as an encounter of the space, then as an experience within the space. By borrowing the principles and

24 Ibid., 130.

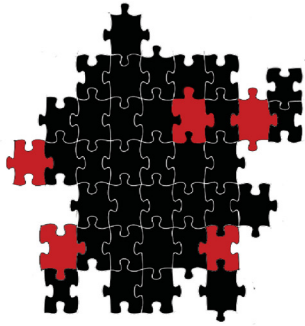
25 Ibid.



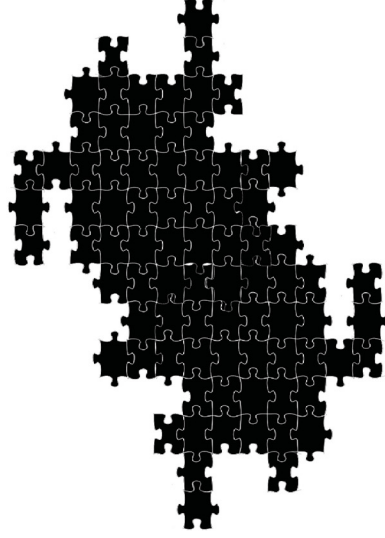
individual memory



individual memory absent in the collective



individual memory within the collective



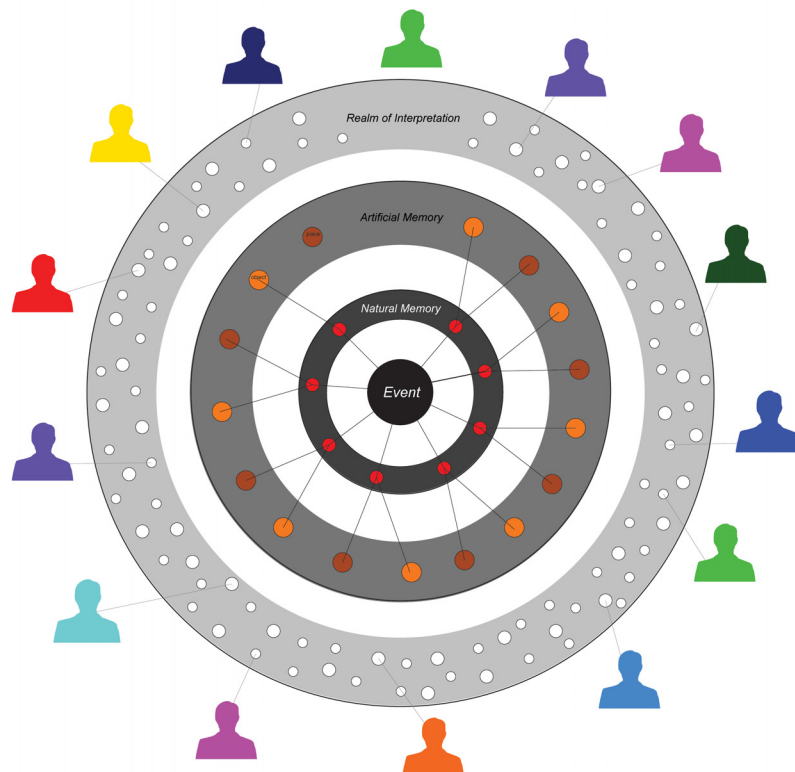
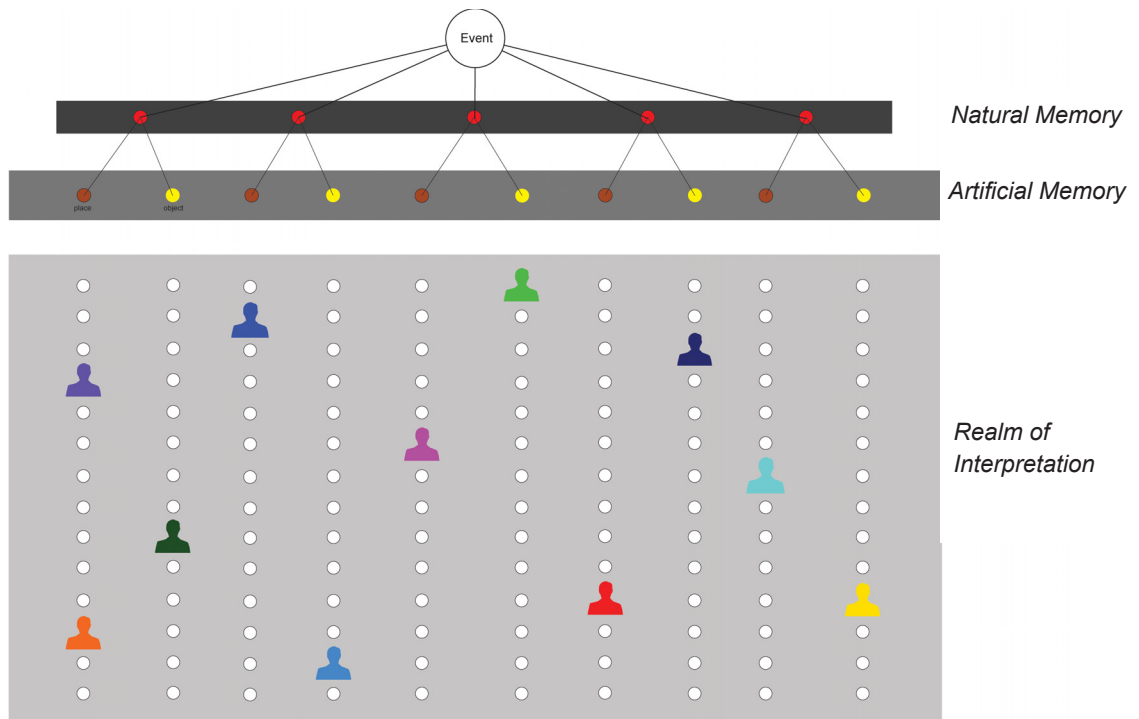
expanding collective memory

Individual personal memory is an important component of collective memory. It is needed and valued to create history.

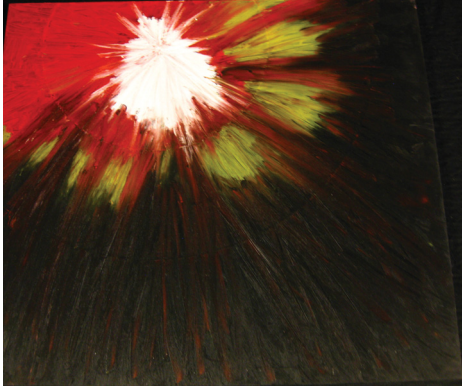
techniques used to create artificial memory (in *The Art of Memory*) and the explorations and understanding of the phenomenology of the human imagination, architecture can be created and arranged in ways that can be read as a narrative while leaving a gap of curiosity to engage the imagination, thereby allowing for personal interpretation. If memory is able to take the form of a narrative and become directly imprinted in the memory of the visitor as a phenomenological experience, then the perception that haptic qualities of architecture and spaces can be used as a medium to convey a powerful message much like a written text.

By creating rooms within the building to represent a specific memory and placing different objects within the rooms to symbolize a fact, it is intended that the sequence of the building and the impact of its spaces will be imprinted on the memory of its visitors. After encountering the building as a whole, each visitor is able to easily recall their experience within the sequence and to extract what they interpreted from each room by revisiting their memory to tell the story of the Halifax Explosion.

Although not one person will describe each room in the same manner such that each space has the ability to stimulate multiple interpretations depending on whomever engages with it, each person will carry with them a valuable perception and interpretation of the story of the explosion as a personal memory within the dimension of the public (civic) realm.



A singular event can generate multiple individual interpretations. Based on natural memory, artificial memory can be created using a place ('loci') and an object. The outcome of artificial memory can generate multiple individual interpretations.



An expressive painting depicting the Halifax Explosion. Oil on plexi.

Civic architecture can become a container for the localization of public collective memories and be an initiator for new private individual memories. As a result, new relationships are generated between the individuals and the community by placing the personal memory into the realm of the civic as a collective narrative experience.

Site and Program Strategy

This thesis addresses the importance in which history and memory is a crucial component to communal identity. The Halifax Explosion is a strong historical component to the identity of Halifax. It is important to note that the boundary of the site should not be limited to the geometric measures of Halifax and Dartmouth, but that the Halifax Explosion both directly and indirectly affected people from cities across Canada, North America and Europe.

The Halifax Explosion

Halifax during World War One was a large prosperous military city with the Halifax Harbour always crowded with ships sailing in and out helping with the war effort in Europe.

On the morning of December 6th, 1917 at approximately 8:45am, the French munitions ship, *Mont-Blanc*, collided with the Belgium relief ship, *Imo*, in “The Narrows” section of the Halifax harbour directly in front of the industrial community of Richmond, North Halifax. After the collision, the ship caught on fire with multiple mini-explosions caused by the sensitive picric acid that ignited the vapours



One of only a few photographs of the blast itself. View of the column of smoke raised by the Halifax Explosion (Dec. 16, 1917).

Source: Library and Archives Canada.

**HORRORS OF HALIFAX
UNEQUALED IN WAR**
**Harrowing Scenes Surpass Any On
Battlefields, Says Survivor**
**Frenzied Men Rush About Wildly in Search
Of Lost Loved Ones**

Front page newspaper headline from *The Boston Globe*, December 8, 1917.

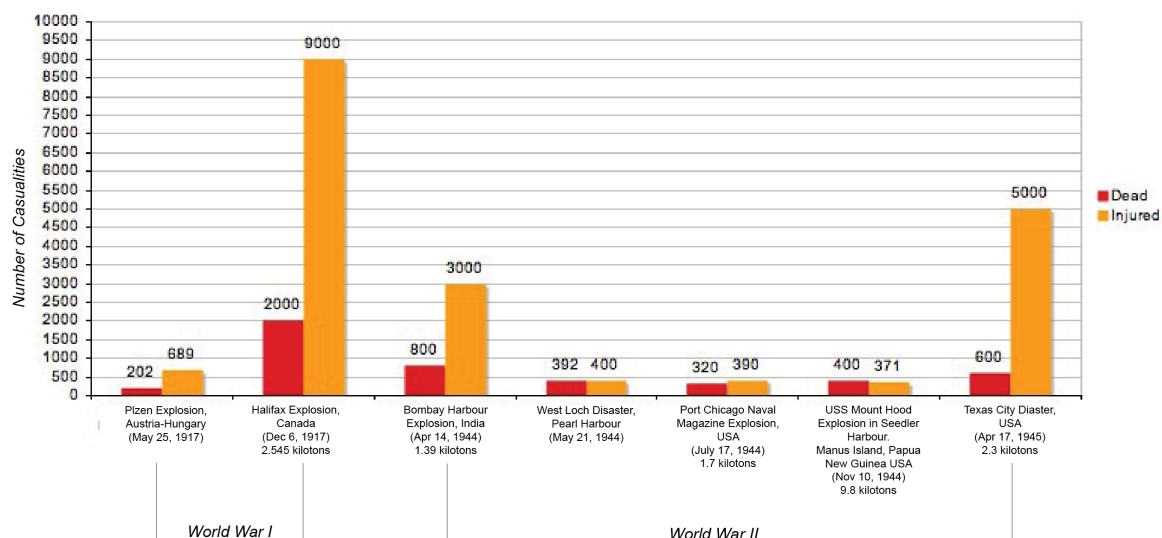
Source: Blair Beed, *1917 Halifax Explosion and the American Response*, 21.

to say a final goodbye.

The tragedy that occurred in Halifax almost a hundred years ago still live in the minds, the memories, and the stories of the community. The explosion physically and psychologically scarred many survivors for life. Months after the blast, deep psychological effects were only beginning to surface. Victims suffered complete nervous and mental collapses. Some were unable to come to terms with the horror and trauma that they had experienced, and committed suicide. Others lived in constant dread of another explosion. Loud noises and the sight of fire often triggered a panic response among the survivors.

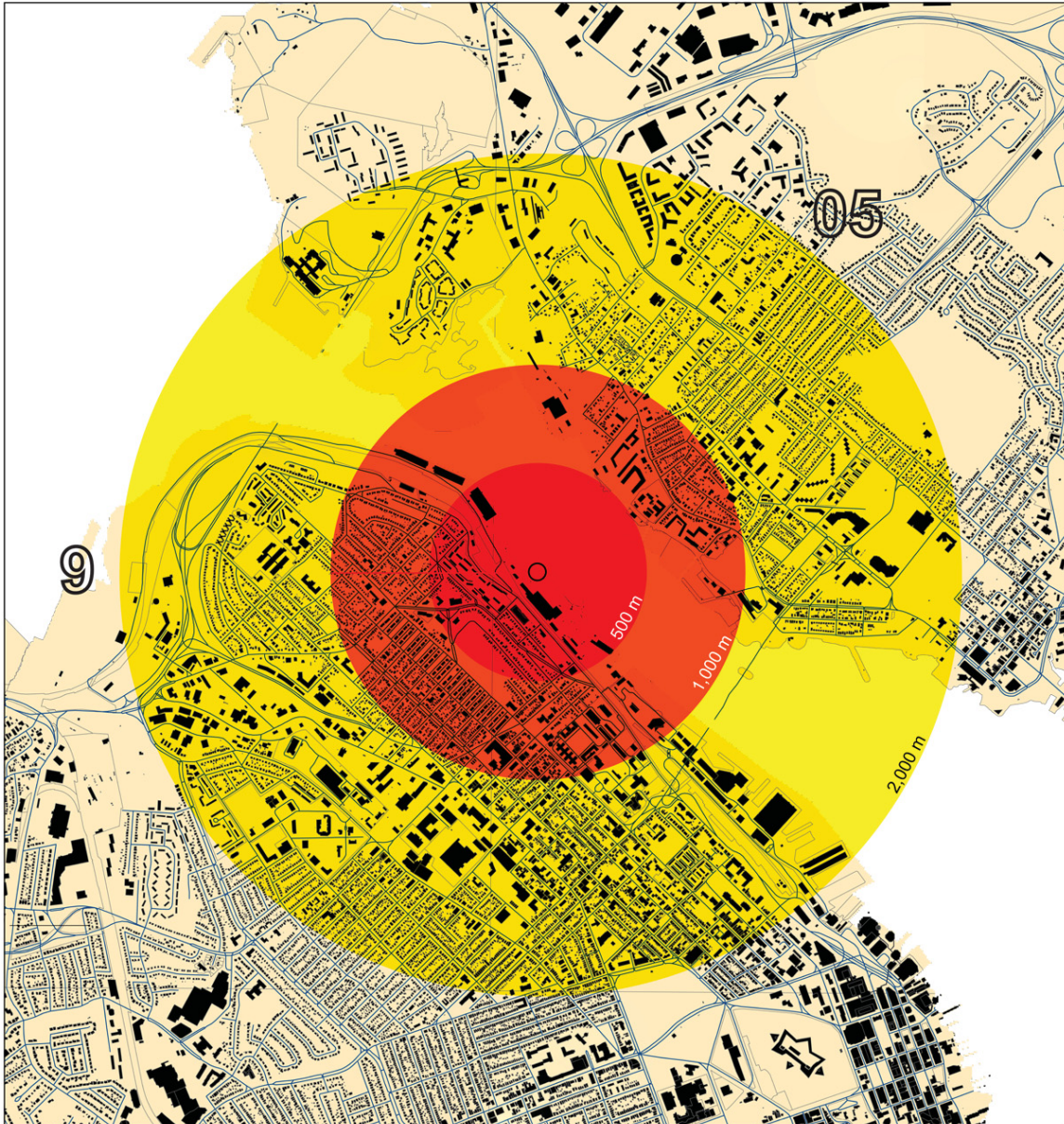
The explosion was seemingly not recorded or documented in the form of publications for more than 60 years. The event itself and the memories associated with it were rarely publicly spoken about. Many survivors did not wish to relive the past by talking about the loss of their loved ones on that fateful day, or about the memories associated with war.

Notably, over the course of the last decade there has been a large number of books published locally on the topic of the Halifax Explosion. Communities within Halifax and Dartmouth, along with historians, have realized many survivors were aging and dying thus giving urgency to documenting their stories. Alongside collecting factual information and preserving the remains of the Explosion, it was most important to record the memories of those



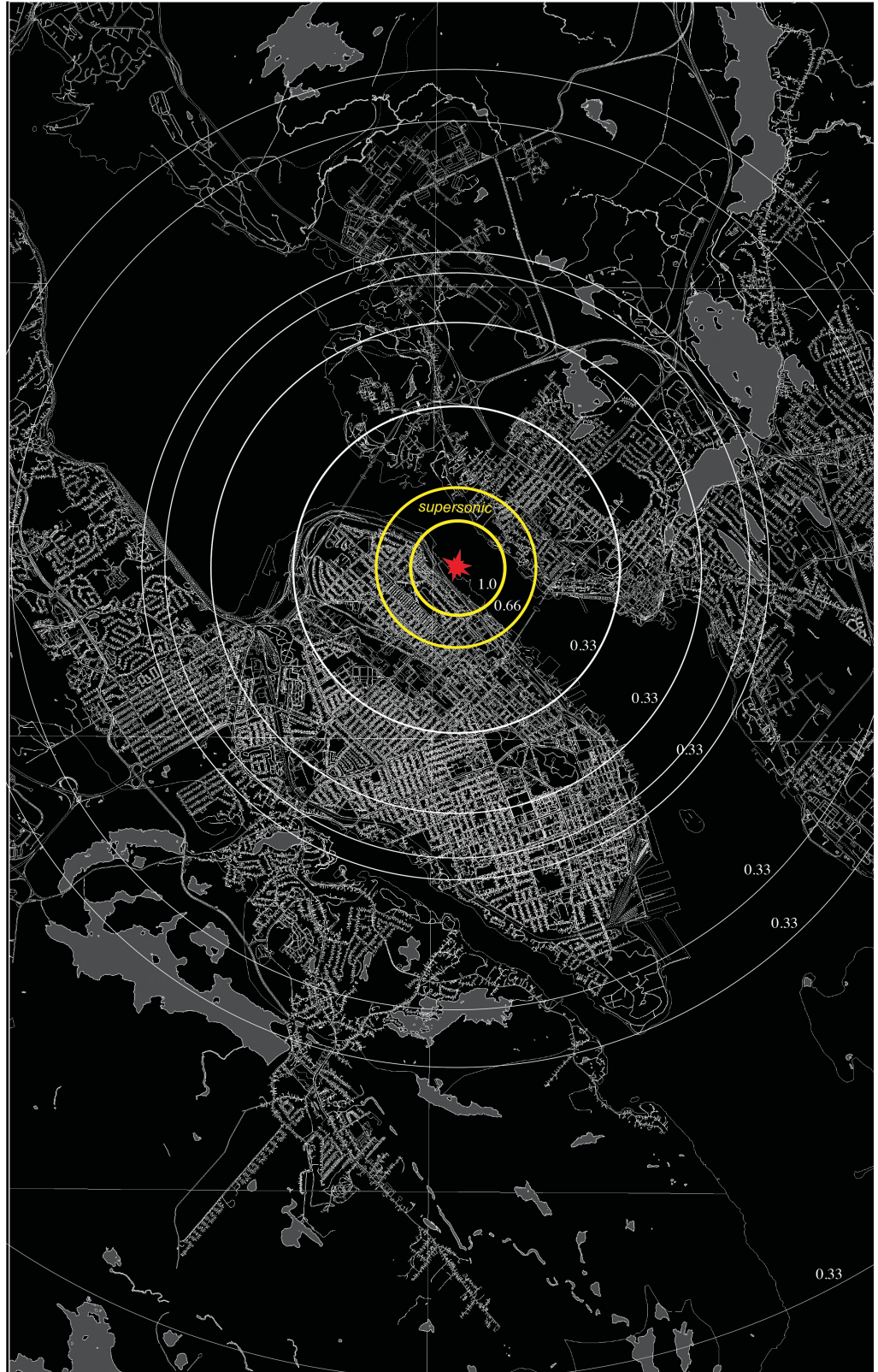
Diaster / Location	Date	Amount of Explosives	Casualties: Dead	Casualties: Injured
Pizen Explosion, Austria Hungary	May 25, 1917		202	689
Halifax Explosion, Canada	Dec. 6, 1917	2.545 kilotons	2000	9000
Bombay Harbour Explosion, India	Apr. 14, 1944	1.390 kilotons	800	3000
West Loch Disaster, Pearl Harbour	May 21, 1944		392	400
Port Chicago Naval magazine Explosion, USA	July 17, 1944	1.700 kilotons	320	390
USS Mount Hood Explosion in Seeadler Harbour, Manus Island, Papua New Guinea.	Nov. 10, 1944	9.800 kilotons	400	371
Texas City Disaster, USA	Apr. 16, 1945	2.300 kilotons	600	5000

The Halifax Explosion still remains the largest man-made non-nuclear accidental explosions in the world during the war era (with casualties over 200). Data sourced from: Alan Ruffman, *The Halifax Explosion: Realities and Myths*, 11.



500 m: burned ruins, total destruction
1,000 m: collapsed buildings
2,000 m: badly wrecked, windows shattered

Zones of Destruction at "Ground Zero" on December 6th, 1917.
Data sourced from: Alan Ruffman, *The Halifax Explosion: Realities and Myths*, 21.
Map Source: Service Nova Scotia and Municipal Relations.



The velocity of shock wave in the air (km/s) from event at "ground zero".
Data sourced from: Alan Ruffman, *The Halifax Explosion: Realities and Myths*, 21.
Map Source: Service Nova Scotia and Municipal Relations.

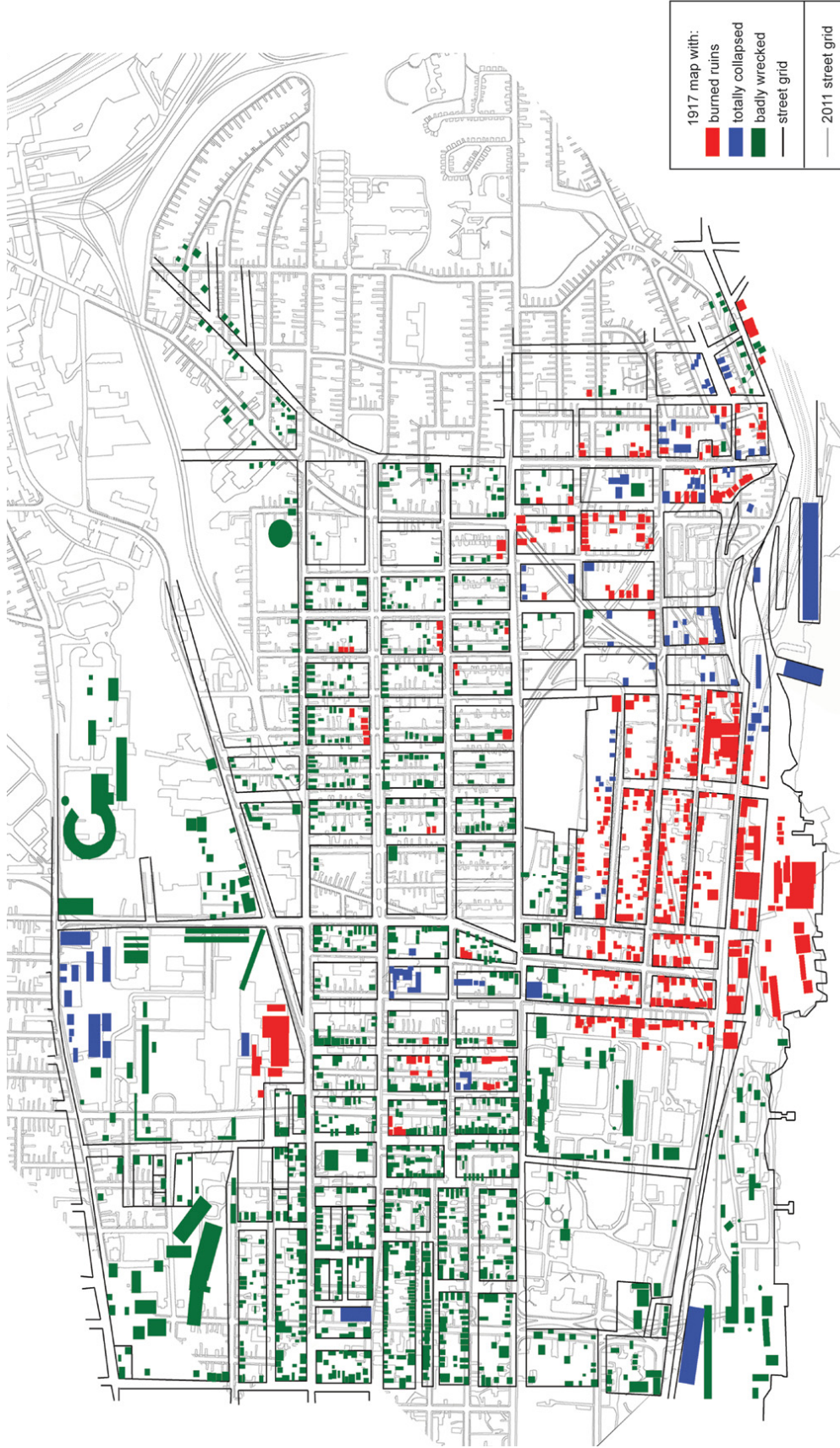
Average speed of sound in dry air at 20°C is 0.343 km/s.

Supersonic sound is a rate of travel of an object that exceeds the speed of sound (March 1).

Regime	Subsonic	Transonic	Sonic	Supersonic	Hypersonic	High-hypersonic
March	<1.0	0.8 - 1.2	1.0	1.2 - 5.0	5.0 - 10.0	<10.0

Distance From Event "Ground Zero" (km)	Velocity of Shock Wave in Air (km/s)	Velocity Seismic Wave in Bedrock (km/s)	Time Difference Between the Two Arrivals (secs)
0.5 Fort Needham, Dartmouth Shore	Supersonic 1.0	6.2	0.42
1.0 Agricola St., Wyse Road, Old Richmond Railway Station, Leeds St.	Supersonic estimate 0.66	6.2	1.10
2.0 Africville, MicMac Encampment at Tufts Cove, Halifax Commons, Brightwood Golf Course	0.33	6.2	3.97
3.0 Jubilee Road, Downtown Halifax and Dartmouth, Lake Banook, Albro Lake	0.33	6.2	6.84
3.550 Dalhousie Seismograph	0.33	6.2	8.42
4.0 Dalhousie Sportsplex, Present CN Station, Clayton Park, Edmonds Grounds, N.S. Hospital, Dartmouth Rotary	0.33	6.2	9.71
5.0 Point Pleasant Park, Saraquay Club, Fairview, Central Spryfield, Circumferential Highway	0.33	6.2	12.58
6.0 Mouth of the Arm, Hfx Industrial Parks, Rockingham, ESSO Refinery, Lake Charles	0.33	6.2	15.45
20.8 Lawrencetown Beach	0.33	6.2	57.9 (if no wind)
100 Truro, Bridgewater, Wolfville, Ship Harbour	0.33	6.2	285 (if no wind)

The velocity of shock wave in the air (km/s) from event at "ground zero".
Data sourced from: Alan Ruffman, *The Halifax Explosion: Realities and Myths*, 21.



1917 North End Halifax map laid over a 2011 map showing devastated areas from the Halifax Explosion on the morning of December 6th, 1917.
Data Source: Janet Kitz and Joan Payzant, *December 1917: Re-visiting the Halifax Explosion*, 22.
Map Source: Service Nova Scotia and Municipal Relations.



Map showing the extent of the tidal wave on the Halifax and Dartmouth shores as a result of the explosion.

Source: Laura M. MacDonald, *Curse of the Narrows*, 1.



North Halifax street grid (1917)



Location of buildings in North Halifax laid over street grid (1917)



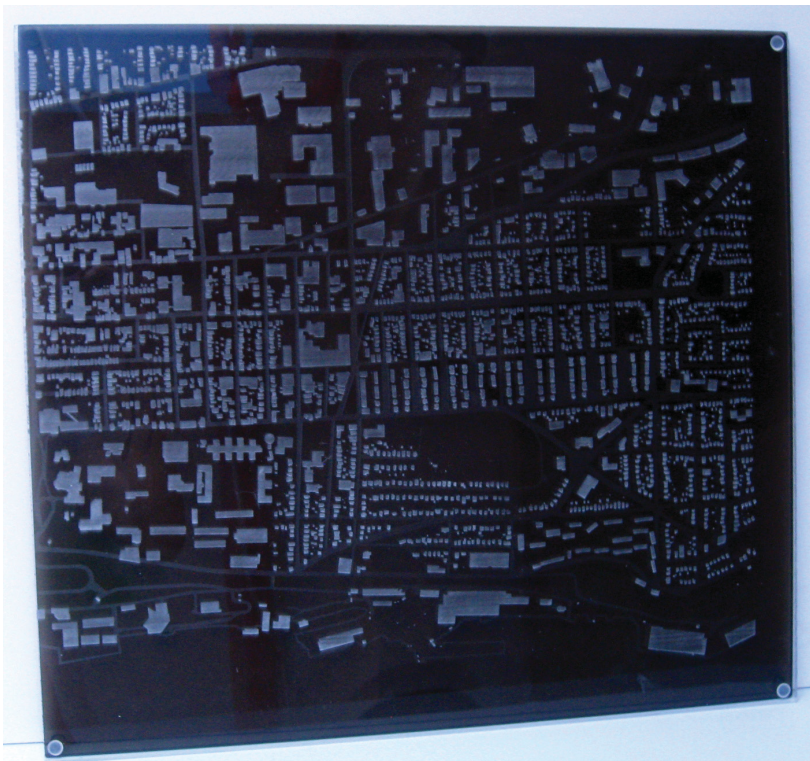
Radiating zones of destruction at origin of explosion (1917)



Depiction of sound waves emitting from origin of explosion (1917)




North Halifax street grid (2011)



Location of buildings in North Halifax laid over street grid (2011)



Various definitions of the word "memory".



HARBOUR WATER. crowds.
fire. shattered glass FROZEN CLOCKS flying glass *eye removals*
blood collapsed buildings amputated limbs
 burned land **burned trees** burned alive
 DESTRUCTION **DEAD BODIES** military
 war *mass funerals* tents




FOG HORN
 explosion
 S I L E N C E
 children crying
 adults weeping
 screaming
 names



ammunition
 BLOOD
 burning wood
DECAYING BODIES
 DEATH
 hospitals



cold "BLACK RAIN" (OIL). DRY.
cold. BLIZZARD.
cold. winter.
cold. white snow.



b.l.o.o.d n g e r
 h u n g e r

Memories associated with the Halifax Explosion.

who braved the tragedy. Many of the survivors were children who became orphans and braved the tragedy in its entirety lived long enough to tell their stories to multiple generations.

Fort Needham Memorial Park

The thesis site is located in Halifax, Nova Scotia at Fort Needham Memorial Park. Pertaining to its name, Fort Needham was historically a military defence post built on a glacial drumlin for the Royal Dockyard, at a time when Canada had strong ties with Britain. It had two guns and barracks for 50 men, was rebuilt in 1807 with four 12-pounder guns, and a blockhouse was built in 1808 but was destroyed in 1820. On the morning of the Halifax Explosion on December 6th, 1917, all the barracks were completely destroyed leaving no evidence on the current site. However, it is believed that the location of the fort was situated at the present location of the tennis courts on the south side of the site.

Fort Needham protected a large portion of the surrounding community from total destruction. The naturally steep topography on the eastern slope of facing the Halifax harbour acted as a shield and deflected an enormous amount of debris, protecting the homes behind the hill from sustaining damage. The physical land underwent a catastrophic shock when the impact of the explosion burned all forms of life to the ground, exposing the slate bedrock.

The supersonic shock wave released into the air as result from the explosion created a force in the air



Edward Hick's etching of Halifax from Fort Needham (1780).
Source: Province of Nova Scotia.



George Parkyns' painting of Halifax Looking South to Citadel Hill from Fort Needham (1801).
Source: Province of Nova Scotia.



Polo Team at Fort Needham (1885).
Source: Province of Nova Scotia.



View of Needham hill from the waterfront after the explosion (Dec. 1917).
Source: Paul A. Erickson, *Historic North End Halifax*, 94.

that blew out all windows and glassware. Windows shattered 80 km away, and the shock wave was even felt 435 km north of Nova Scotia in Sydney, Cape Breton. The invisible force carried people who were standing in the vicinity of the harbour and displaced them hundreds of feet away. There were many accounts of survivors who miraculously found themselves unconscious at the foot of Fort Needham when the Mont-Blanc ship blew up. The force of the blast generated a massive vertical column of water. The water in the Halifax harbour split open and exposed the ocean floor, creating a 6 metre deep crater²⁷ at the epicentre immediately triggering an immense tidal wave that swept up to Fort Needham and extended beyond the shorelines of Dartmouth and Halifax. Hundreds of people drowned, ships were tossed around like toys, and the wharves endured significant damage.

Many years following the Explosion, Fort Needham hill was untouched until urban planner, Thomas Adams, was hired to redesign 325 acres of devastated land to create a new vision and identity for the North End community using the latest “garden city” philosophy.²⁸ Adams envisioned Fort Needham Park to be the largest public park in the North End that would rival that of Point Pleasant in the South End of the peninsula. Not until 1949 was the Halifax Relief Commission (HRC) able to concentrate on the park. Minor improvements were made to the hill but it was still far from attractive

²⁷ Ibid., 4.

²⁸ Paul Erickson, *Historic North End Halifax* (Halifax: Nimbus Publishing Ltd., 2004), 114.



Gottingen Street along Fort Needham July 17, 1918.

Source: Paul A. Erickson, *Historic North End Halifax*, 115.



Fort Needham before landscaping, c.1950s.

Source: Paul A. Erickson, *Historic North End Halifax*, 124.



The vision of Thomas Adams, c.1950s.

Source: Paul A. Erickson, *Historic North End Halifax*, 125.

and useable. With evidence of the extremely steep slope on the western hill, it is speculated that the terrain was heavily reconstructed to make a levelled construction ground for the residential relief homes, now know as the Hydrostone district. In August 1949, the HRC and the City of Halifax signed an agreement to develop Fort Needham Park. The commission agreed to landscape and improve the park at its own expense, then turn it over to the City of Halifax which would maintain it for the public in the long term. Over the term of ten years, the Commission spent more than \$150,000 on grading, planting, sports and recreational facilities, and a canteen.²⁹ In 1959 Fort Needham was handed over to the City, and in 1980, the city council enacted building height restrictions to protect its view towards the harbour to the site of the explosion.³⁰ Currently, Fort Needham Memorial Park is primarily a neighbourhood community park for residents of the Hydrostone area and the surrounding North End community. The site is the highest point in the North End and overlooks the Halifax harbour to its east, and the single-family residential dwellings on the west. Surrounding the site are community amenities such as the Community Recreational Centre and Pool, the Nova Scotia Family Courthouse (the former Richmond Elementary School), and The United Memorial Church.

²⁹ Ibid., 124.

³⁰ Ibid., 124.



The location of the soon-to-be Hydrostone District from Fort Needham (Oct. 7, 1918).

Source: Paul A. Erickson, *Historic North End Halifax*, 115.



Rebuilt Former Richmond with the newly built homes of the Hydrostone district clearly seen at the top right (1930).

Source: Paul A. Erickson, *Historic North End Halifax*, 123.



Halifax Explosion Memorial Bell Tower

Halifax Explosion Memorial Bell Tower







The Memorial Bell Tower was erected in 1985 at Fort Needham Park through a citizen group that raised \$400,000 for a memorial carillon to be built at the top of the hill to commemorate the Halifax Explosion. The carillon contains ten bells donated to Kaye Street United Memorial Church in memory of the Orr family members who died in the Explosion. Over the years it has become a landmark in Halifax and reunites the community during the annual commemoration ceremony on December 6th. The bells ring throughout the city as a sign of remembrance to observe a moment of silence. The Bell Tower Memorial was designed to with spacing between the two walls as a gesture to indicate the site where the Explosion occurred: the former memory and location of Pier 6 terminal. Unknown to much of the public, within the Memorial contains a time capsule with material from 1917 and 1985, inserted by Millicent Swindells, a survivor of the Explosion.³¹ The time capsule is due to open on the 100th anniversary on December 6th, 2017 at 9:05am.

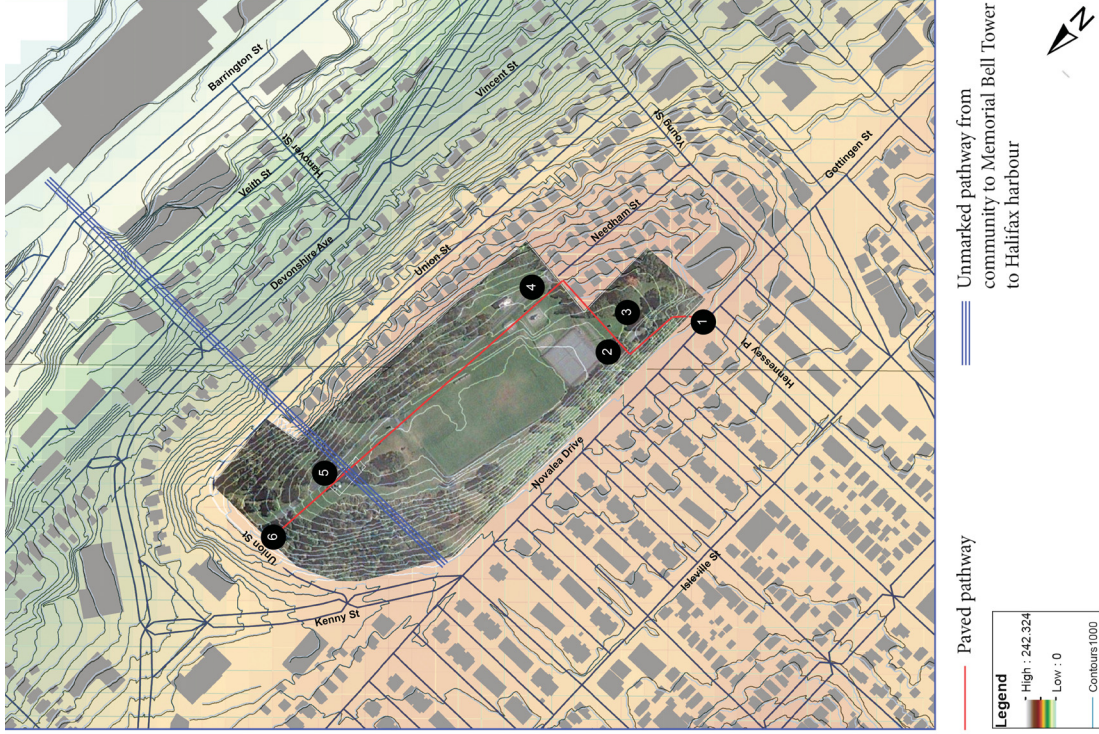


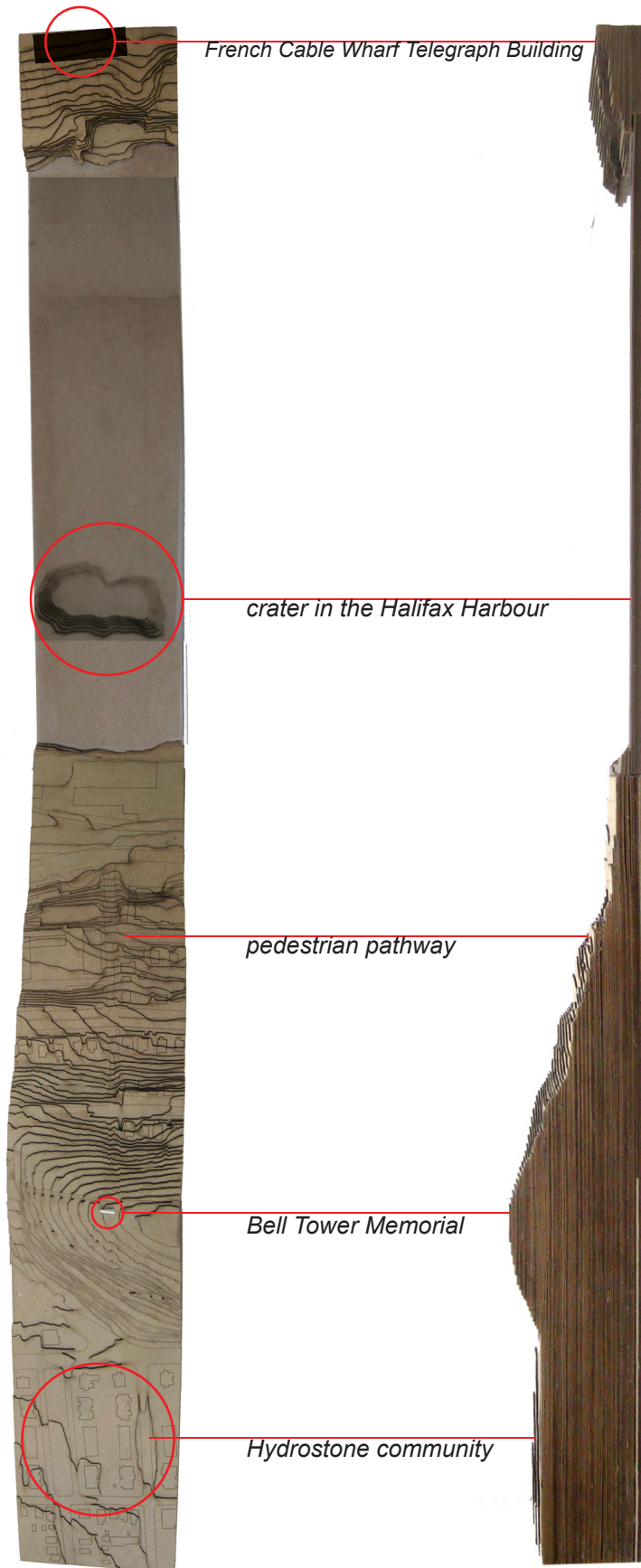
The view of Halifax Harbour and the pathway leading from the memorial directly down to the site of the explosion of 1917.

The Bell Tower Memorial remains the only official memorial to the Halifax Explosion. Although being well intentioned, the Memorial lacks essential and important information regarding the tragic event, and is impersonal and unresponsive. It stands alone at the top of the park as a monument rather than a memorial that allows for interaction, reflection, and

³¹ Janet Kitz and Joan Payzant, *December 1917: Re-visiting the Halifax Explosion* (Halifax: Nimbus Publishing, 2006), 31.

- 1  Main entrance to Fort Needham Memorial Park at Novalea Dr. / Hennessey Place. Pathway leading up and into the park.
- 2  Recreational tennis court and first view of Bell Tower Memorial.
- 3  An open field with a commemorative plaque dedicated to the volunteers of the Halifax Relief Commission. A second plaque denotes the location of Fort Needham with a brief history of the Halifax Explosion.
- 4  Pathway leading to Bell Tower Memorial.
- 5  Memorial with the addition of donated commemorative family plaques.
- 6  Small information panel with info of Halifax Explosion. The cut between the Bell Tower Memorial and the pathway leading down towards the Halifax Harbour (explosion site). Exit from the park / back entrance to park.





French Cable Wharf Telegraph Building

crater in the Halifax Harbour

pedestrian pathway

Bell Tower Memorial

Hydrostone community

Model showing axial section of linear relationship from Hydrostone community to the French Cable Wharf Telegraph Building on Dartmouth shore.

education.

While a few family names have been commemorated and added to the memorial as self-funded plaques, the Memorial does not celebrate these additions by the community. The Memorial does a poor job of educating those who are curious to know more about the Explosion. More importantly, it lacks a physical space for the community to pay its respect to the victims.



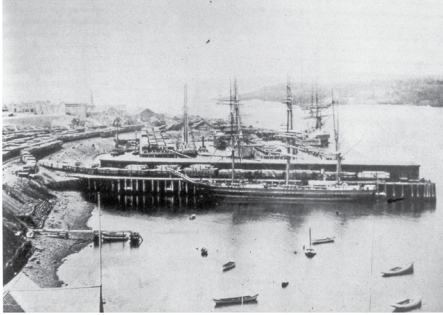
Users and Program

Nearing the 100th anniversary year of the event, it becomes increasingly urgent to preserve the personal memories and stories of those who perished along with those who had survived. Each year the commemoration ceremony grows in size with the crowd becoming younger. Attending a commemorative ceremony allows for education, as well as to participate as a witness in the collective experience. Within the audience, some individuals may have a personal connection to the Explosion, being family and friends of the survivors, while others may be drawn to the ceremony by their own curiosity; for example, history buffs, student school groups and tourists.



Halifax Explosion Commemoration ceremony in front of the Bell Tower Memorial on December 6, 2011 at 9:05am.

Over time, the collective memory of an event will begin to change as new generations arise. In the next generation when survivors are no longer in the midst of a commemoration ceremony, there will be an absence of direct intimate connection to the event. The thread of memories will always be in flux



Richmond railway terminal and yards with Pier 6 in the foreground (1900). Source: David B. Flemming, *Explosion in Halifax Harbour*, 29.

as people will bring indirect 'secondary' memories to commemorate the same event.

Even though the reason for commemoration will not change, the direct first-person memories of the event will be transformed and adopted by a new generation through the art of story-telling. Each generation will pass along the memories from the previous generation through each individual's interpretation of the story and their own memory of the story. Thus, the collective memory is never stagnant and always evolves with time.

City Scale: Site Interpretation and Education

The program serves the individual at a singular level and the community as a collective experience. The purpose is to integrate the visitors of the site into the memories of the past. The program of site interpretation and education are addressed primarily in two scales.



Remains of the Richmond piers after the explosion (1917). Source: David B. Flemming, *Explosion in Halifax Harbour*, 49.

Firstly, the disaster occurred at a citywide scale all across the peninsula of Halifax. Many well-known buildings and sites showed signs of trauma as a direct result of the Explosion (i.e. shattered windows, collapsed roofs, etc.). Both private residential homes and public buildings across the city adopted new roles in the wake of the Explosion; for example, many families in the South End welcomed the wounded and the homeless to stay in their homes for weeks; the Technical University of Nova Scotia (now the Dalhousie University architecture building) had large aid supplies stacked in boxes outside on the doorstep;

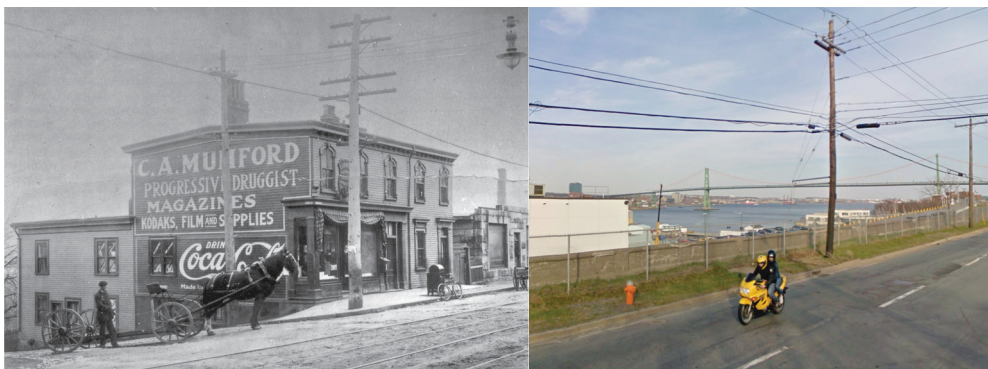


A view of the same site at Barrington Street and Richmond Street (2011). Source: Google Maps.

the Bellevue House at the corner of Spring Garden Rd. and Queen St. became the American Hospital for the Harvard University medical students (now a construction site for the new Halifax Public Library); dozens of wooden coffins were laid outside on the sidewalk and road outside Snow & Co.'s Undertakers on the corner of Argyle and Carmichael Street (now the popular Five Fisherman's Restaurant); and the Halifax Commons was littered with hundreds of white tents set up as medical stations and temporary relief homes. As well, evidence of the Mont Blanc ship were launched into the air and scattered as far as 2km throughout Halifax and Dartmouth. These are a few examples of specific locations associated with the Halifax Explosion.

Program Design

The design for the program will address both locals and tourists with a relationship to the site in the following two ways: one, the program will be realized with a series of on-location site interpretations in the form of self-guided walking tour routes. The "route of interpretation" is the pathway towards ground zero, and another route wandering away from the impact. The 'Richmond Tour' will encapsulate a route within the former community of Richmond with interest points of former streets and buildings of Richmond. The larger Halifax 'Centennial Marathon Tour' will address the sites across the peninsula of found remnants of the *Mont-Blanc*. Each site indicated on the walking tour will have an interactive space indicating its connection to the Explosion. The spaces



1917 / 2011: C.A. Mumford's was one of the few drugstores in Richmond located on Barrington Street (formerly 49 Campbell Rd), at the southeast corner of Barrington Street and East Young Street.

Source of left photo: David B. Flemming, *Explosion in Halifax Harbour*, 21.



1917 / 2011: Medical supply boxes stacked outside Nova Scotia Technical College.

Source of left photo: Janet Kitz and Joan Payzant, *Re-visiting the Halifax Explosion*, 76.



1917 / 2011: The Massachusetts State Guard Medical Unit rushed to Halifax to help with the recovery efforts. Standing in front of Bellevue House, a temporary American Hospital, on Spring Garden Rd and Queen Street.

Source of left photo: Blair Beed, *1917 Halifax Explosion and the American Response*, 21.



















1917 / 2011: Temporary relief tents on the Halifax Commons.

Source of left photo: Blair Beed, *1917 Halifax Explosion and the American Response*, 37.



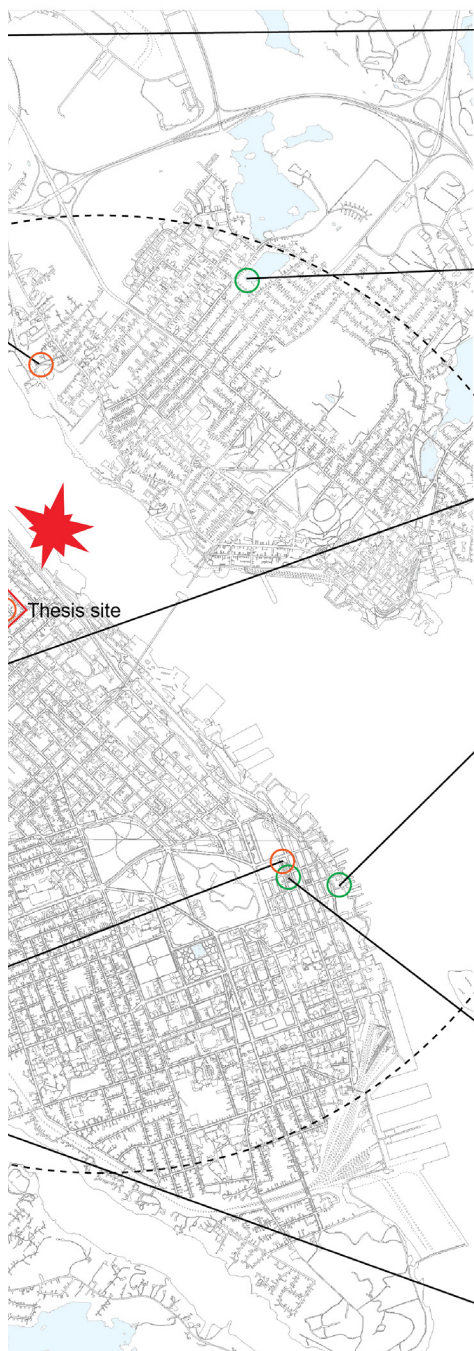
Map showing the location of cemeteries, monuments, and fragments of the *Mont Blanc* ship within a 2km radius of the explosion site.
 Data Source: David B. Flemming, *Explosion in the Halifax Harbour, 90.*
 Map Source: Service Nova Scotia and Municipal Relations.

Cemeteries & Monuments

	<p>Tuft's Cove Cemetery, Lovett St. Dartmouth</p>	
	<p>Fort Needham Memorial Park</p> <p>Halifax Explosion Memorial Bell Tower & Halifax Relief Commission Monument</p>	
	<p>Firemen's Memorial, Lady Hammond Rd / Robie St</p> <p>Commemorates 9 firemen killed in explosion</p>	
	<p>Fairview Lawn Cemetery, 3720 Windsor St</p> <p>Burial site of unidentified dead</p>	
	<p>Bayers Rd Monument</p> <p>Site of later burials of unidentified victims. Monument to the unidentified dead</p>	
	<p>Mount Olivet Cemetery, Mumford Rd / Mayfield Ave</p> <p>Monument dedicated to unidentified dead. Graves of Royal Canadian Navy and Royal Navy personnel, and other explosion victims</p>	
	<p>Halifax City Hall, Grand Parade Square</p> <p>The clock stopped at 09:05 and sits today always at this time as a memorial to the explosion</p>	
	<p>Deadman's Island</p> <p>Burial site of unidentified dead</p>	

Detail of map.

Fragments of the Mont-Blanc ship



**20 Basinview Drive,
North Dartmouth**

A propeller blade from *Mont-Blanc* made as the backing of a chair in a quiet park.



**Little Albro Lake,
Dartmouth**

A melted cannon from the *Mont-Blanc* with a small commemorative plaque.
Weight: 545.5 kg
3km from explosion site



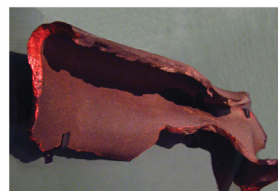
**Calvin Presbyterian Church,
3311 Ashburn Ave**

Piece of anchor shank of *Mont-Blanc*
3.8km from explosion site



**Maritime Museum of the Atlantic,
1675 Lower Water Street**

3 pieces of the *Mont-Blanc* found around HRM and given to Museum.



**St. Paul's Anglican Church,
1749 Argyle Street**

A man's profile in the broken window where he stood at the moment of the explosion.
(upper floor, third from back of church).

A piece of the ship embedded into the church wall.
3km distance from explosion site

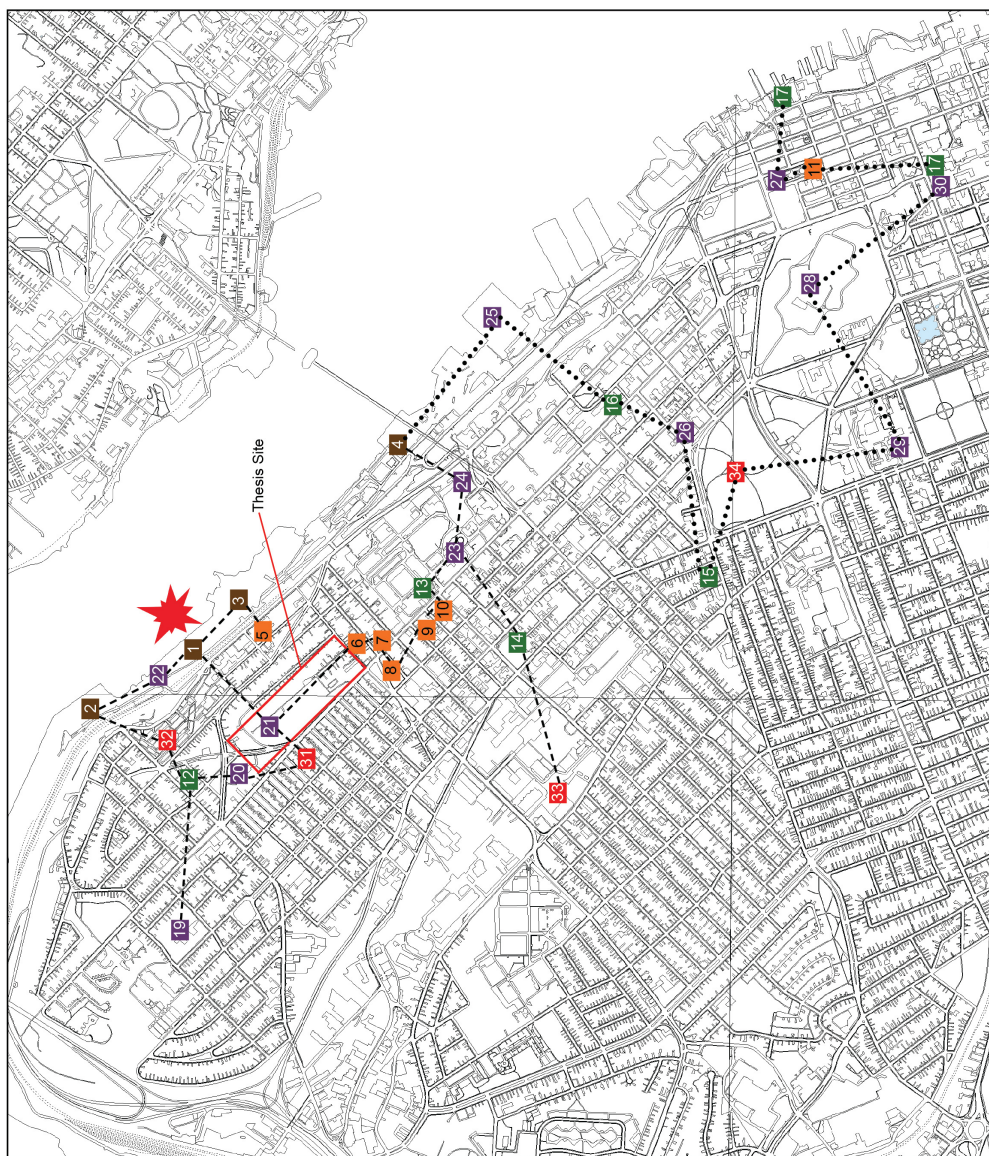


Spinnaker Drive & Anchor Drive

Anchor shank of *Mont-Blanc*
Weight: 502 kg
3.8km from explosion site



Detail of map.



- | | |
|--------------------|---|
| 1 | Pier 6, site of explosion |
| 2 | Site of Richmond Yards |
| 3 | Site of Acadia Sugar Refinery |
| 4 | Site of North Street Station |
| Religious | |
| 5 | Veith House (Protestant orphanage) |
| 6 | United Memorial Church
(Tarpaper Church built this church after explosion) |
| 7 | Site of former St. Joseph's Roman Catholic Church |
| 8 | Site of Tarpaper Church
(temporary church after explosion) |
| 9 | St. Mark's Anglican Church |
| 10 | Site of former St. Joseph's Hall |
| 11 | St. Paul's Anglican Church |
| Educational | |
| 12 | Original Richmond School site |
| 13 | Shambhala School |
| 14 | Bloomfield School |
| 15 | Former Chebucto Road School |
| 16 | Halifax North Memorial Library |
| 17 | Maritime Museum of the Atlantic |
| 18 | Dalhousie University School of Architecture |
| Government | |
| 19 | Site of former Rockhead Prison |
| 20 | N.S. Family Courthouse, former Richmond School |
| 21 | Former Fort Needham |
| 22 | Halifax Shipyards |
| 23 | Wellington Barracks |
| 24 | Maritime Command Museum (Admiralty House) |
| 25 | The Naval Dockyards |
| 26 | The Armouries |
| 27 | City Hall Clock |
| 28 | Citadel Hill |
| 29 | Camp Hill Hospital |
| 30 | Site of former Bellevue House |
| Community | |
| 31 | Hydrostone District |
| 32 | Site of former Mulgrave Park |
| 33 | Halifax Forum, site of Dominion Exhibition grounds |
| 34 | The Commons |

Map showing the location of sites in Halifax relevant to the Halifax Explosion.
 Data Source: Janet Kitz and Joan Payzant, *December 1917: Re-visiting the Halifax Explosion*, 25.
 Map Source: Service Nova Scotia and Municipal Relations.

will consist of an interactive digital signage with information concerning the importance of the site, providing education. Architecturally, a framed view with a glass panel will have an etched image that is placed directly in front of the particular site, in-line with the exact view of the current building that was destroyed and was once on location, or an activity that occurred on the existing site. By activating the memories of these sites using visual images, the subjects of remembrance are memorized together with familiar architectural spaces; these places could later be revisited in the mind of the user, evoking recollection.³² Over time, these sites and walking tours will become pilgrimages.



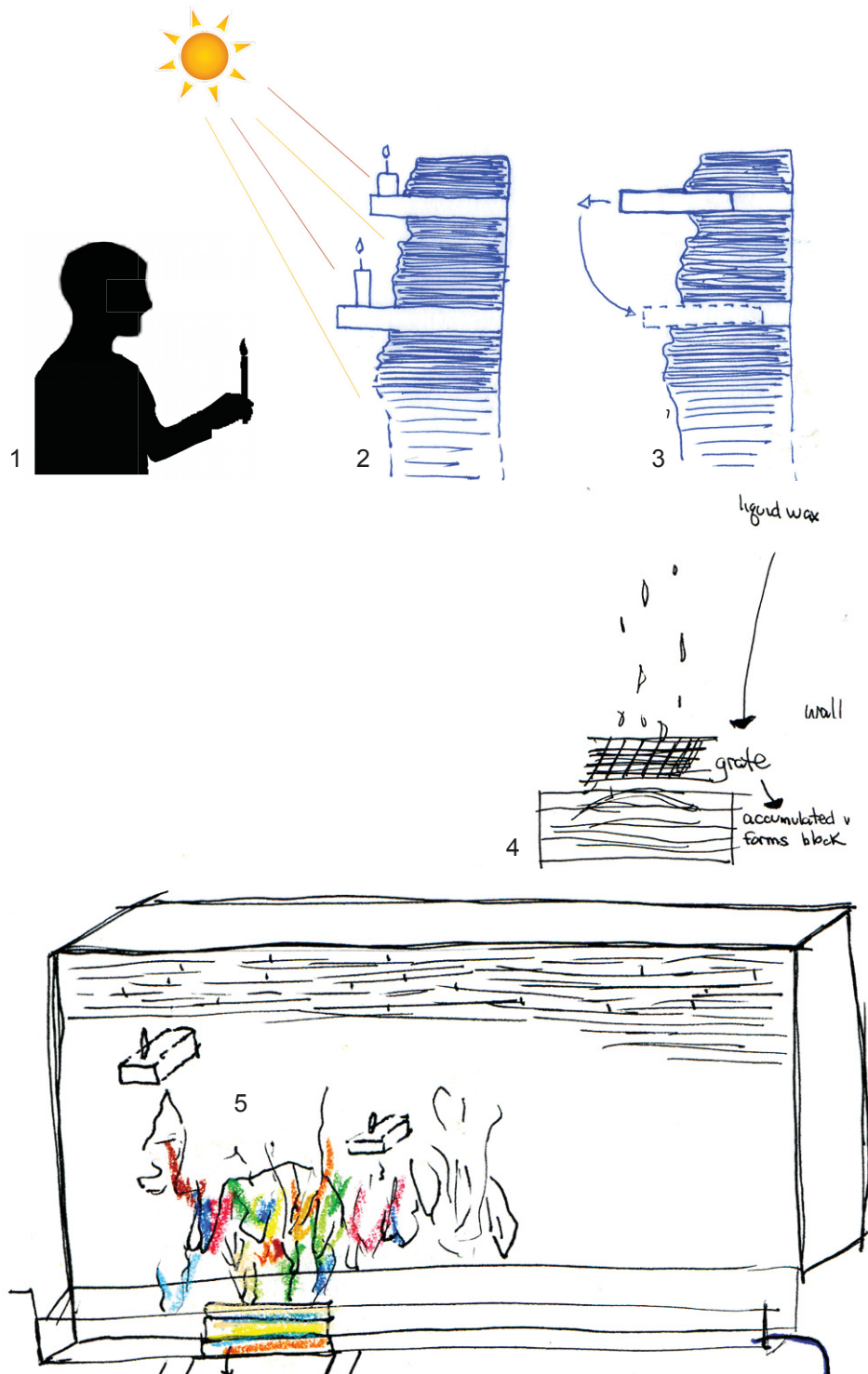
The desired visual effect and textural quality of dripped candle wax running down and solidifying on a vertical slate wall.



An experimental study showing the horizontal layers of candle wax collected with a rectangular form.

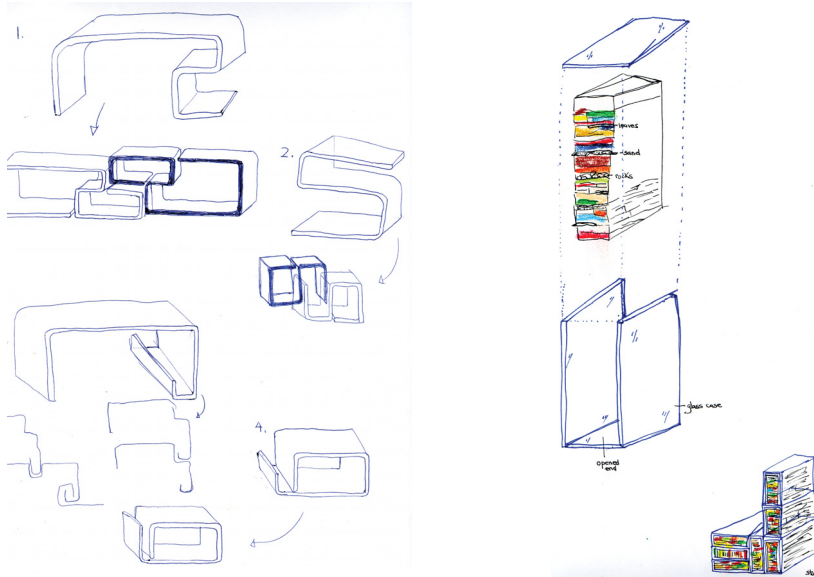
Secondly, during every annual commemoration ceremony, a small wax cube will be distributed to each person in attendance. Just as buildings and sites act as places of memory in which the memory itself turns into history, it is intended that the users bring with them their 'memory cube' to fill the empty frame at each location. These wax cubes, harvested from the Memory Wall (see Final Design: Memory Wall section), depend on other wax cubes to collectively build up a structure. The wax-filled cubes are each approximately the size of a brick and are easily transportable. The cubes are designed to structurally connect to each other and can be used as both a wall system or as furniture at the sites depending on the preferences of the users. The integration of contemporary users into past events provides a new

³² Haim Yacobi, *Constructing a Sense of Place: Architecture and the Zionist Discourse* (Hants, U.K.: Ashgate Publishing Company, 2004), 251.

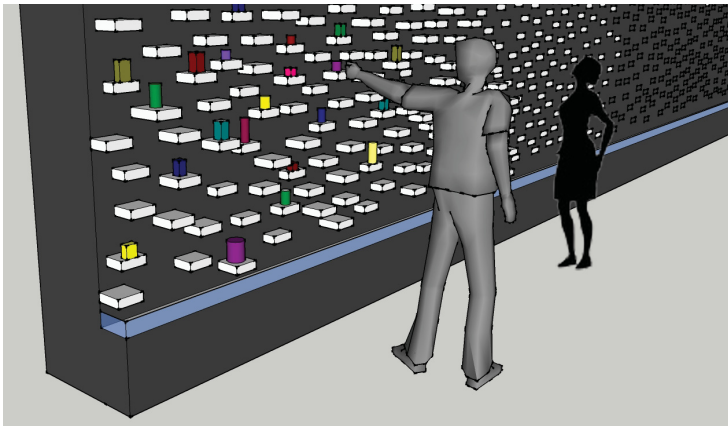


Concept sketch showing the process of creating a "memory cube" on the Memory Wall:

(1) an individual brings with them a candle to place on a shelf on the exterior slate wall, (2) candle wax drips slowly down the wall (sunlight also melts wax accumulated on wall), (3) each shelf varies in length and can be pulled out and be placed in a different location along the wall to create a dynamically interactive space, (4) various types of debris are layers and preserved in the wax, (5) wax flows down the slate wall, filling up the different shaped formwork at the bottom of the wall.



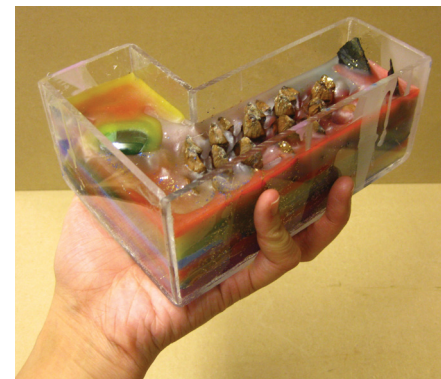
Study of formwork connections with various shapes and modular cubes.



Sketch of Memory Wall with 2,000 candle holders, each representing a casualty.



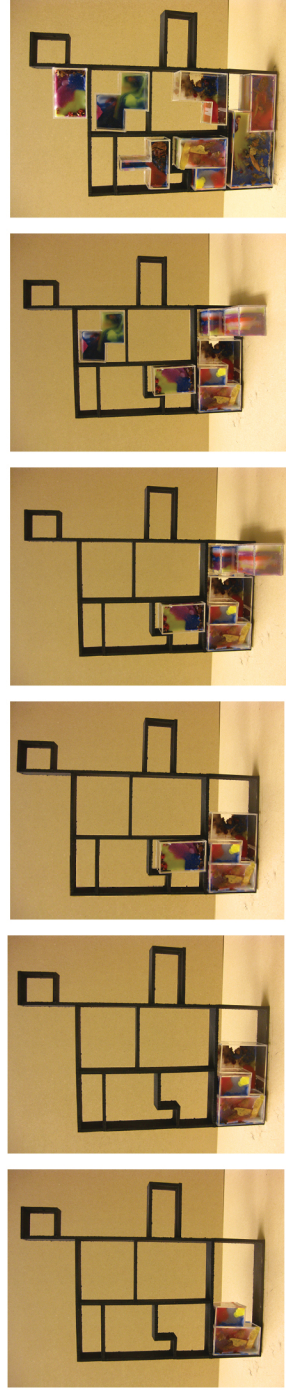
Variations of stacking



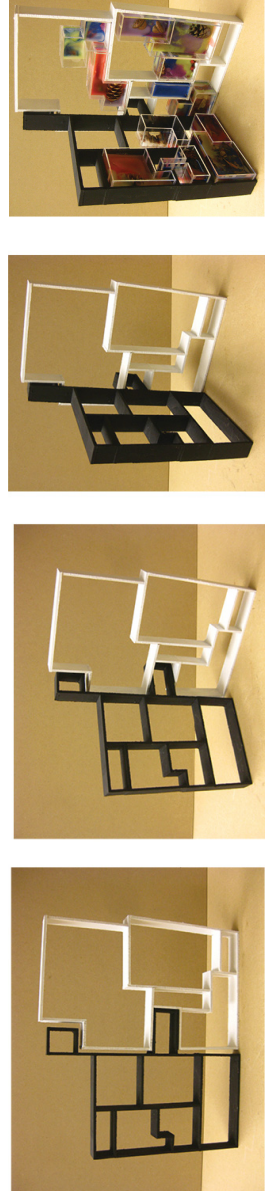
1:1 prototype detail of wax cube showing layers of accumulated debris and candle wax.



Option 1: formwork of various shapes placed at the bottom of the wall to collect melted candle wax



Each block can be placed into the Corten steel frame in a variety of different positions. Users of each space are able to move the blocks spontaneously to form a haptic space dependent on their need.



Additional frames can be added to the site when the first frame is filled. Two or more frames can be joined and pivot at the hinge to make a space.

linkage between memory and space, intensifying one's knowledge and relationship to the land.

The program strategy of these site interpretations, in the form of walking tours and on-location interactive spaces, is to educate the users about the Explosion and prompt them to visit Fort Needham Park to experience the memorial, create civic identity, and eventually to attend the annual commemoration ceremony.

Design Process

The principle themes guiding the design are the three theoretical texts and the influence of Carlo Scarpa's work. This thesis draws upon the necessity to explore new territory in design using architectural banal elements of the everyday to create vivid spaces that can be remembered by the individual experience yet translated as a form of a collective narrative.

Discovering Architectural Banalities

In Carlo Scarpa's architectural work, he explores the architectural banalities of the everyday and unites it with the theme of thresholds. Scarpa was able to transform ordinary architecture - such as windows, the doorway, the step, a ramp, the staircase – to become something monumental, spectacular, and expressive. For Scarpa, it was about making the everyday beautiful. Architecture provided a public vehicle for private expression and Scarpa provided a dialogue between the old and the new. His buildings

and designs produced radically new, highly personal forms with his resistance to the neutral and the growing search for individuality.³³ In Brion Cemetery, Scarpa successfully found private expression in sympathy. Fumihiko Maki, a Japanese architect, views Scarpa's design process as a work of explorations and discoveries: "Architectural creation is not invention but discovery; it is not a pursuit of something beyond the imagination but the externalization of the collective imagination of an age."³⁴

Measuring the Individual and the Collective

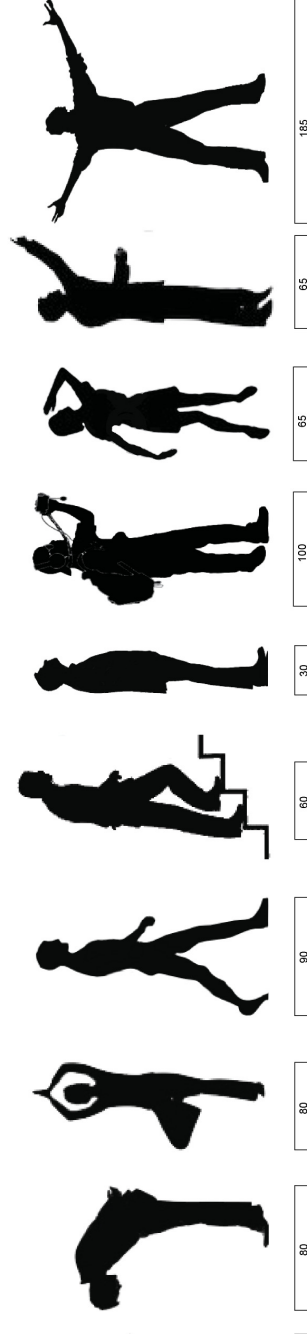
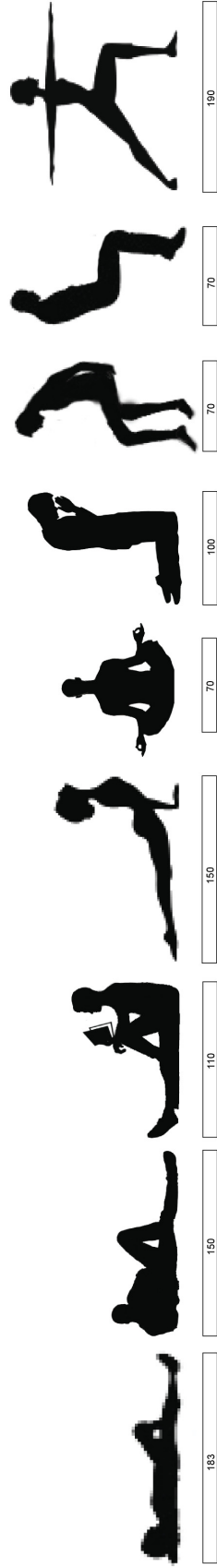
Taking Le Corbusier's example of the modular man, I pursued the study of the horizontal dimensions/limits of the average Canadian human body. The diagram shows the approximate amount of horizontal space that is needed for a single person, a pair of people, as a group of a few, and as a crowd. These dimensions became a critical element in the design process of specific haptic spaces within the building so to benefit both the individual and the collective experience.

Exploring the Wall as Space

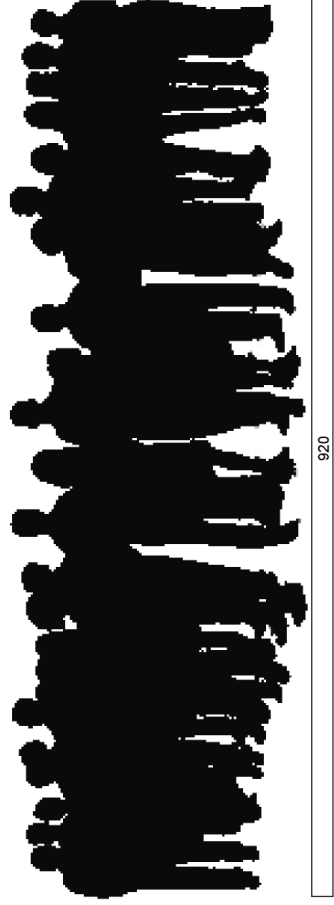
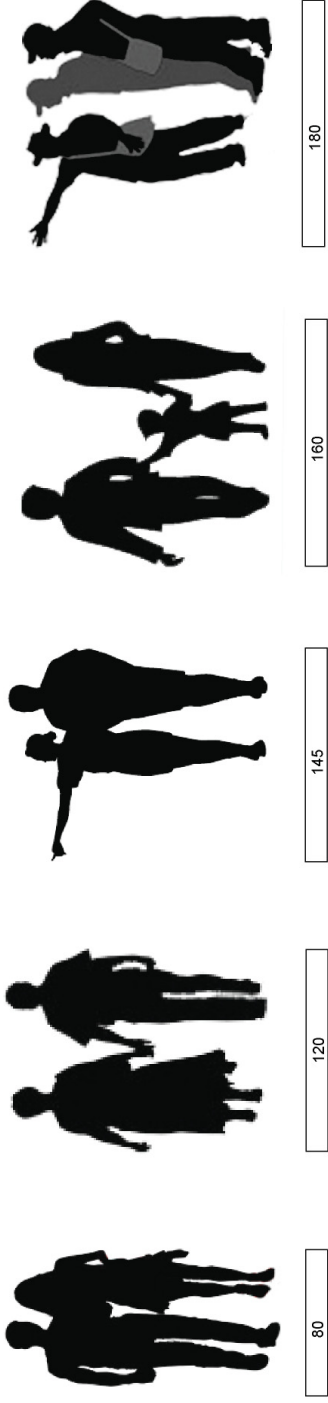
The wall as a medium has the ability to create many different types of spaces within and between itself by using the elements of threshold and transitions. Imagining the wall as an inhabitable space (rather than an object) that relates to the presense of a body, multiple creative forms can be devised to

³³ Nicholas Olsberg, *Carlo Scarpa, Architect: Intervening with History* (Montreal, Quebec: Canadian Centre for Architecture, 1999), 238.

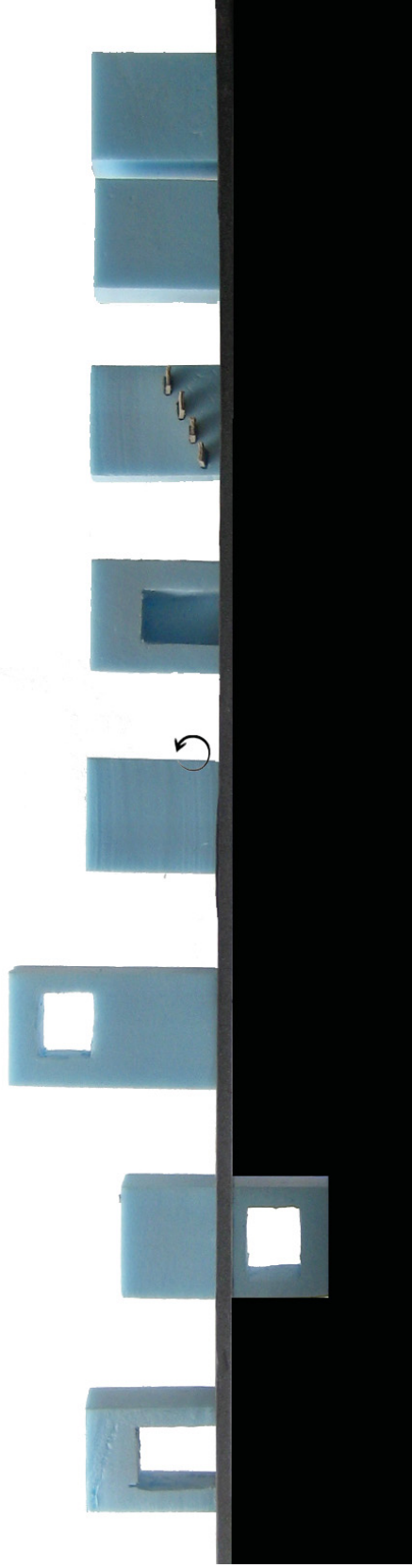
³⁴ Ibid.



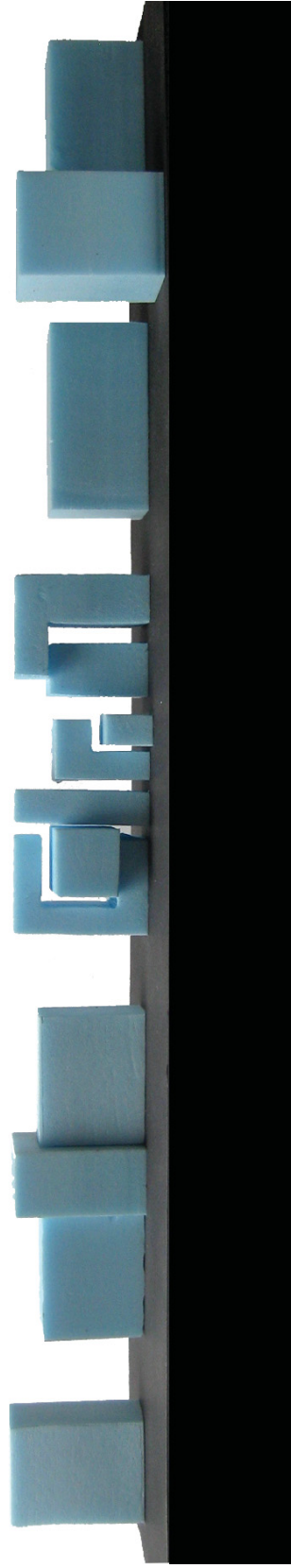
Horizontal dimensions (in cms) of the average human body engaging in different activities. Dimensions show the amount of space each activity needs in relation to an individual, a few people, a small group, and a large group.



Horizontal dimensions (in cms) of the average human body engaging in different activities. Dimensions show the amount of space each activity needs in relation to an individual, a few people, a small group, and a large group.



through under above around within on separated



isolation collision fragmentation projection

Physical models showing different ideas of using a wall to create various types of spaces.

formulate different individual haptic experiences. Assuming the wall is analogous and having a deep thickness, spaces can be created through, under, above, within the wall itself, etc. The wall can be a stand-alone feature remaining in isolation or can be confrontational to the individual forcing them to walk around it. Combining and shifting multiple walls can create many forms, voids, and spaces. The idea that individual memory is intitated between a single wall, or multiple walls, became a component of exploration in my design.

Similarly, Monica Wyatt explores the meaning of a wall in her thesis at Cranbrook Academy of Art entitled "Space-Enfolding-Breath".³⁵ She questions the definition of a wall:

To define a wall: What is a wall?

Is a wall defined by its thickness, height, and resistance to penetration?

Is a wall measurable, finite, with two sites, this side and the other?

Is a wall defined by what occurs on the other side?

Is a wall an object such as myself with space separating us?

Can I be (in) a wall, fixed and watching bodies move with space separating us?

Can a wall be merely the surface with which one comes in contact, with the substance behind/ beyond the surface as something else?

Can I define a wall considering only the frontal relationships, just one of the surfaces?
Is a wall the surface with which I am immediately confronted?

35 Lois Weinthal, *Towards a New Interior: An Anthology of Interior Design Theory* (New York: Princeton Architectural Press, 2011), 341.

(Can the wall be that which always separates me from the other object? Is space the medium that always separates, or does it merely fill the gap that is impassable?)³⁶

Sequence Organization and Representation

In the process of researching and gathering information about the Halifax Explosion, an organizational approach was taken to separate factual and non-factual information. Factual information included the precise timing of particular events that lead up to the explosion, the precise elements that occurred at the time of the explosion, and the train of events that followed afterwards. Non-factual information included personal anecdotes, material objects that survived the explosion, along with movies and songs that were created to interpret and retell the story.

All this information required a holistic understanding of the sequence of events in the manner it occurred. This sequence was further organized into a linear manner and grouped according to space and time. The result of this became the building sequence as it corresponds to the narration of the Halifax Explosion.

Like Scarpa's buildings, there is one singular delineated pathway throughout the building. The pathway becomes the only steady tread that accompanies the visitor from the beginning of the journey to the end of the building, like a constant comrade.

36 Ibid.

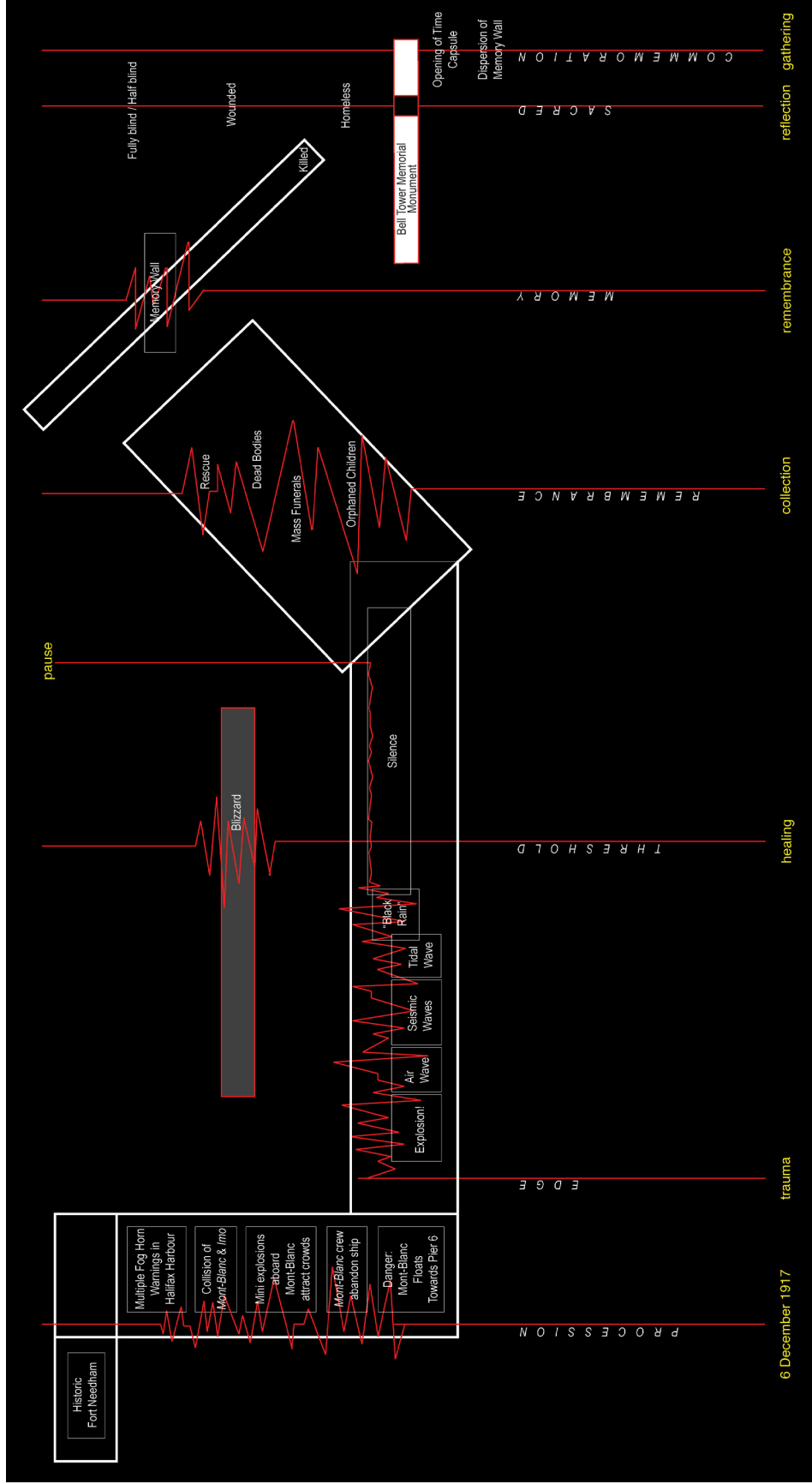


Diagram of the sequential events leading up to, during, and after the Halifax Explosion on December 6th, 1917. The organization of information resulted in the final building sequence for this thesis.

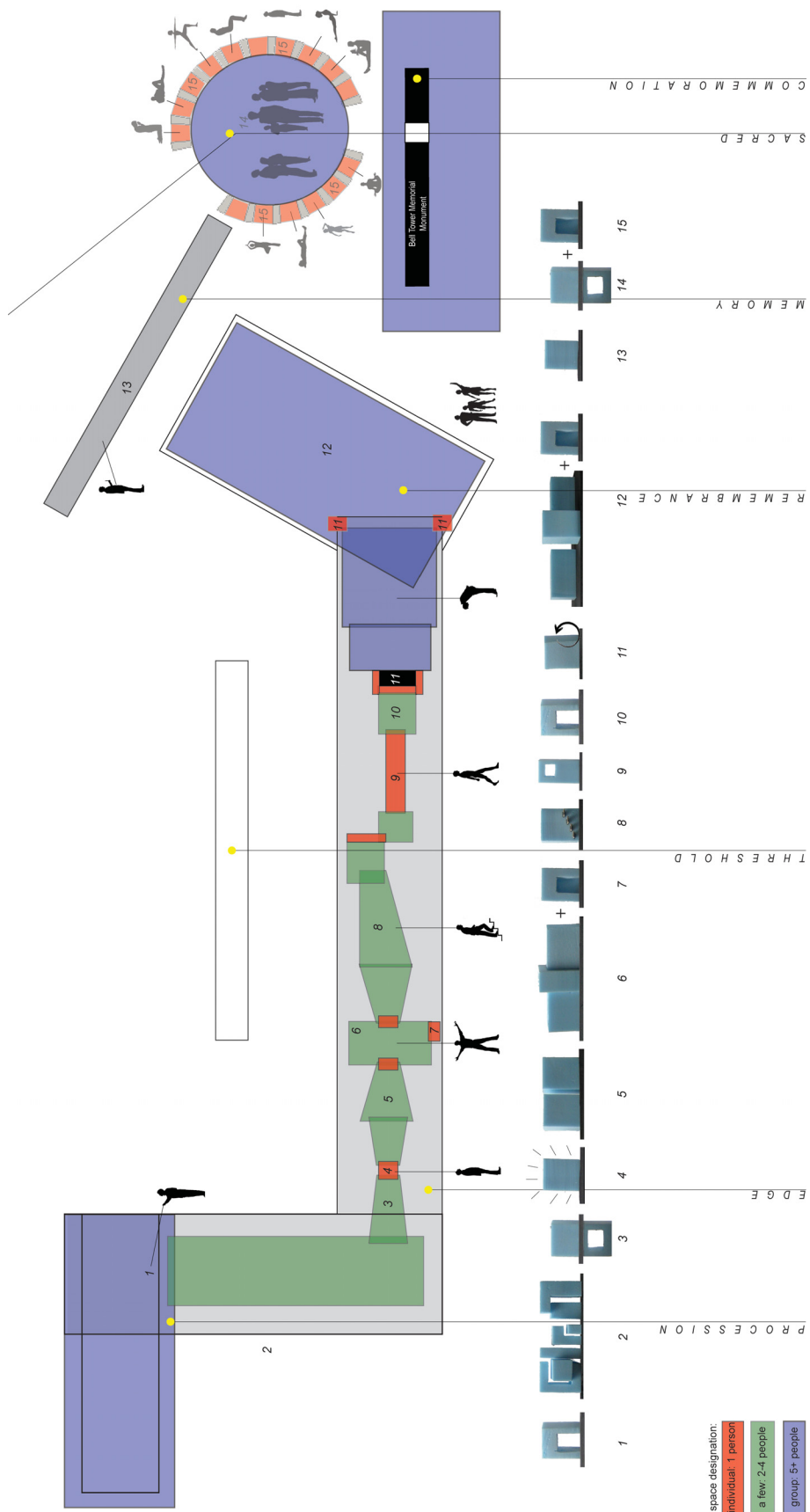


Diagram indicating the transition of various wall conditions and the relationship between the number of users within each sequence of spaces.

Spatial Exploration

The process of spatial exploration was derived from Bachelard's opposites between the spaces of the cellar and the attic: verticality below the ground is intended to create within the imagination a sense of mystery and a hesitation to the depths of the unknown, whereas verticality above the ground gave a feeling of clarity, freedom, and comfort.

The process was initiated by exploring the spatial relationships between horizontal expansion and vertical release/compression. Along the sequence, some spaces will allow for groups of people to gather, and other spaces are deliberately smaller and narrower strictly allowing the space for one person. The differences in scale and height create different spatial dynamics within the building sequence and are intended to alter the relationship between body and its environment.

Creating Interpretation through Architectural Mimicry

Borrowing the techniques and methods to create artificial memory in *The Art of Memory*, the design was generated by creating artificial places to contain each sequential fact (i.e. explosion, air wave, seismic wave, tidal wave, "black rain", etc.). As a result, multiple rooms with architectural features were composed. Each room contained one artificial object, which when seen or experienced with the senses would become associated with a fact that co-relates to the Halifax Explosion (i.e. fire, air, earth, water, etc.). Each room along the building sequence contains no more than

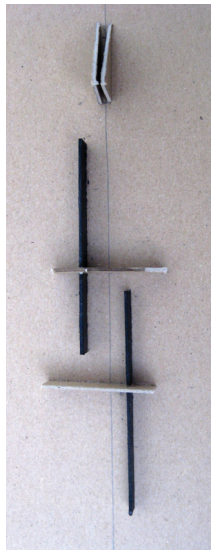
two haptic senses (i.e. sight, touch, hearing, smell, taste) so to avoid overloading the creation of memory within a space through bodily experience.

There exists a certain level of architectural mimicry involved in the attempt of representing (or interpreting) a historical event. Similar to art, art is active and architecture calls for active spaces requiring one to ponder and be curious about what is unseen and untold. Architectural interpretation does not reveal everything at one particular instance. To create a bit of curiosity, an individual is required to be actively engaged in the moment. The first encounter of these active spaces calls for an immediate response and reaction rather than the passive observation or understanding of information. It is intended that the visitor is able to interpret and self analyze the architectural reference and draw from it, the important details that relate it to the Explosion. Similarly, architecture as a building can be thought of in a theatrical sense where the building becomes the actor, and the visitor is the audience seeing the play by encountering the sequence and spaces within the building. The collective memory involves a memorial that is always evolving depending on who participates; it is never fixed, and its conditions are always different because different people are being engaged.

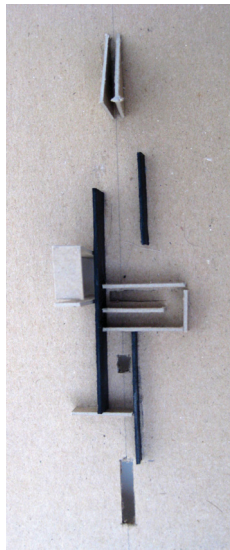
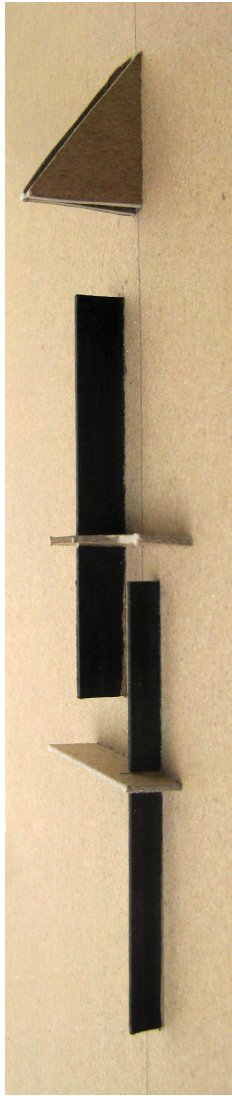
Furthermore, taking the exploration of the wall as a space, each room within the sequence is intended to mimic a specific moment in time (in relation to the Halifax Explosion). The individual, not knowing

what is awaiting in front of them, experiences each moment in the sequence like a pleasant or a horrific surprise. The visitor will first encounter a space then experience the space. Their haptic bodily memory will experience spaces that are unpredictable and architecturally irregular. These spaces of oddities and unfamiliarity inspire to initiate a bodily memory in the visitor so that they can recall the sequence and narrative by retracing their memory to the strikingly unusual, exceptionally beautiful, unbelievably odd or ridiculous things they have experienced.

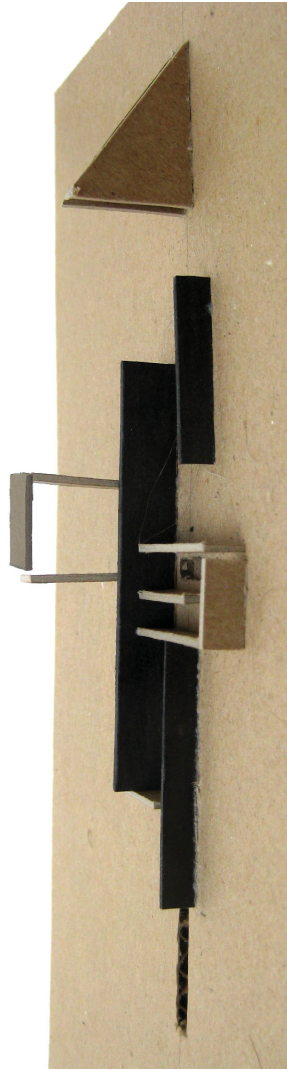
Personal experience is remembered and associated with the qualities of a particular phenomenon. Throughout the design process, physical models were created that allowed me to focus on the haptic phenomenological experience and the visual quality of light witnessed by the projectary of light and the edge of the shadow. Spaces were best explored through multiple renditions of sketches, painting exercises, and through physical models that drew out the ideas and images of the imagination.



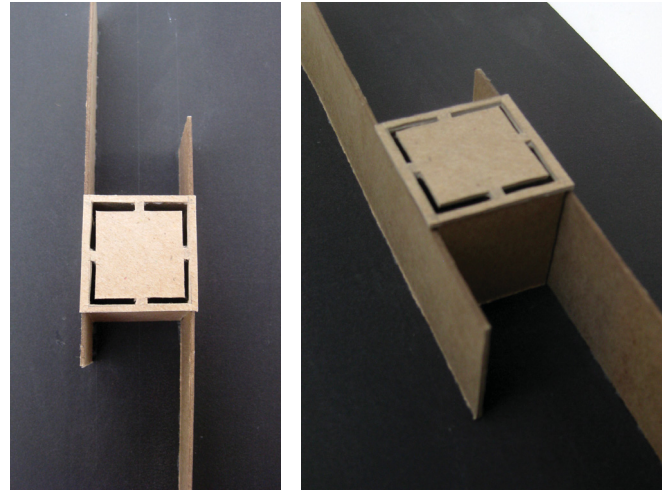
Study 1



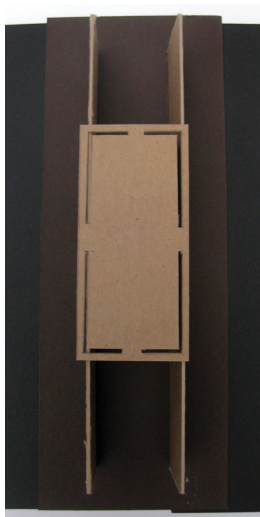
Study 2



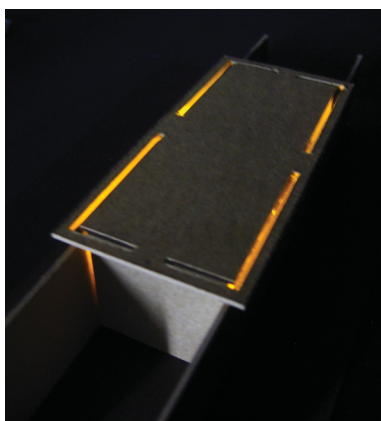
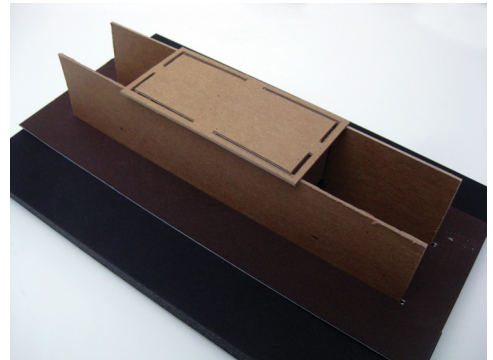
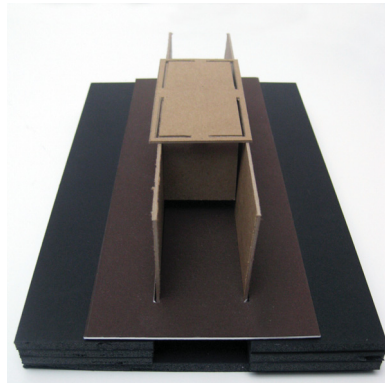
Preliminary studies of inhabiting the space between two walls as an idea that visually frames the view of Bell Tower Memorial and physically becomes a pathway that brings you to it.



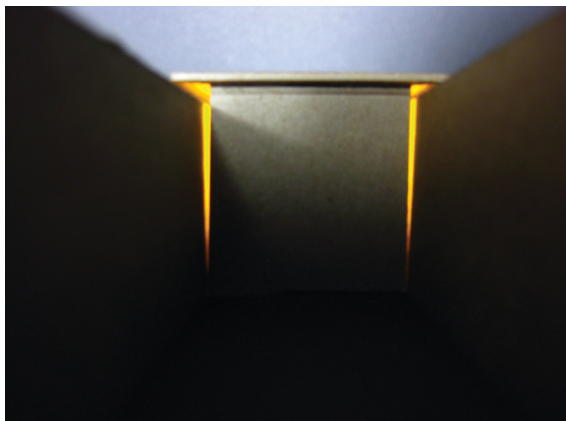
Study 1



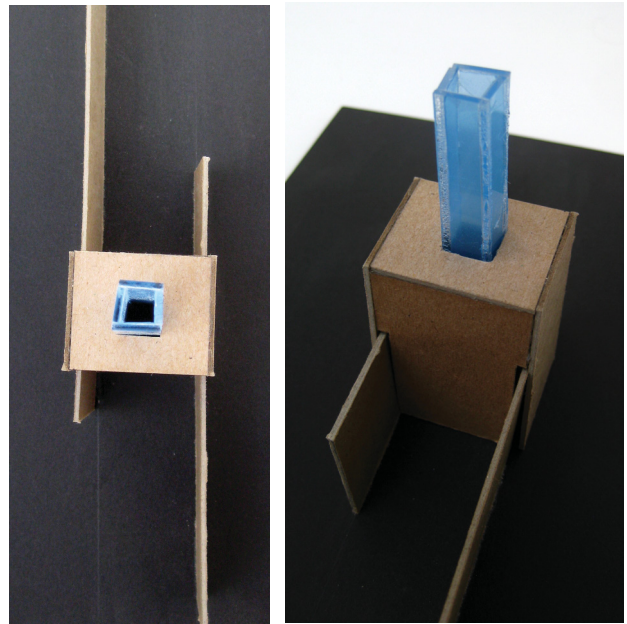
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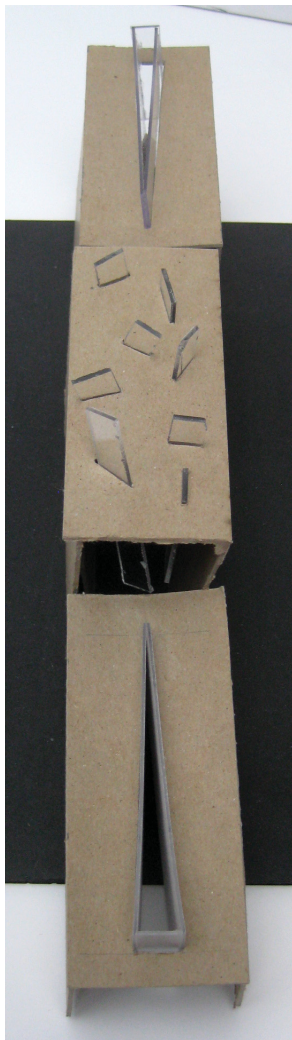
Light study



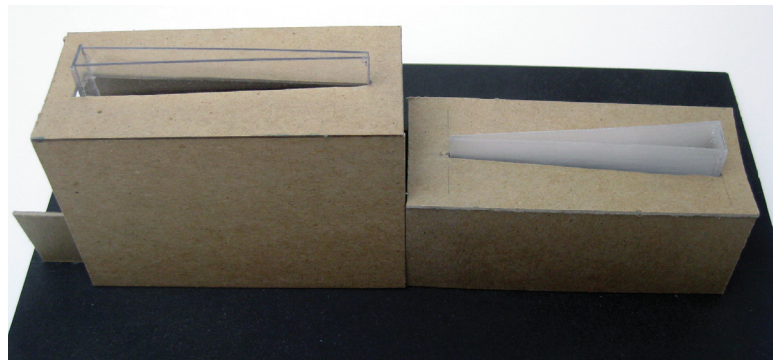
Fire (sketch model)



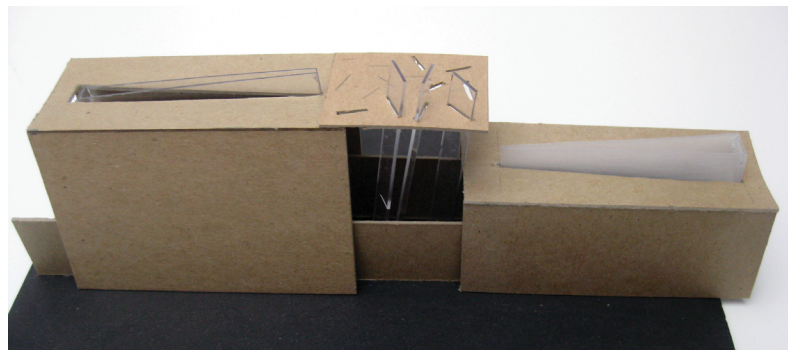
Study 1



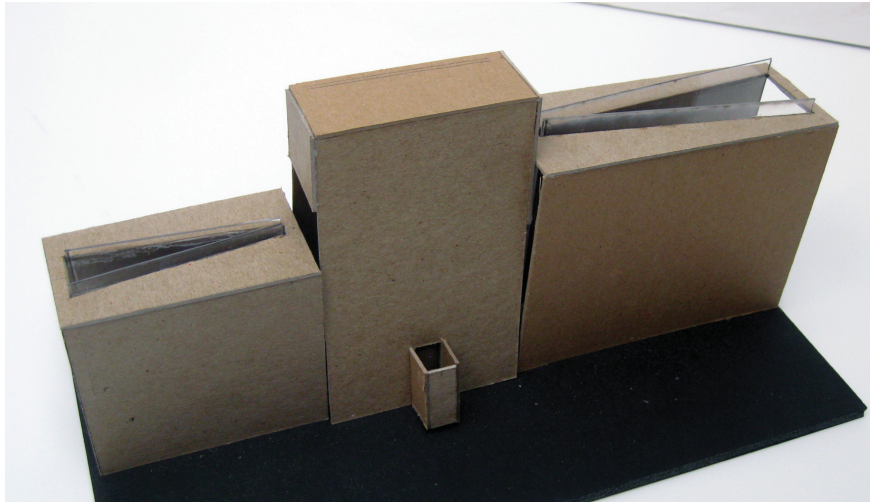
Air (sketch model)



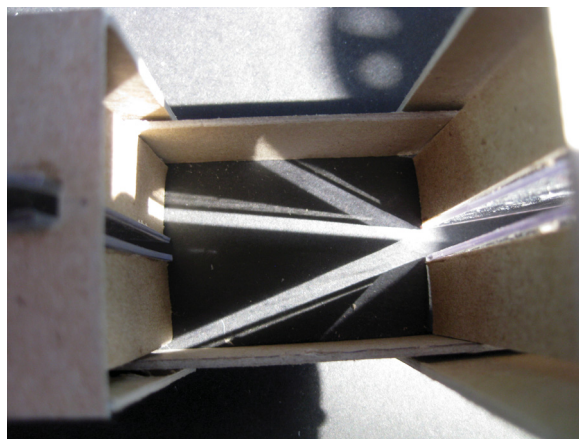
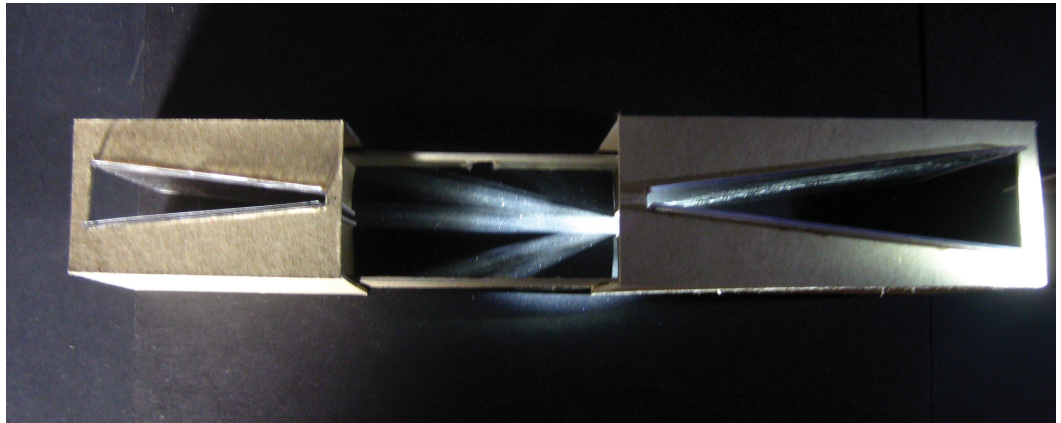
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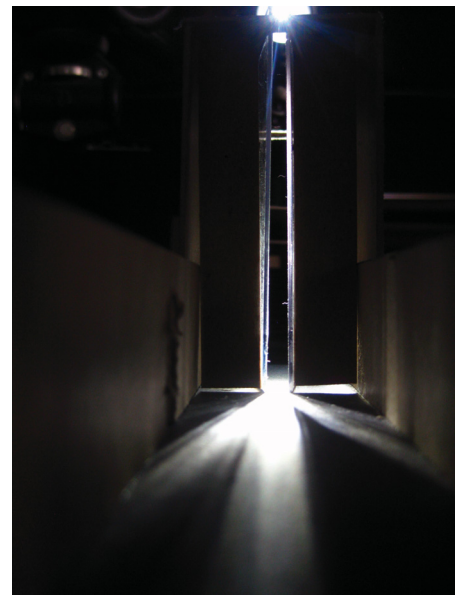
Study 3



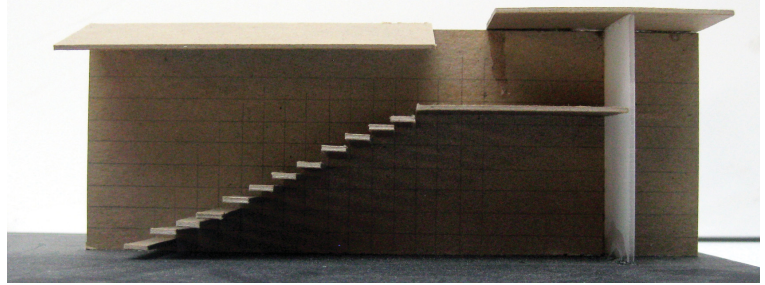
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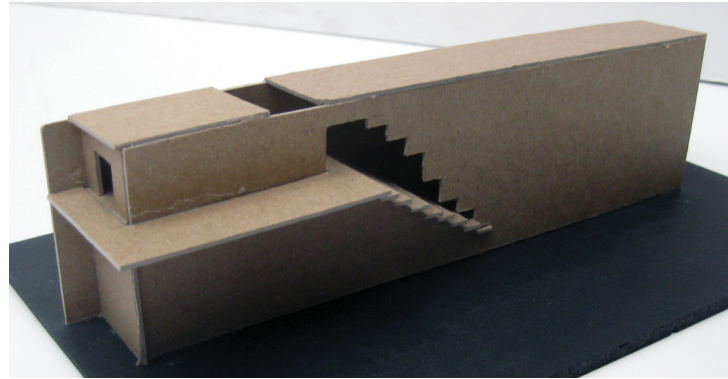
Light study



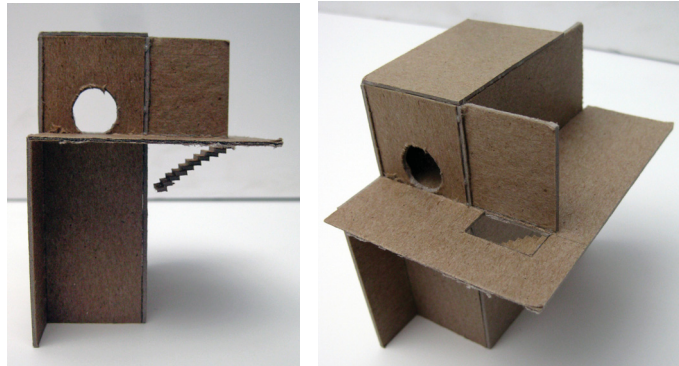
Air (sketch model)



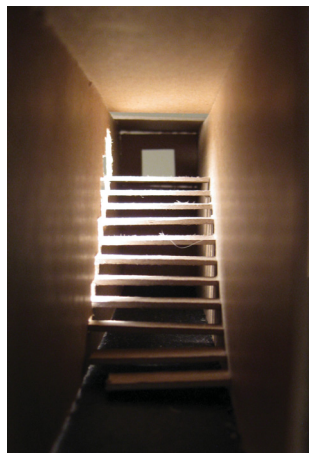
Study 1



Study 2

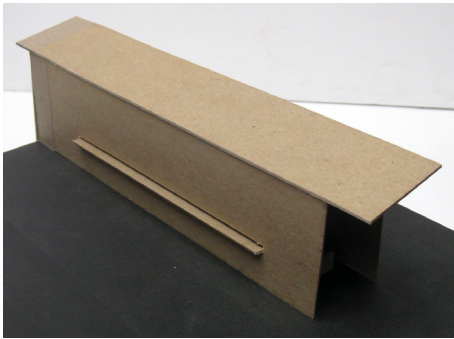


Study 3

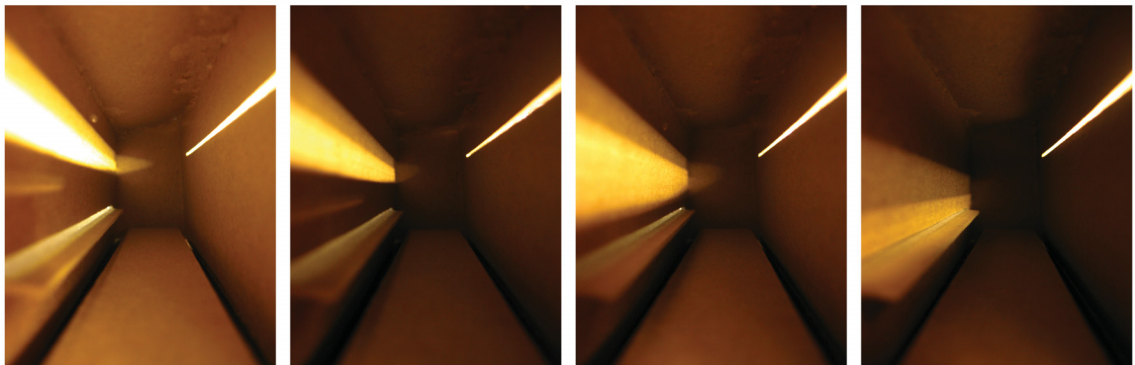
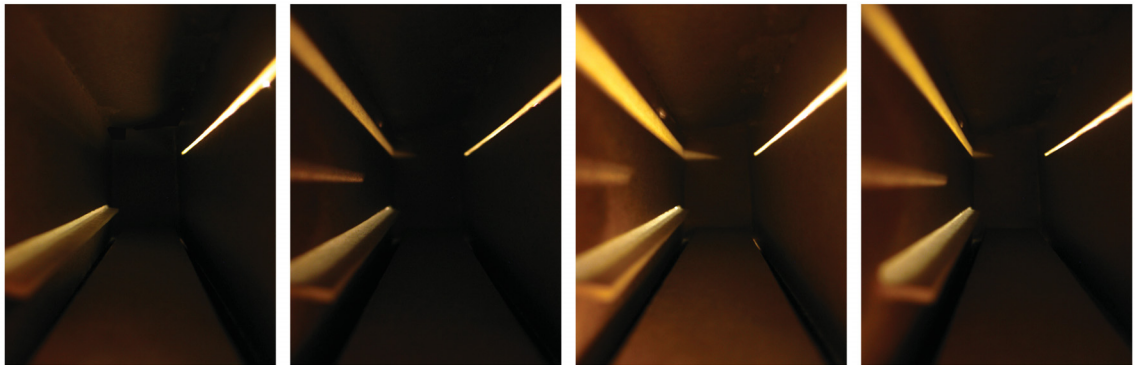
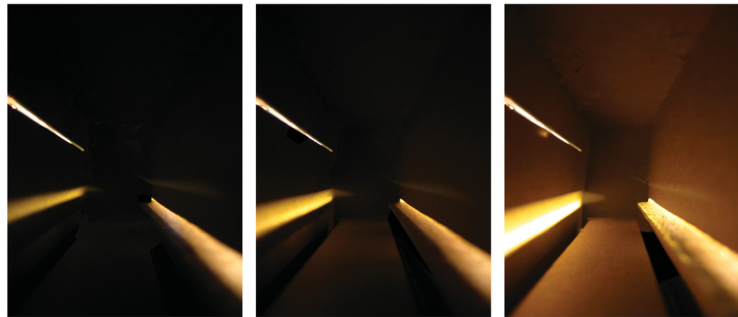


Light study

Earth (sketch model)

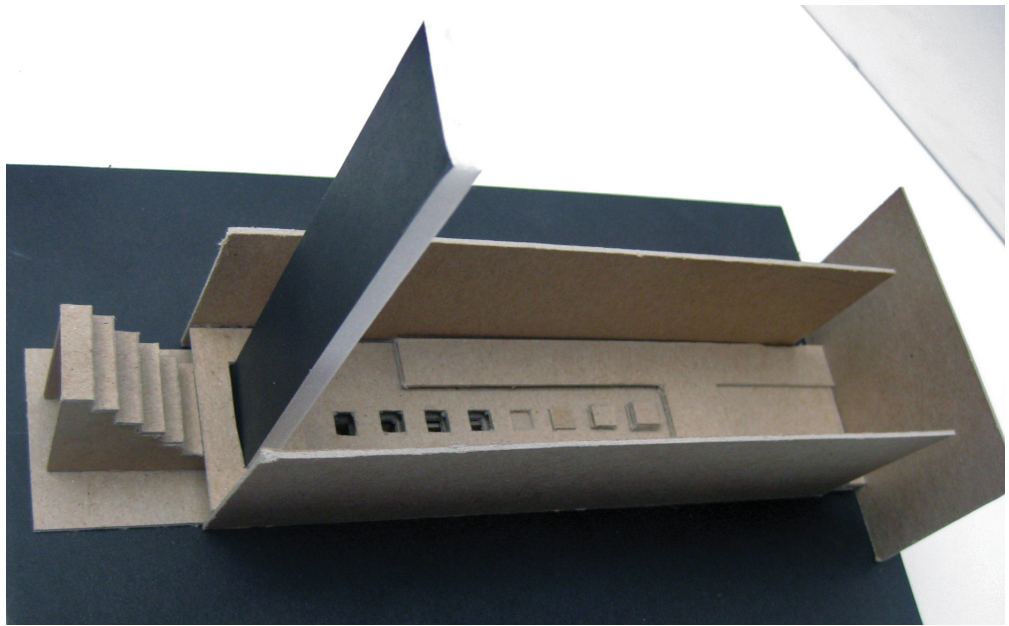


Study 1

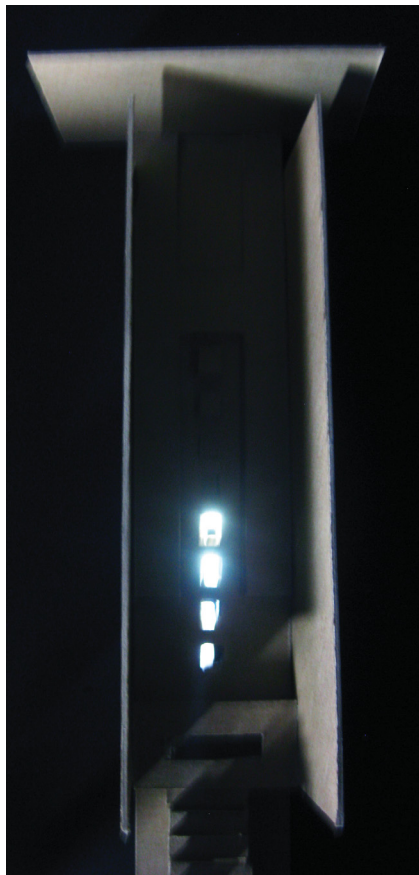


Light study

Water (sketch model)



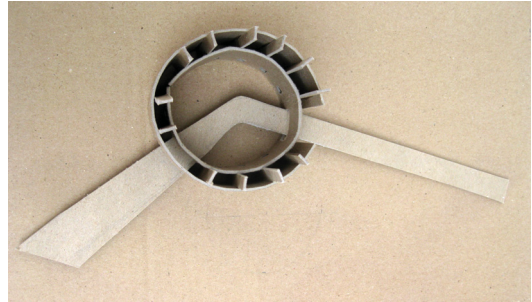
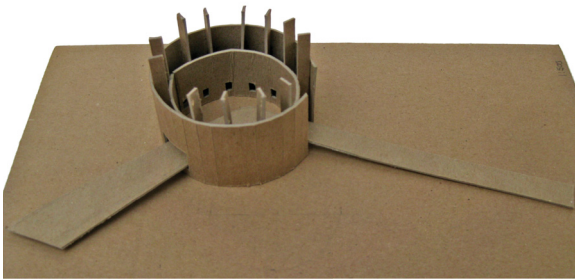
Study 1



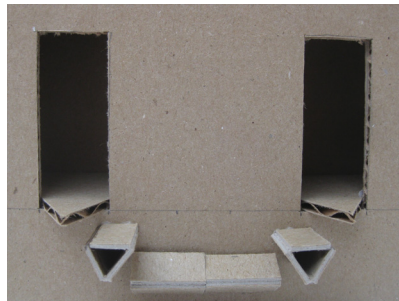
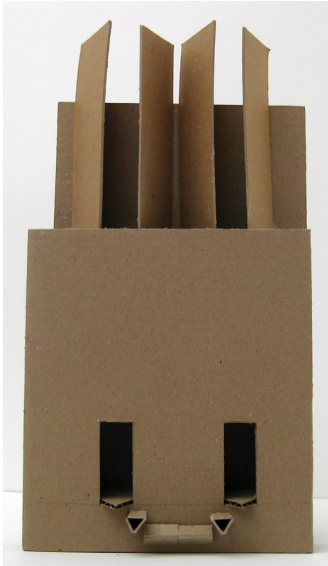
Light study



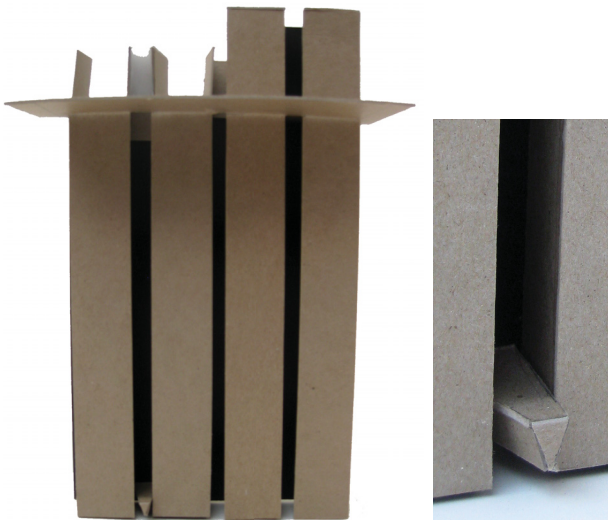
"Black Rain" (sketch model)



Study 1



Study 2



Study 3

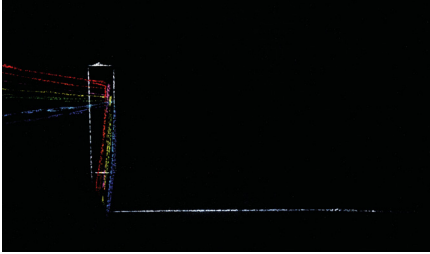
The developmental studies of the sacred space (sketch models) showing form and detail of the bronze steps.

Chapter 2: Final Design

The final design is composed of a collection of encounters and moments experienced by the visitor. The haptic experience within each space was developed by the investigation of the wall as a condition and the involvement of the individual versus the dynamics of a group. Spaces were explored through 1:50 physical models.

Through the process of design development, small adjustments and refinements were made in each model. Every condition and space in the sequence was meticulously thought-out and designed with the focus and detail of the passage of sunlight. The spaces were refined and combined in a sequential order to form the haptic experiences of mimicking the events leading up to, during, and after the Halifax Explosion. The seven main sections explored in the sequence had to maintain their original unique characteristics, meanwhile taking into consideration the atmospheric qualities of the next space and its relationship from the room before it. Using this method of design, each space could be united to the next to form a cohesive whole as a building unit through the transition of thresholds and the understanding of light conditions.

All these spaces were deliberately designed with with the intension that one is able to use their imagination to draw reference to the events of the Halifax Explosion.

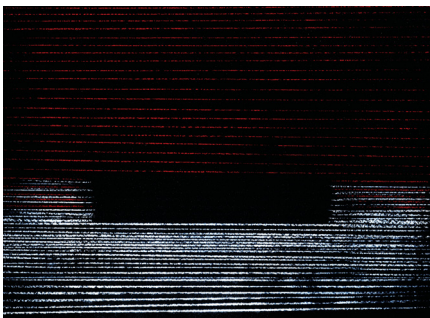


'Procession' is like a prism of light.

Procession

The procession begins as the first space a visitor encounters on the site: the forecourt. The forecourt is the beginning of the building sequence; it is a meeting place where people gather and anticipate what is to be experienced ahead. A small fountain is located in the forecourt acting as a reference point the exact historic location of former Fort Needham (prior to the Halifax Explosion). The previous openings of the south wall allow for the spontaneous flow of people into the space. This space contains a small gallery with historic information panels about the site and a brief history of the Explosion.

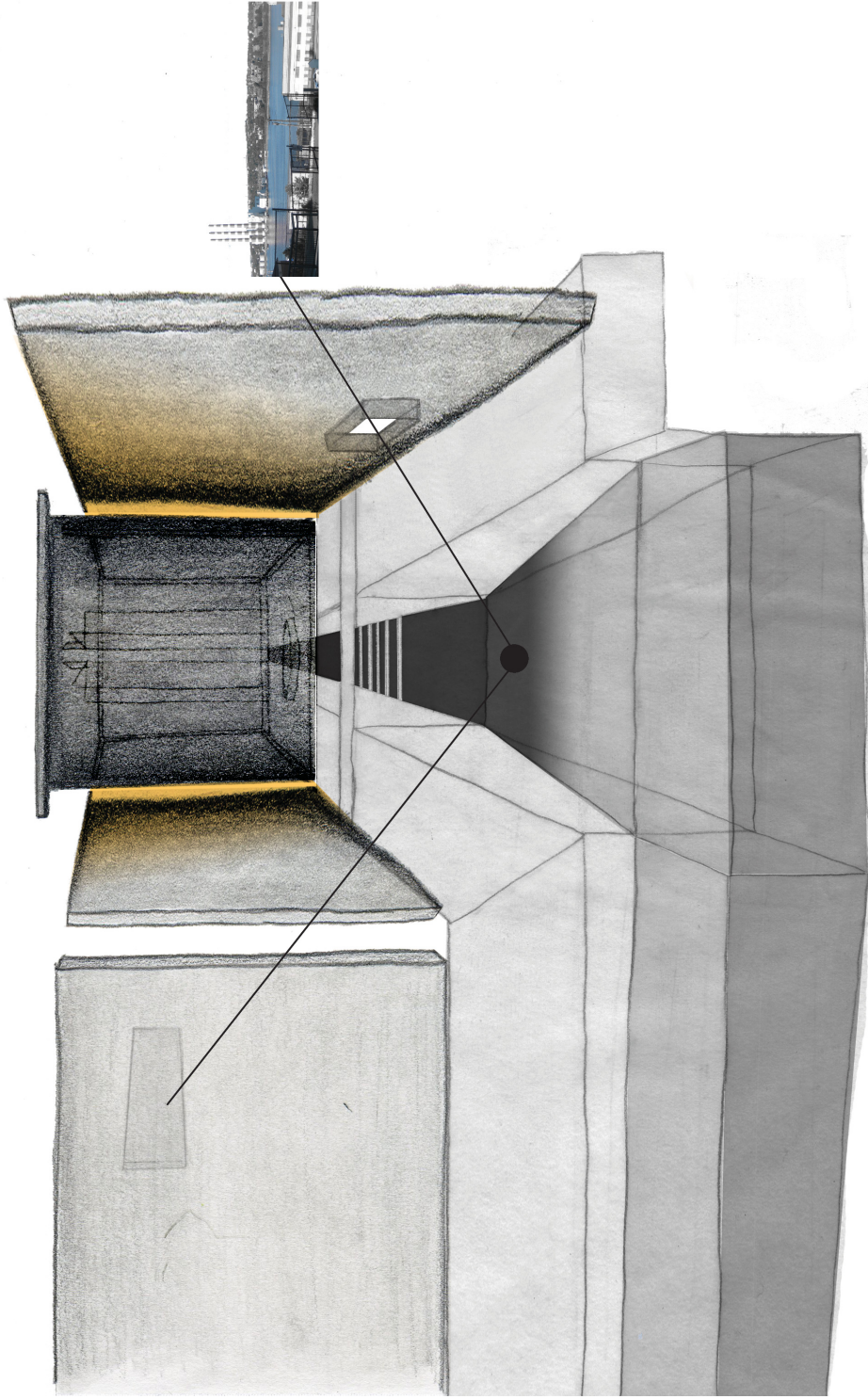
The 'procession' channels people into the space like light through a prism, directing an orderly movement towards the entrance of the building. While entering into this space, individuals must pass under a bell tower that contain a single bell, which can only be activated manually, alluding to the old foghorn warning signals that both ships made before the collision. As the building sequence begins with a bell that is added and manually activated, it ends with ten bells on the Bell Tower Memorial that is triggered electronically once a year at the commemoration ceremony.



'Edge' is a marked by the extent of the explosion.

Edge

The 'edge' becomes a metaphor for the extent of the physical destruction of the blast that reached the top of Fort Needham hill. The Rooms of Trauma are placed along this edge and refers to the memories associated with the traumatic experiences and



Procession / 1917: a visual reference to Halifax Harbour and to the Memory Wall between the two encompassing walls before descending underground.

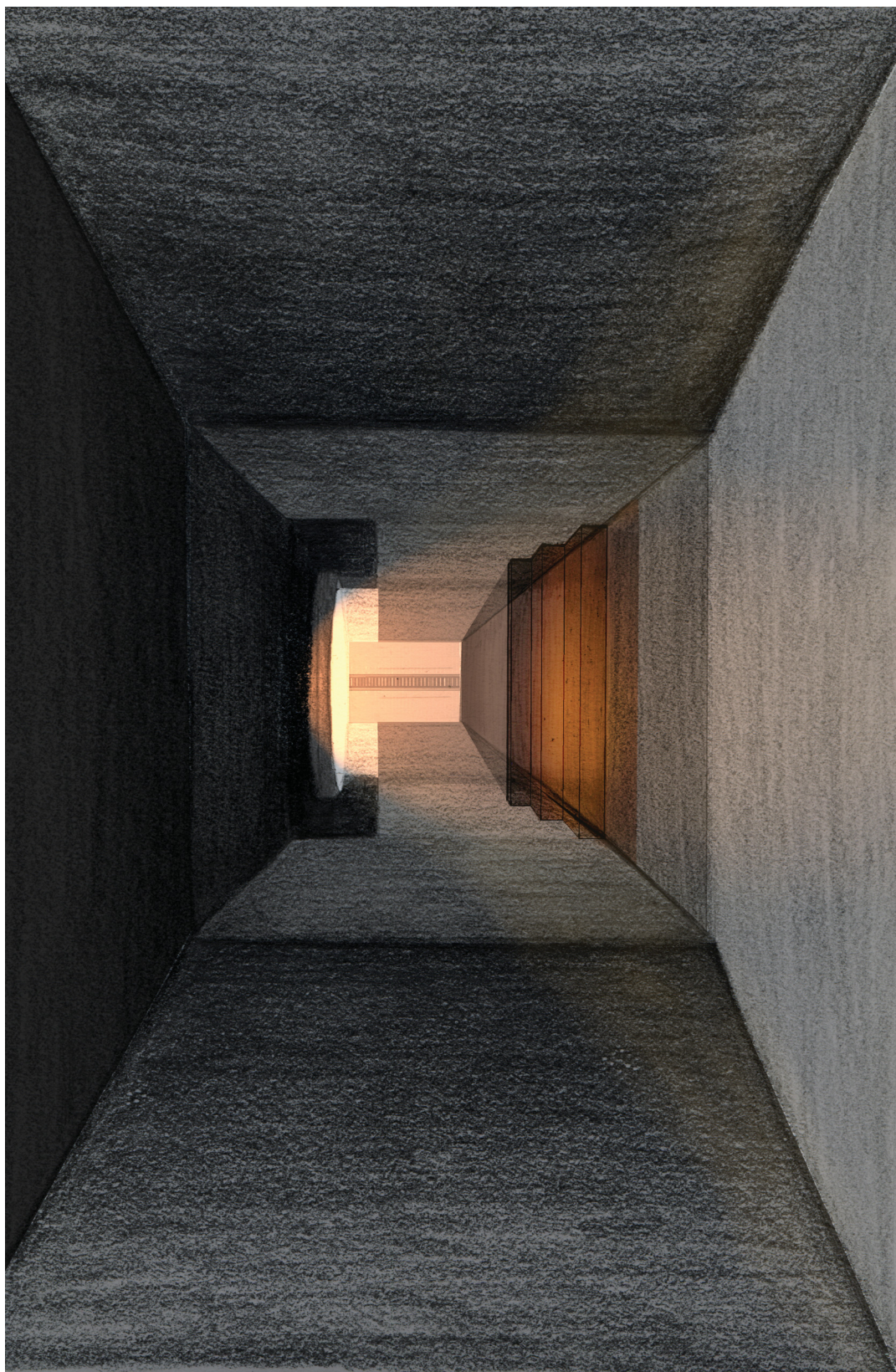
the shock to the human system that changed the community and the landscape forever – the edge of life.

Rooms of Trauma

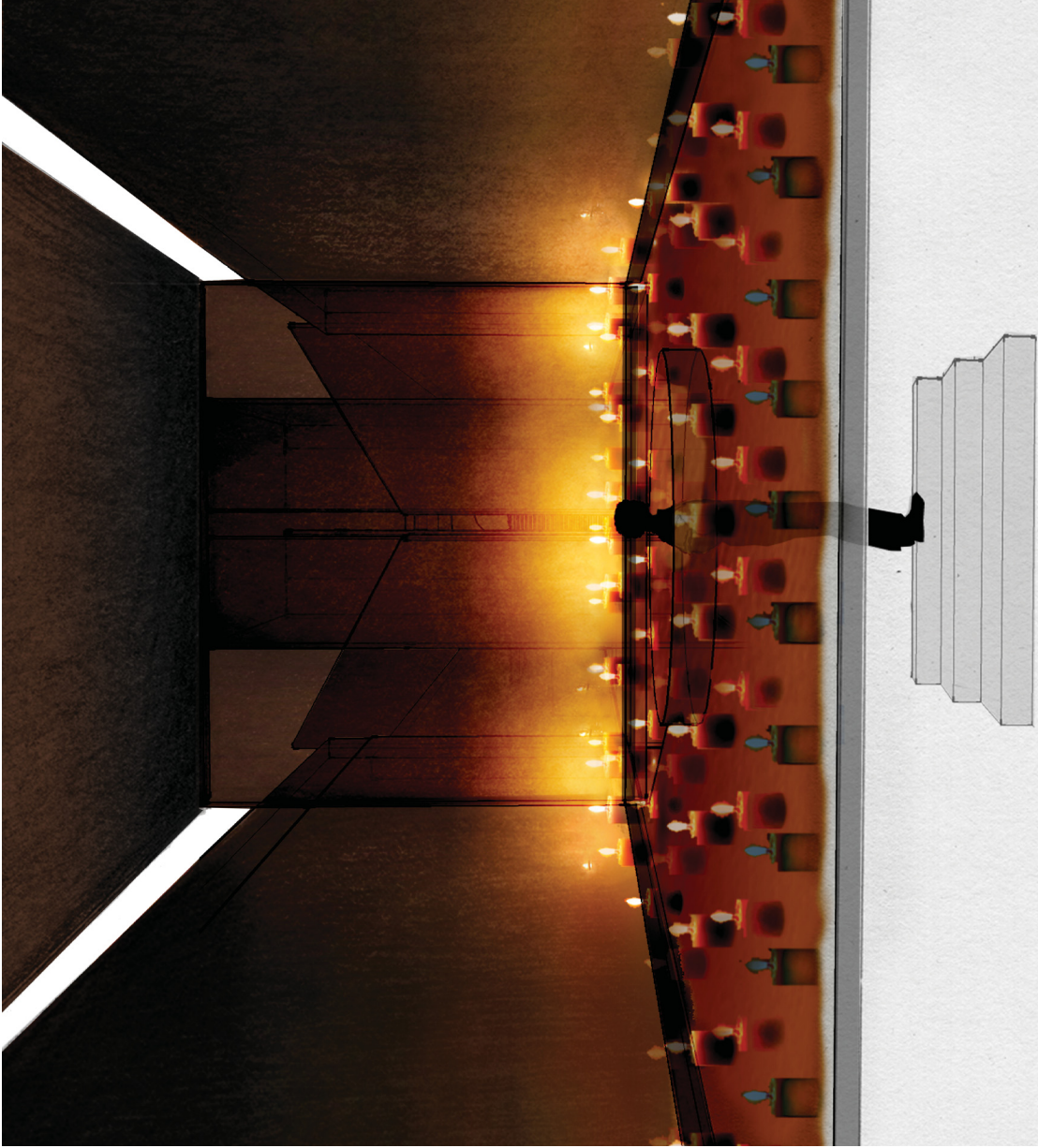
Fire

Visitors enter the building by following a pathway that takes them underground. Along the dark pathway, they encounter the presence of a soft glowing light. Three peculiar steps are lit from a light source from above. The individual steps up these three steps and protrudes their head into a circular hole, and experiences a rectangular room filled with candles at floor height. The individual does not and cannot actually enter into this room, and is only able to see the many flames of the candles at eye-level. Dimly lit, the eyes are able to read the texture of this room with its rough slate walls. The candlelight flickers and pulsates during the night mimicking that of a lighthouse marking danger for pilots at sea.

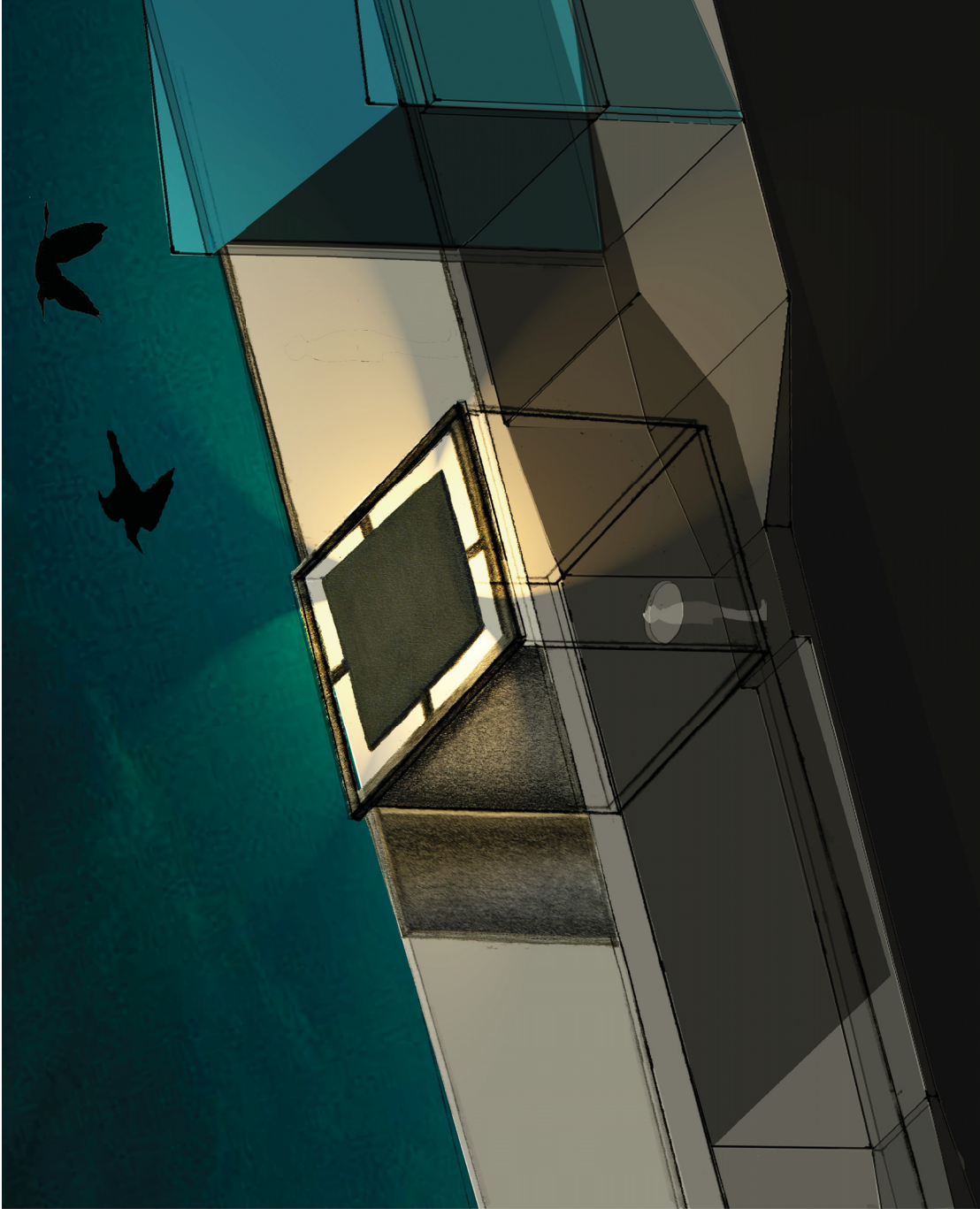
This first room begins the narration of the factual and linear sequence of the explosion. The Fire Room is intended to artificially recreate the imagined feelings associated with the fascination of the multiple mini explosions aboard the *Mont Blanc* ship, moments just before the explosion. It is imagined that one can also interpret this room as the metaphor to the single brilliant flash of light that illuminated the sky at the precise moment of the explosion.



Edge / Trauma: underground procession to the Fire Room.



Edge / Trauma: Fire Room (explosion)

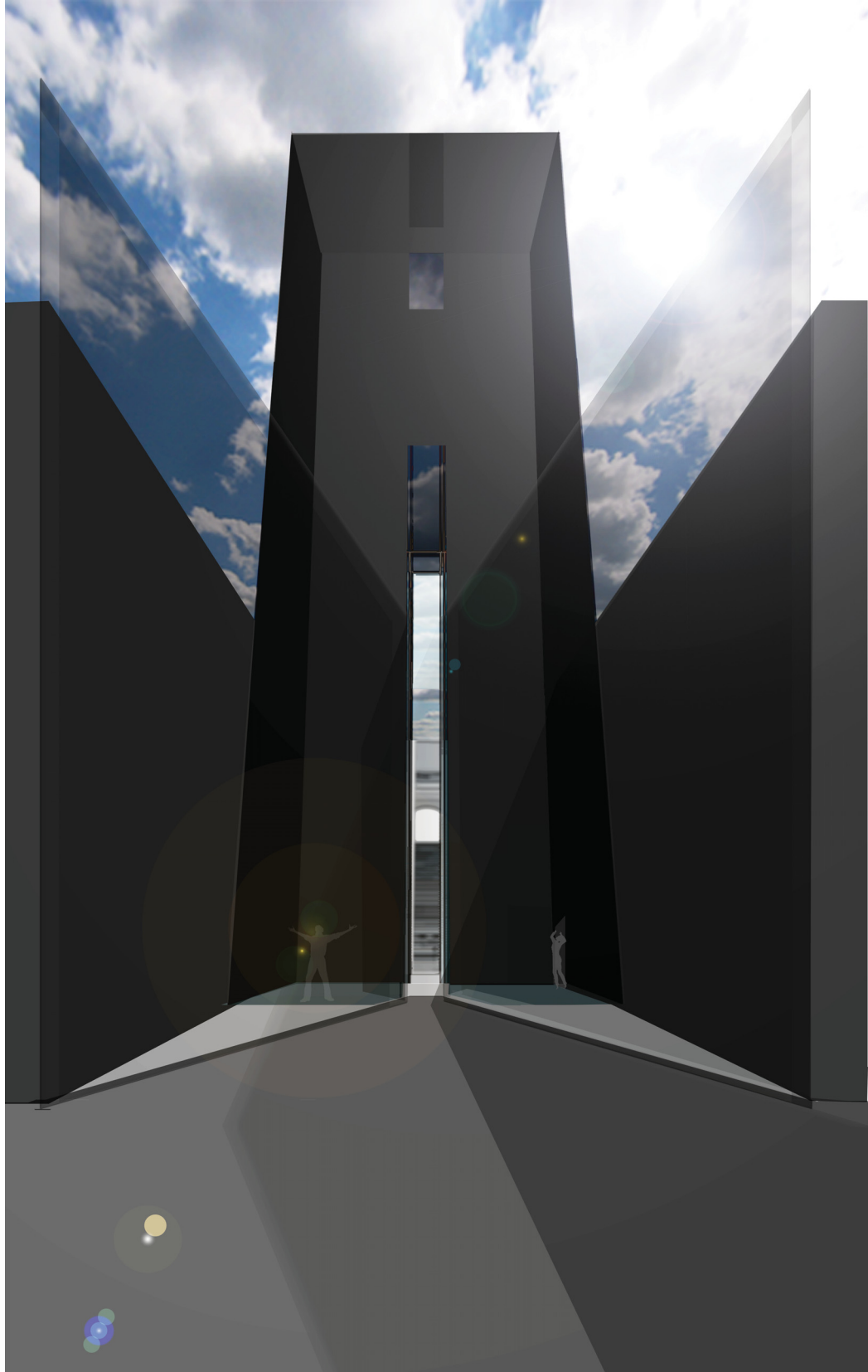


Edge / Trauma: aerial view of the Fire Room

Air

Transitioning from the Fire Room, a group of no more than a few people are able to walk between the two panes of glass soaring at a height of 9 metres. Encountered as a space that dwarfs the human, sunlight becomes the overwhelming haptic experience as it is refracted and channelled between the other two panes of glass at the opposite end, creating a divine visual effect of light patterns on the floor.

The microclimate within this glass pathway is intended to create a slightly uncomfortable hot space heated by the sun (similar to a greenhouse). At the end of the glass pathway, the space gradually becomes narrower allowing for the passage of only one person. Transitioning from a heated space, the visitor enters into a surprisingly welcoming threshold of a dark tall concrete tower devoid of sunlight. At the top of the tower are two small openings for the passage of air. Much like the principles of the stack effect in an atrium, it is intended that the hot air within the confines of the glass pathways will rush into the cooler dark space of the tower and create a wind tunnel effect of a breeze felt by the visitor. Inside the tower contains a small niche tucked into the corner of room. This hidden space can only accommodate one person and is intended to provide a place of observance to view the interactions between the people within the space, their reception to the incoming streams of light and the unexpected reactions of the lift of the air. The room of air and the object of glass refers to



Edge / Trauma: air (supersonic air wave)

the supersonic airwave that traveled through the air after the explosion and created a force in the air that blew out every windows and all glassware across the Halifax peninsula and in Dartmouth.

Earth

The third experiential space mimics that of the physical force of the explosion, literally taking the metaphor of exploding through the wall. Seismic waves were felt all over the Halifax peninsula and in Dartmouth. This space plays with the idea of the familiar and the unexpected: just as an individual encounters the familiarity of a flight of stairs and assumes he will go through the circular passageway at the top of the stairs, he is actually unexpectedly led through the wall and out onto an exterior platform overlooking the garden and the community.

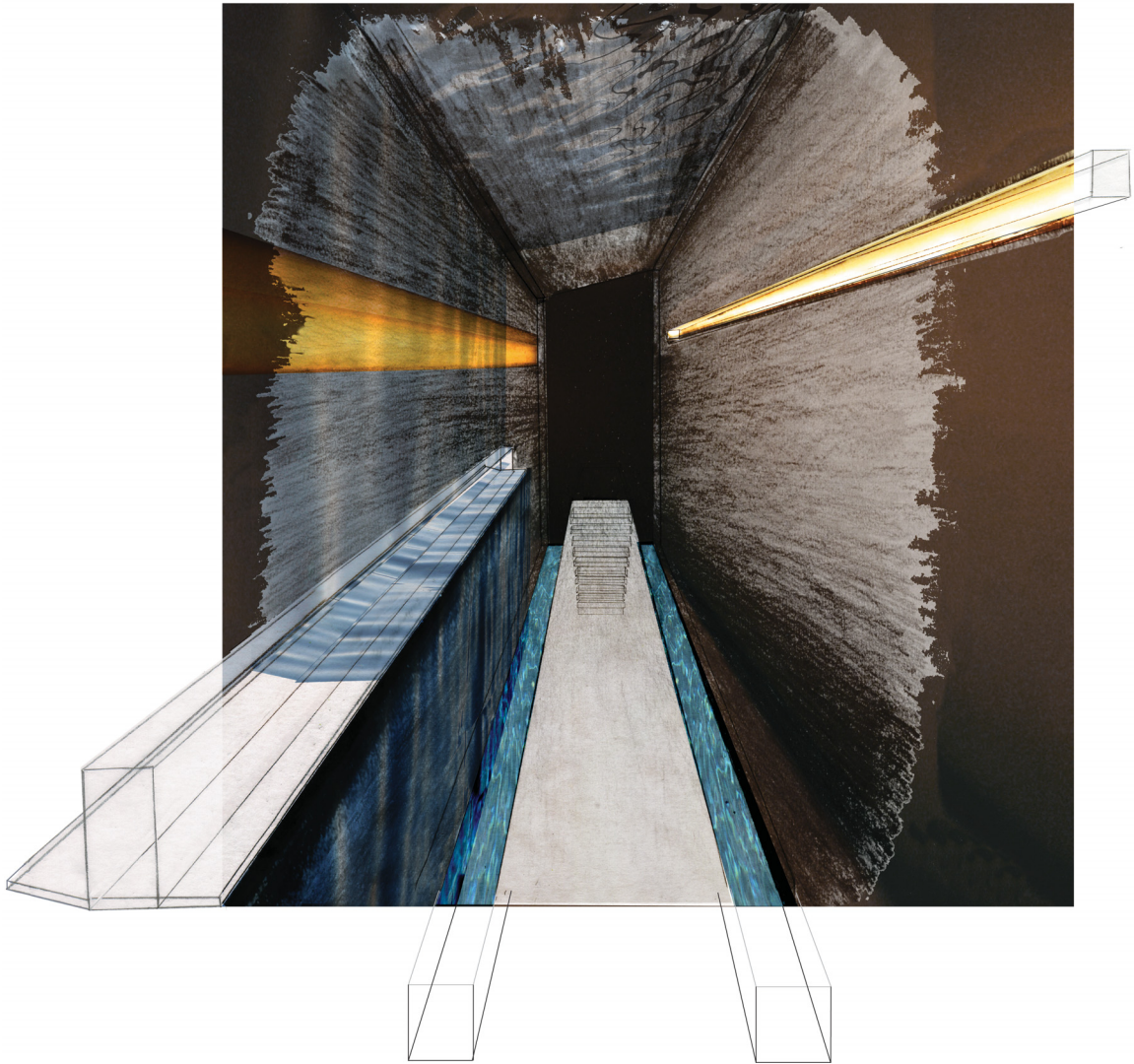
Water

Transitioning from the bright and sunny exterior overlooking the garden, a series of stairs descend down into a dark room. The fourth room in the sequence references to the tidal wave as a result of the explosion. This space allows for only one person to enter and experience it at a time.

Stepping up onto an elevated walkway, the room is dark and cool. The visitor quickly realizes they are in the midst of a pool of water that surrounds them below the walkway. Water can be heard overhead on the roof trickling slowly down the exterior left wall. There is a gap that opens to the outside, which is



Edge / Trauma: earth (seismic wave)



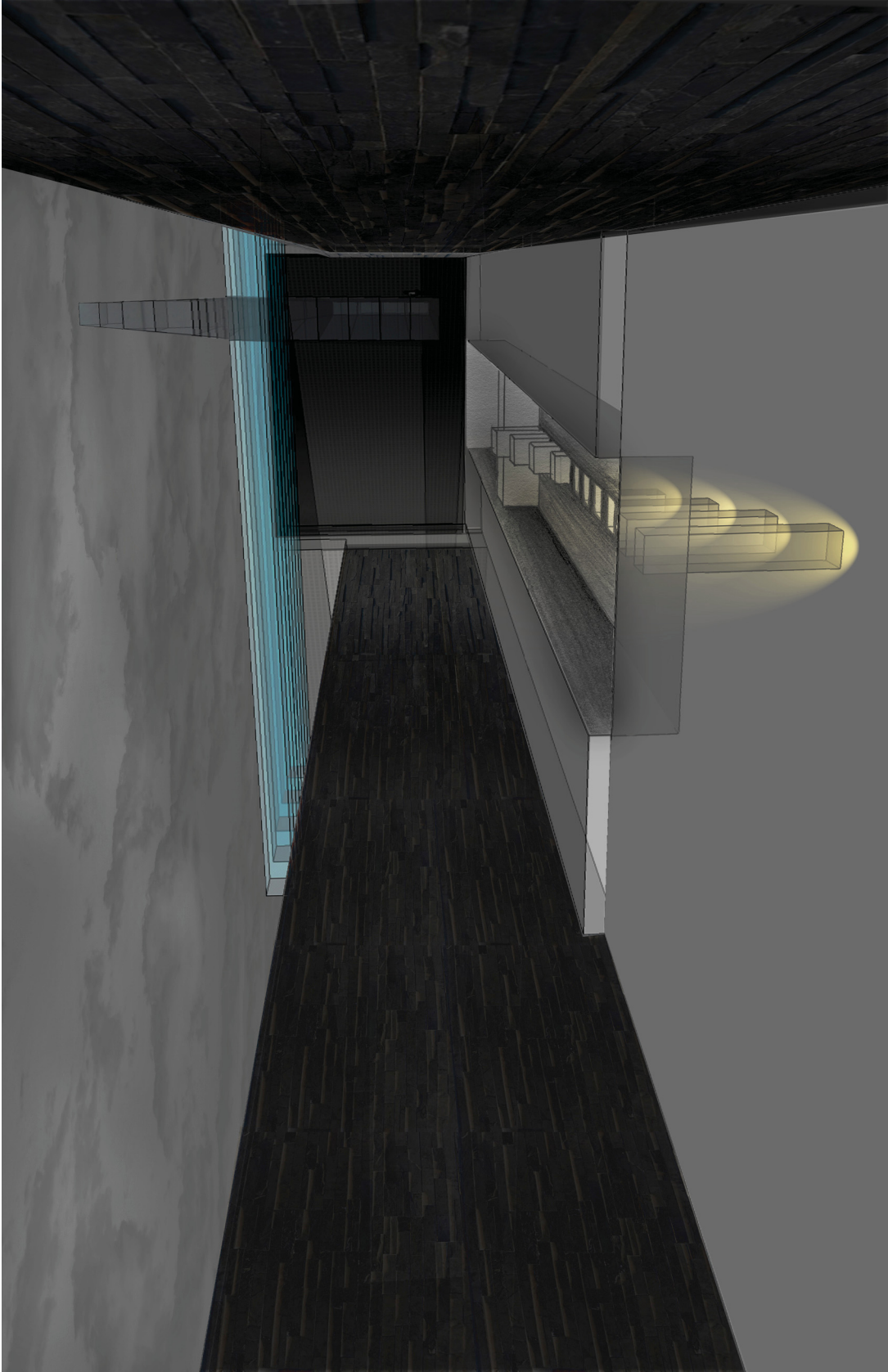
Edge / Trauma: water (tidal wave)

actually a ledge. Running the left hand along the concrete ledge, the cool sensation of water is felt on the fingertips. The water runs down the ledge and into a channel that surrounds the individual as they continue to walk forward. Distracted by a narrow beam of light entering through a slit on the right wall, the eyes look through the slit towards the water in the Halifax Harbour.

This room contains a very strong poetic gesture that connects the physical sensory element of water to the deliberately framed visual cue of water. By eliminating all senses yet concentrating on one, a heightened arousal for touch is created and provoked to be experienced.

Silence and “Black Rain”

The room of silence is a small black box designed as a threshold for an important transition. This room permits individuals to gather with other visitors and briefly ponder the dynamic co-relation of the sequence of rooms just experienced. Exiting from the room of silence to the exterior, visitors are immediately confronted with a 6 metre tall black granite sloped wall. Engraved upon the wall is a brief account of the event with factual evidence of numbers. This pause is needed to digest and comprehend the unexpected severity of the Halifax Explosion before moving onward into the next space. This stillness represents the silence that came seconds after the extreme intensity of the explosion (fire, air wave, seismic wave, tidal wave).



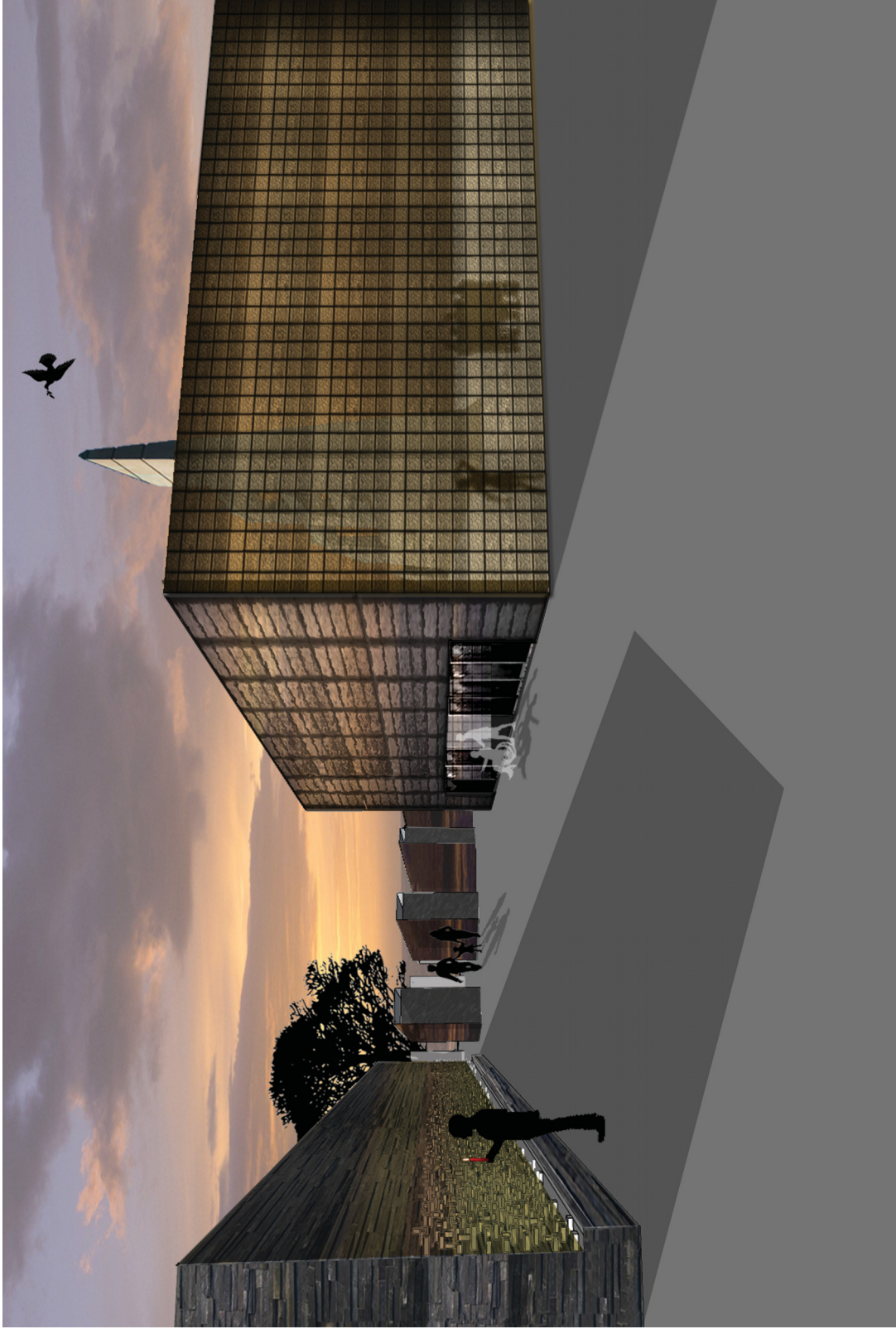
Edge / Trauma: silence, "black rain"

The black oil from the ship that fell from the sky for over an hour after the explosion was nicknamed “black rain”. Survivors were covered in a thick layer of oil from head to toe walking around the devastated site like the living-dead. This solemn space is designed for individual reflection amidst the presence of the collective.

The ground is sloped inward suggesting that during periods of high rainfall, rainwater will collect and drain down the ten water columns. Meanwhile at dry periods, visitors are able to look down to the bottom of each column and discover a clearly lit rare image of the explosion. Making an effort to satisfy the curious, it is intended that the photographic image will be something beautiful or equally shocking in order to imprint on the memory. At night, a beam of yellow light will expand out from each column and onto the glass beams before refracting up into the sky thereby creating a mysterious glow to trigger the memory of the images.

Remembrance / Collection: Vitrine for Artefacts

The vitrine is a space for reflection and collection. It is a three-storey building designed to celebrate the revealing and opening of the time capsule on December 6, 2017, the 100th anniversary of the Halifax Explosion. Glass, containing a strong associated memory that represents the human fragility of those who lost their sight and became blind when they stood by a window on the morning of the Explosion, this building is constructed entirely



Remembrance / Collection: vitrine of artifacts
Memory / Remembrance: Memory Candle Wall

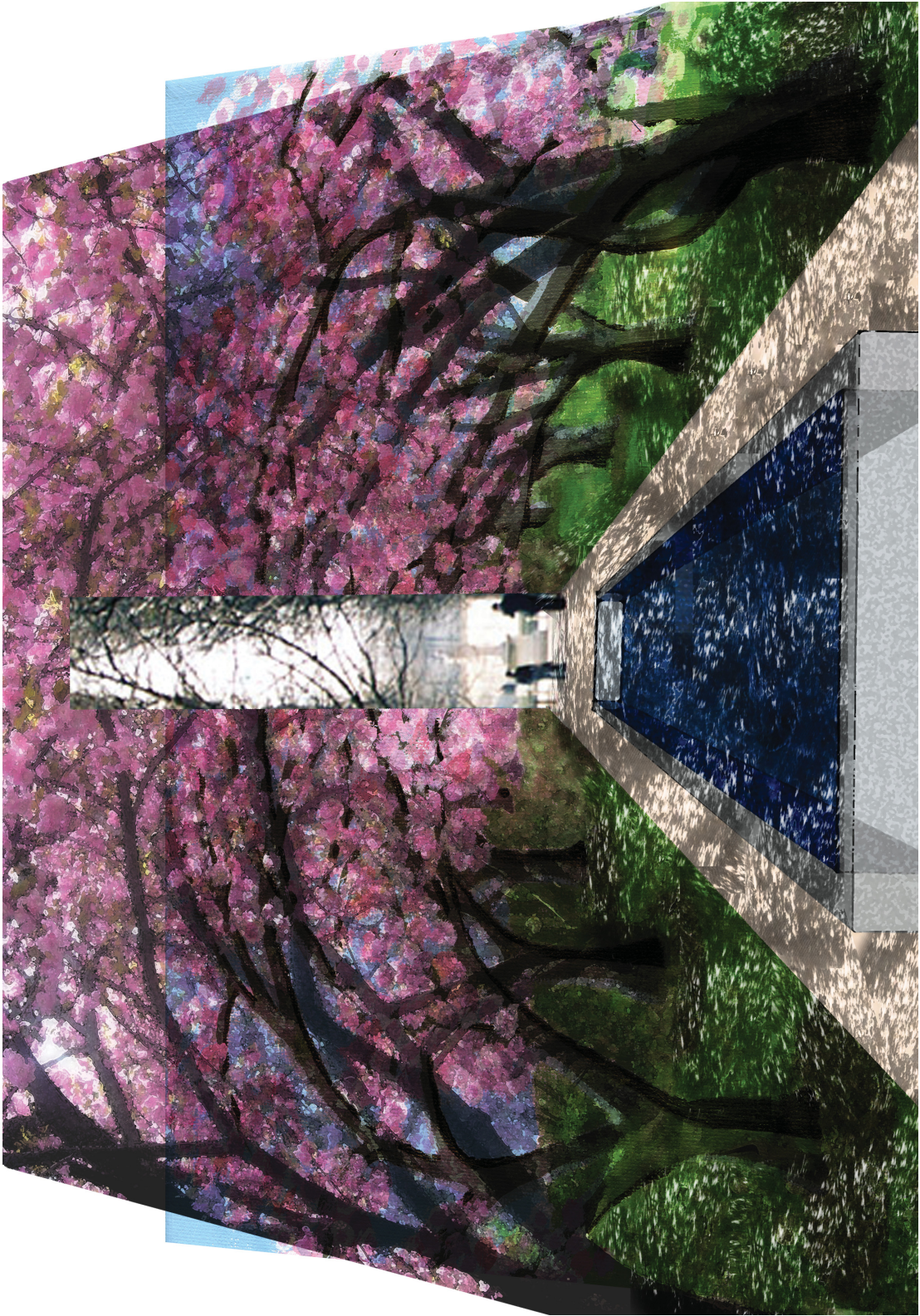
of glass blocks, and within each individual block contains an artefact that has survived or is related to the explosion (i.e. melted clocks, stopped clocks, pieces of the Mont Blanc ship, silverware, china, toys, etc.). The vitrine, within the very essence of its walls, becomes a glowing lantern of exhibition space that is home to a collection of artefacts and memoirs belonging to the deceased, from survivors, and from their loved ones. It is a place of remembrance, a collection of the sacred that is eternalized. At night, this glowing 'time capsule' poetically becomes the glowing beacon of light, like the attic where reality is true in the present and becomes a lasting reminder that there is no fear of talking or remembering the past, as it is in the midst of the community. This space is a celebration of the past and the present.

Threshold / Blizzard: Healing Garden

A day after the tragedy, the entire city was blanketed by a severe blizzard that hampered rescue efforts. Many people died from waiting to be rescued in the cold. The tranquility of the weeping willow cherry blossom trees represents renewal and healing after the explosion. Blooming only once in the springtime and lasting but a few days, the bright pink color of the cherry blossom trees stand out at the top of Fort Needham hill attracting people from all over. The petals will blow over the community serving as a beautiful poetic gesture as a reminder of the sacred.

Memory / Remembrance: Memory Wall

The Memory Wall is the most elusive component of



Threshold / Healing Garden: cherry blossom trees, reflection pool

the memorial. Composed of rough stacked slate, it acts as a funerary element in that it demands the participation of the visitor over the course of time. In the making of collective memory, each visitor brings with them a single candle to the site to place on one of the two thousand ledges, all of various heights and protrusions. Designed with the intention that over the course of a year and lasting through four seasons, wax from the candles and debris from the land will drip down the wall and collect in a transparent formwork of different sized 'cubes'. At every annual commemoration ceremony, the formwork will be harvested from the bottom of the wall and given to each person present. The visitors will then be encouraged to disperse these cubes and place them into the framework at different locations around the city that are associated with the Explosion. These wax cubes act as a device that helps to trigger memories of being in attendance at the commemoration ceremony.

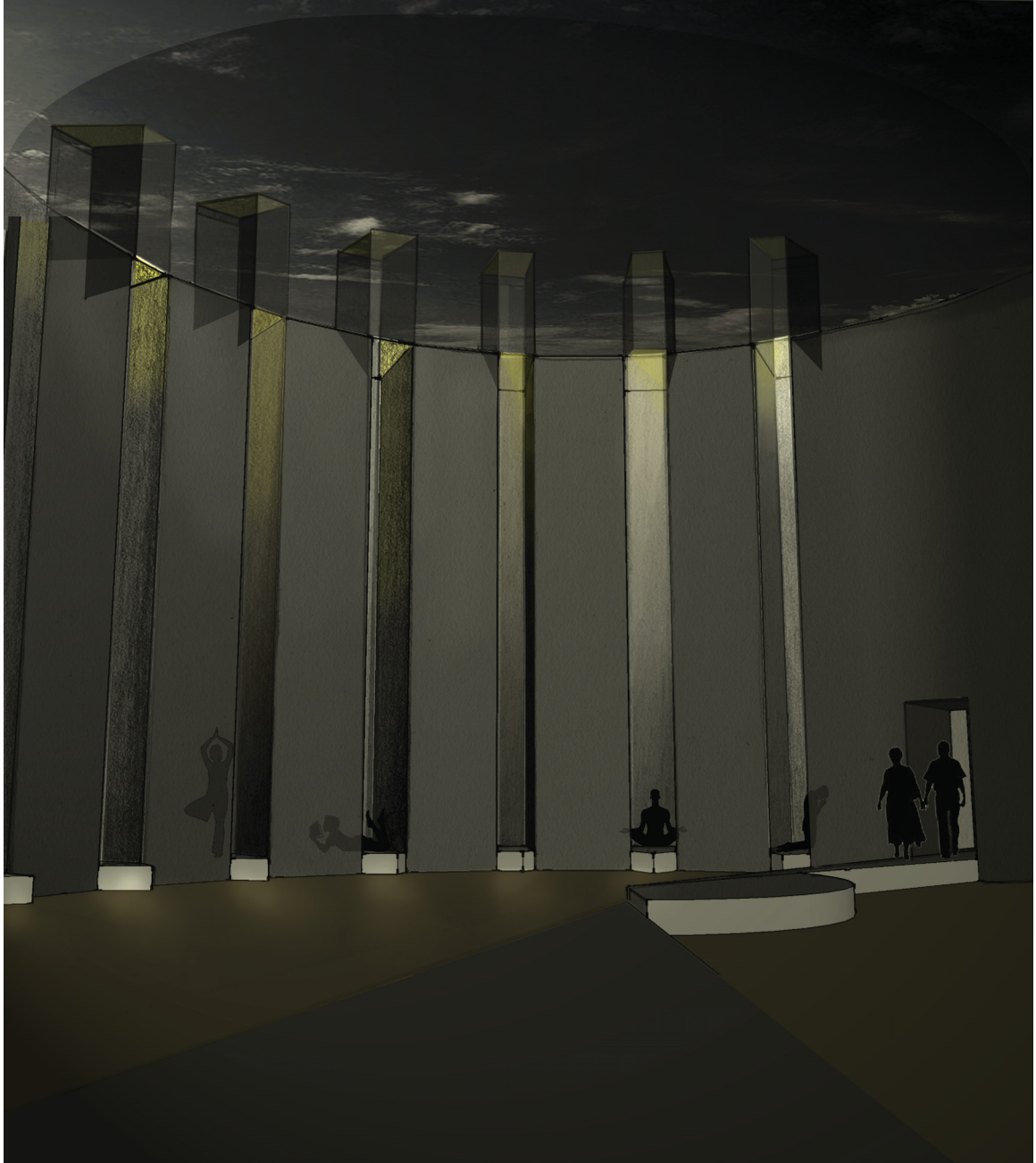


The wax blocks arrive at the site by attendees of the annual commemoration ceremony.

Sacred / Reflection: Sacred Commemorative Space

A sacred commemorative space at Fort Needham Memorial Park will provide a quiet place for individuals of the community to meditate, reflect, and pay respects to the victims of the Halifax Explosion. Opening out onto the western slope of the hill facing the Hydrostone community, a small plaza provides a place encouraging the community to gather. This is an informal meeting place / meeting point where people can relax, play chess, people-watch, etc. From the plaza, a pathway leads the individual into the underground tunnel that focuses on the ambiance of light and architectural form, firstly by reducing all human sensory elements then proceed to target and enhance one or two sensory inputs incrementally. Walking through the underground tunnel, a moderate amount of sunlight is brought in through two light wells that penetrate the darkness. Upon arrival at the sacred space, the individual must choose one of two paths: to step off the path and onto a floor of sand, or continue on the path that will lead them out the other side of the hill.

Human existence is fundamentally based on the sensual, such that we engage in the world through our senses; sacred places are sensual places. The experience of the sacred takes us out of the everyday as we are able to enter a different environment where our senses are confronted by complexity and the dynamic visual experiences of movement, approach and the shifting views of ever-changing light and shadow. The perfect circular interior of the sacred



Sacred / Reflection: underground sacred space

space and the visual phenomenological moment of watching the movement of light, imposes a dynamic sensation within the human. Experienced as a phenomenological component, the sacred space is always changing at different times of the day and during different seasons. Within this space, the visitor will encounter primarily three sensual elements: the soft touch of sand on their bare feet as they walk towards the niche, the cool sensation of the bronze step and the bronze floor within the niche (the material of bronze marks human involvement and the passage of time), and the warm sunlight flooding into each light well from 12 meters above. The visitor is able to find a place for themselves within one of the niches, each designed for the maximum of one person.

Commemoration / Gathering

While memories of the past and paying tribute to an event can often be individual and entirely private (remaining with the individual in one's own mind by recollection, or by reliving the moment through reminiscing over conversation and event), it contains a certain level of due communal ownership. In contrast, despite that sometimes memories are public in status but may be entirely private, commemoration involves more than rehearsing or reliving the past in one's own mind. Commemoration moves beyond the mind involving something distinctively extra-mental through a ceremonial observance. Observance brings together the repetition in the re-enactment of former circumstance, social sanction of ceremony,

and formality.³⁷ Commemoration is defined as, “a calling to remembrance, or preserving in memory, by some solemn observance or public celebration.” The act of commemorating is by taking the past seriously and celebrating it in appropriate ceremonies. Memorialization connotes not only an affirmation of being there at the present, or having one’s past being commemorated, but is an honouring of the past by an act of tribute. Honoring seeks to preserve and stabilize the memory of the honouree and concerns itself with endurance and permanence against the element of time.

The act of commemoration involves a specific ritual. The bodily movements with fellow commemorators through a certain processional ceremonial homage or pilgrimage constitutes a ritualistic action that is fixed and invariant from year to year, however seemingly casual it might appear to a non-participant.³⁸ A ritual is a dynamic affair that is temporal and asks for the direct involvement by commemorators who are present. Commemoration is directly experienced in the first person and a ritual demands the active involvement of the individual, happening only in the presence of the collective. Both the commemoration and the ritual is performed in the public presence of others and accessible to many viewers; it does not occur in isolation of spectators but within the presence of participants acting together and taking action together. The memory wall and the dispersion

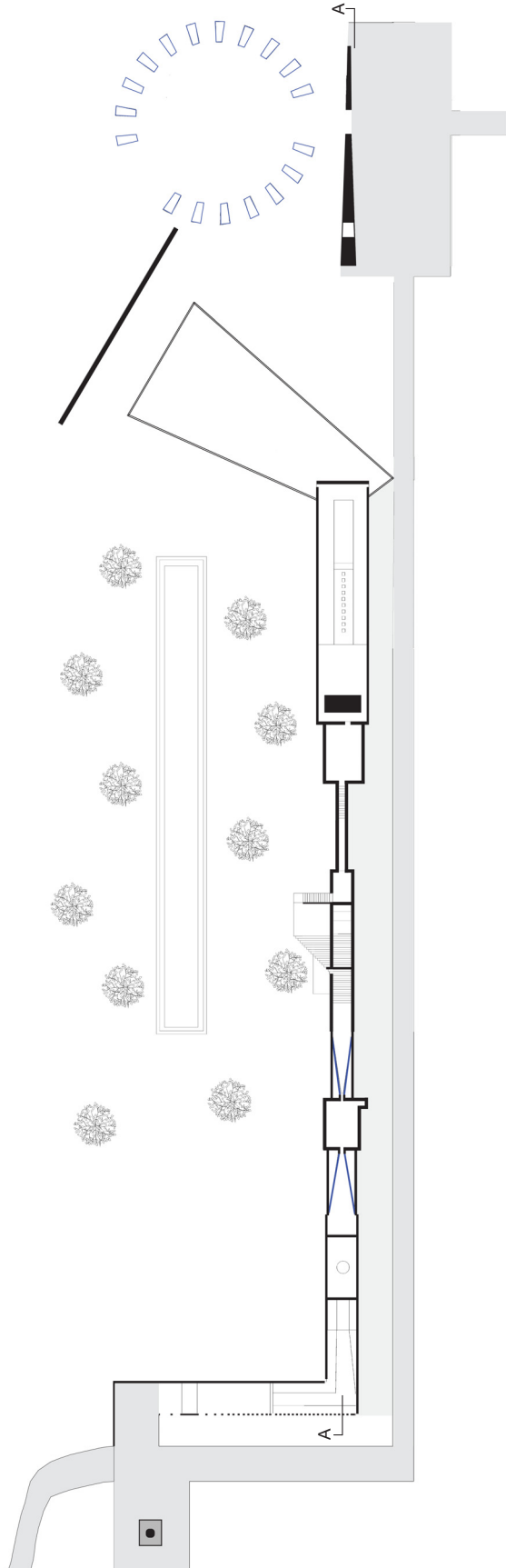
³⁷ Edward Casey, *Remembering: A Phenomenological Study* (Bloomington: Indianan University Press, 1987), 225.

³⁸ *Ibid.*, 221.

of the wax candle cubes become a shared object that is created as a symbol which occur only through activities of ritual to which it shares an attachment to place.



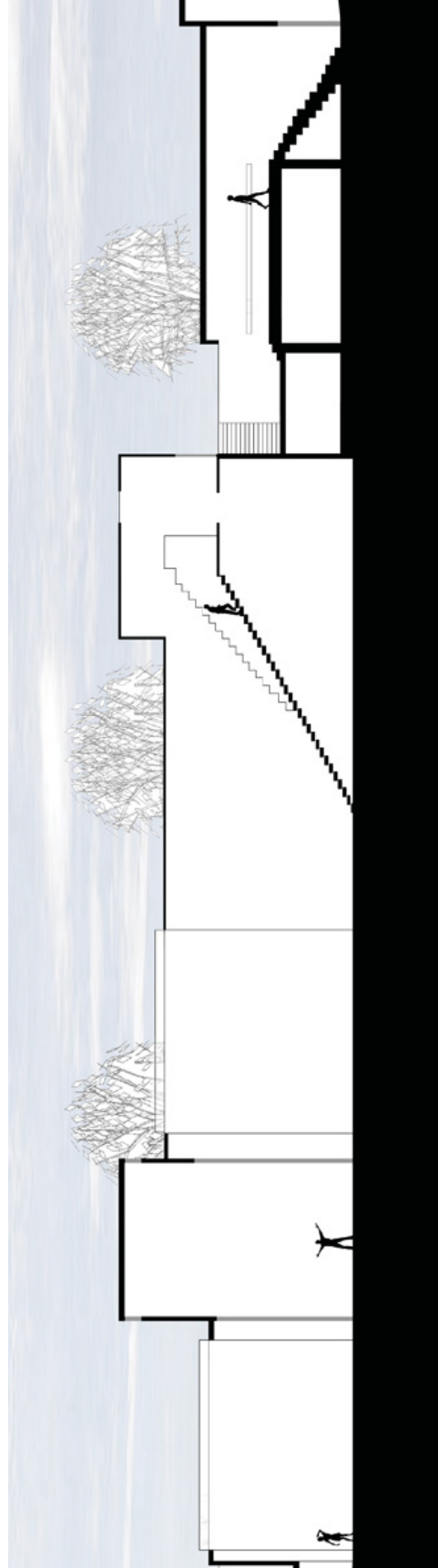
Section AA



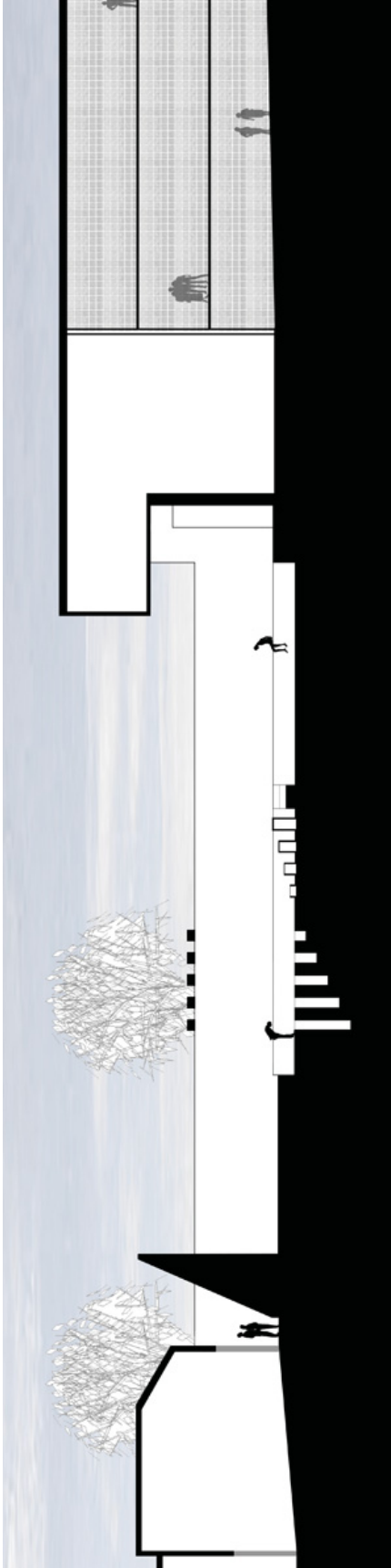
Longitudinal section through building with matching ground level plan



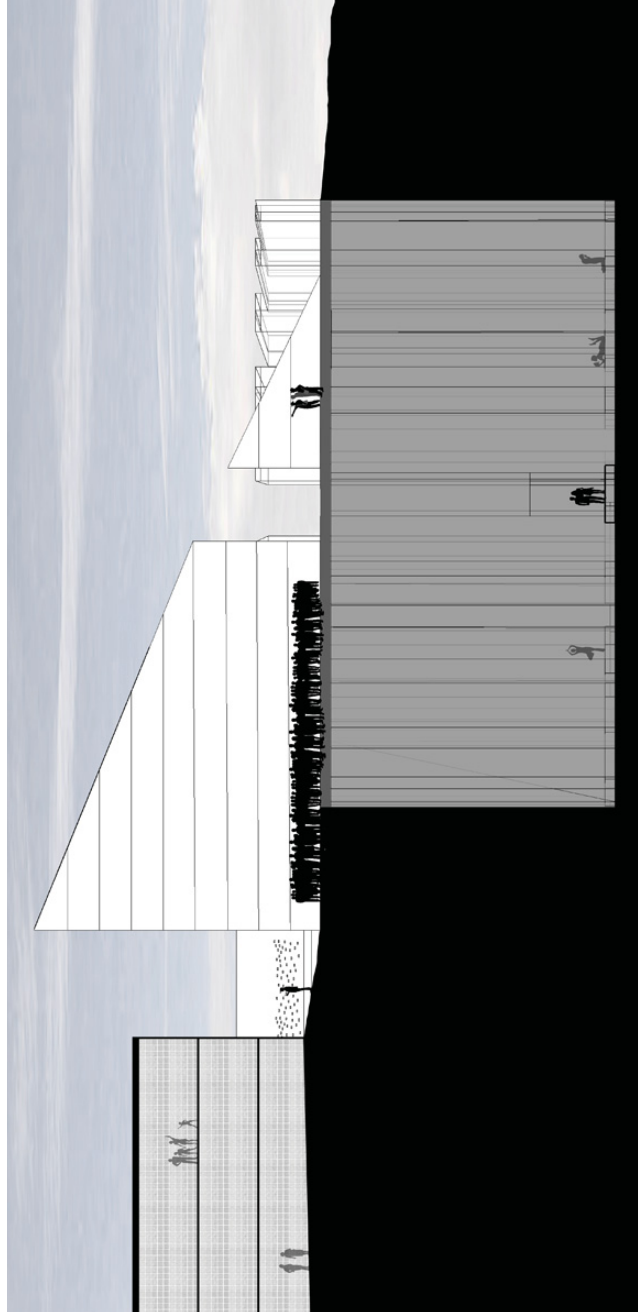
Detail of section AA



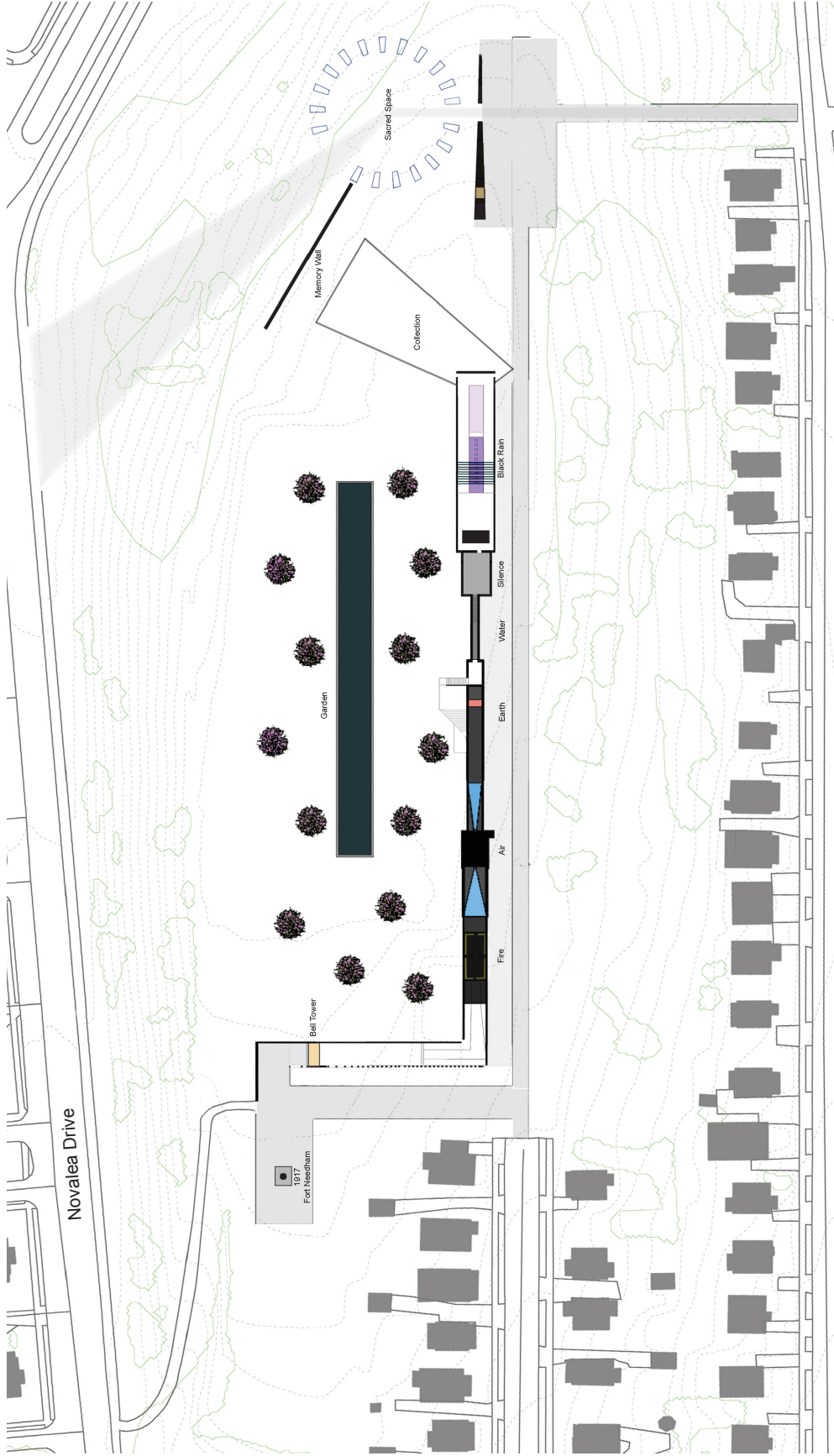
Detail of section AA



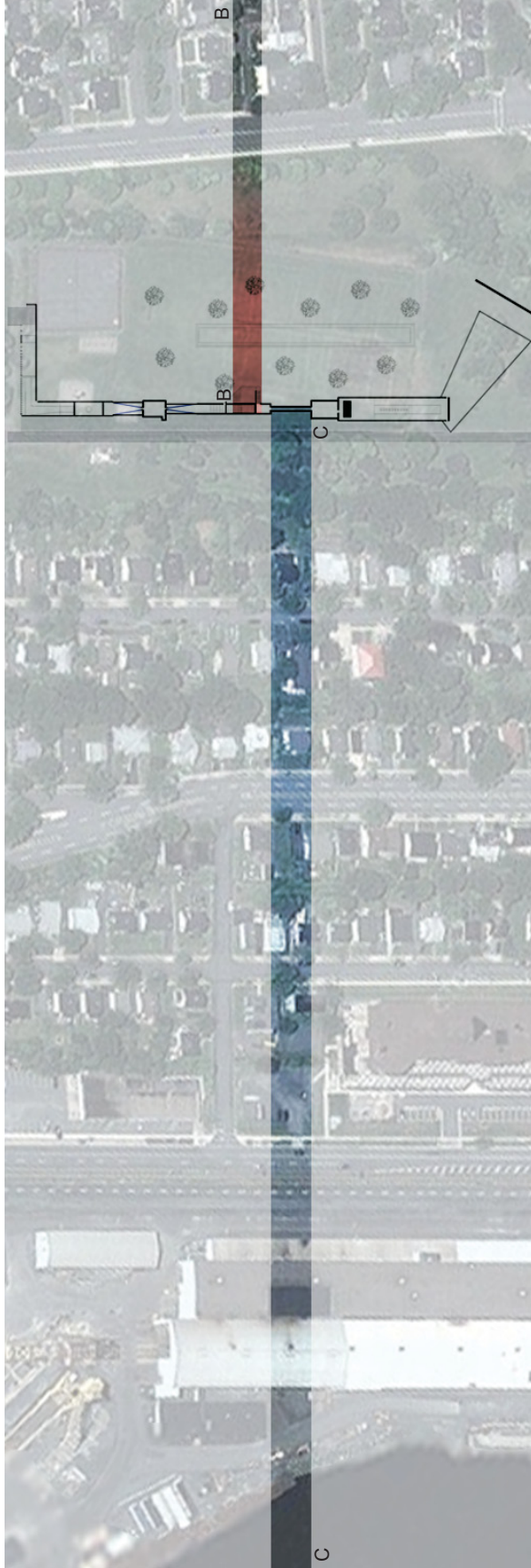
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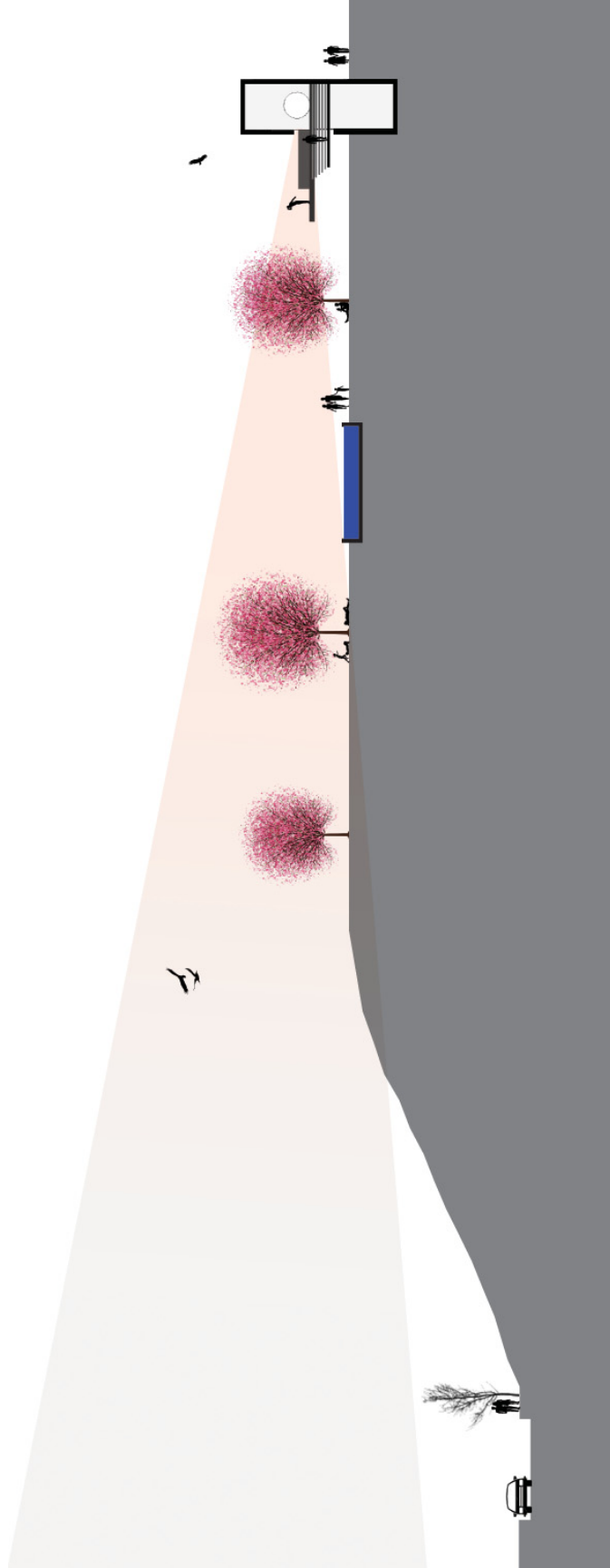
Detail of section AA



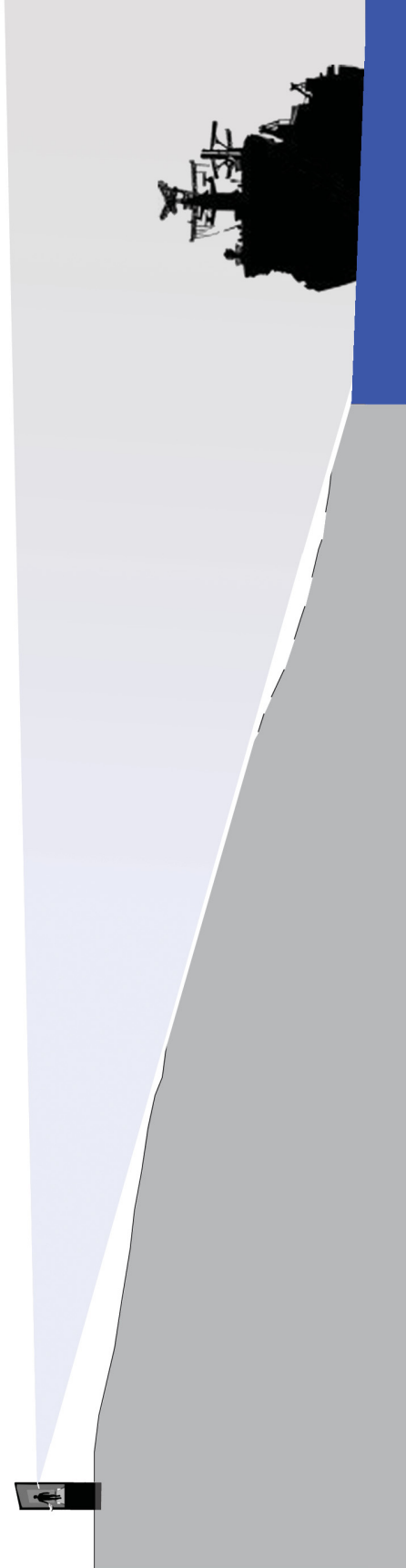
Roof plan with surrounding site context



Map indicating cross sections BB and CC



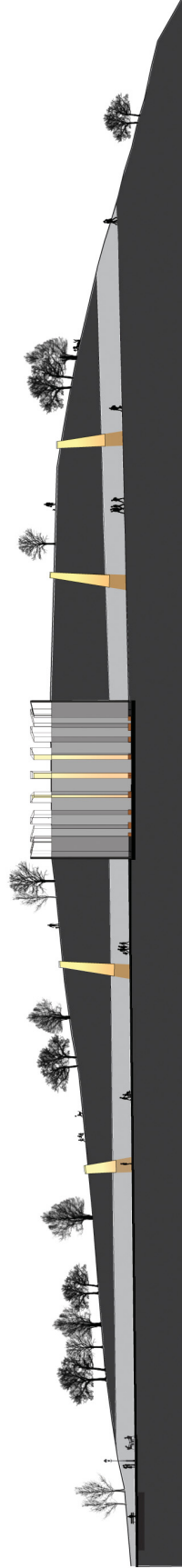
Section BB



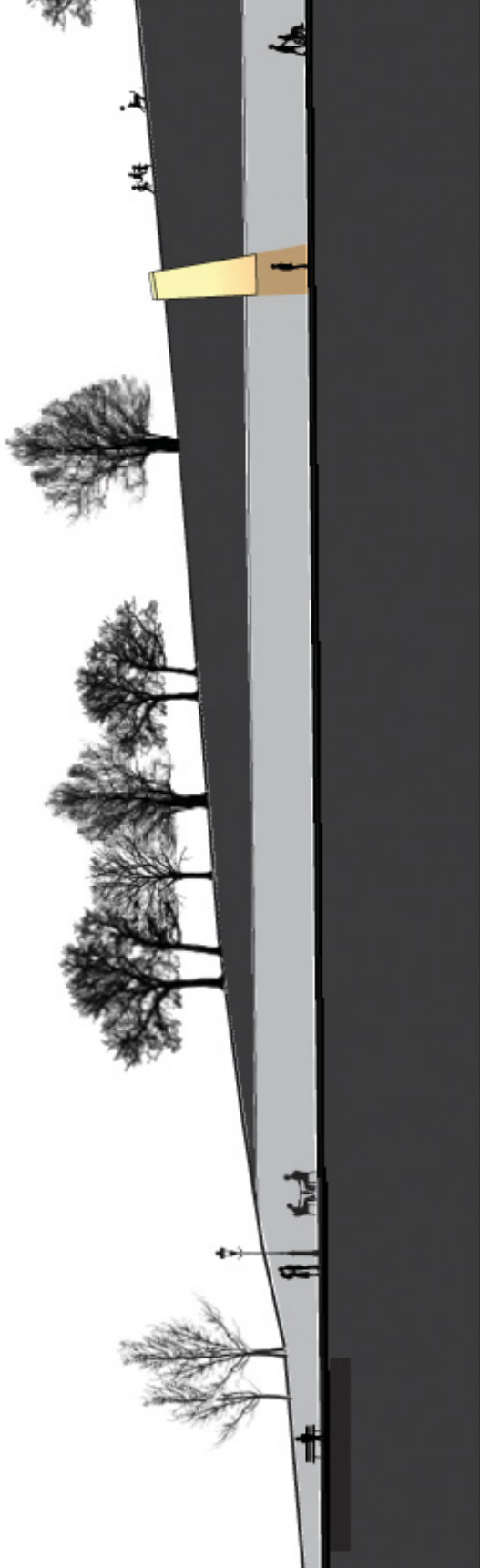
Section CC



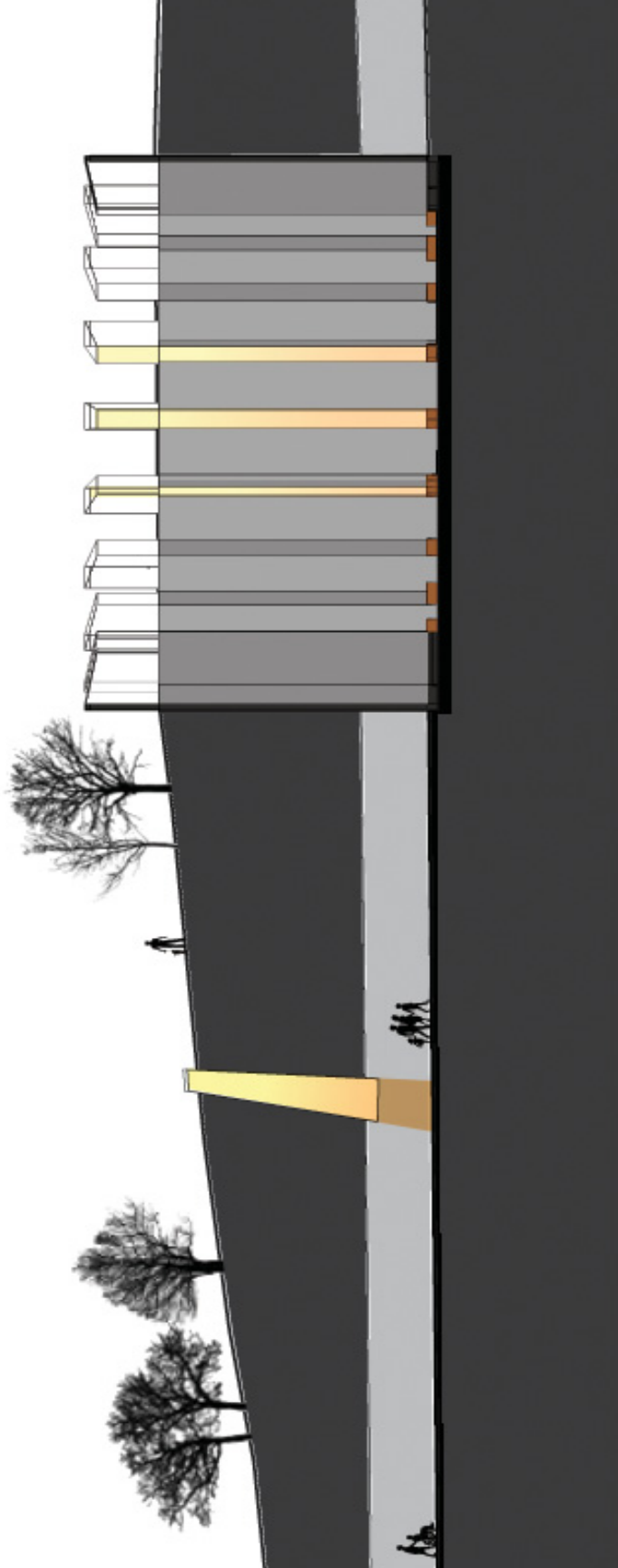
Map indicating cross section DD



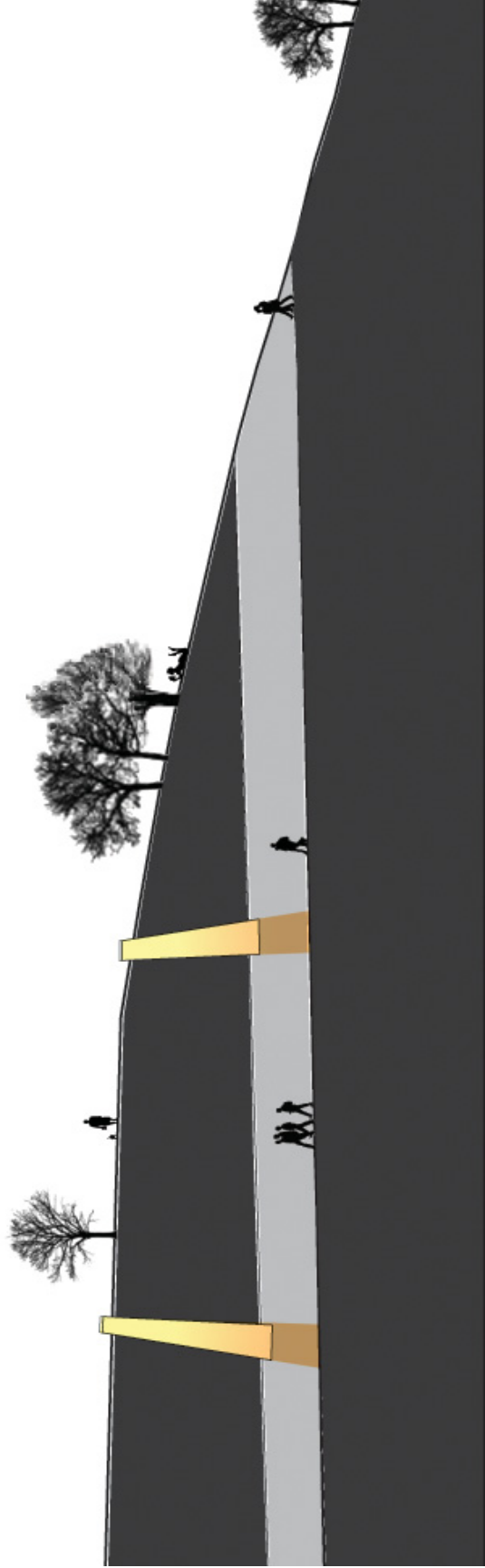
Section DD



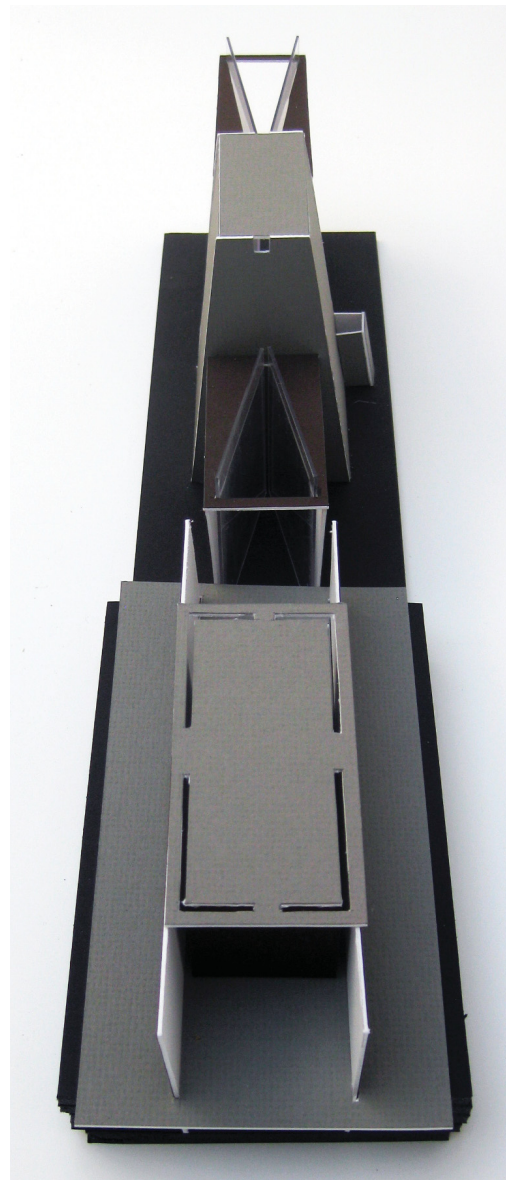
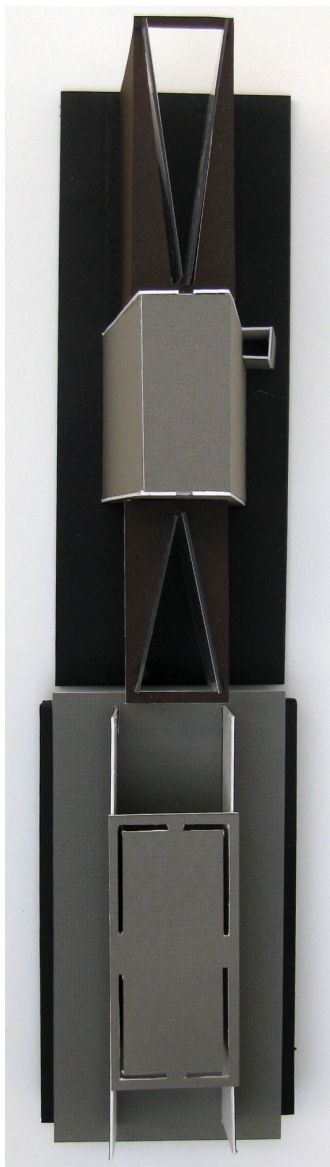
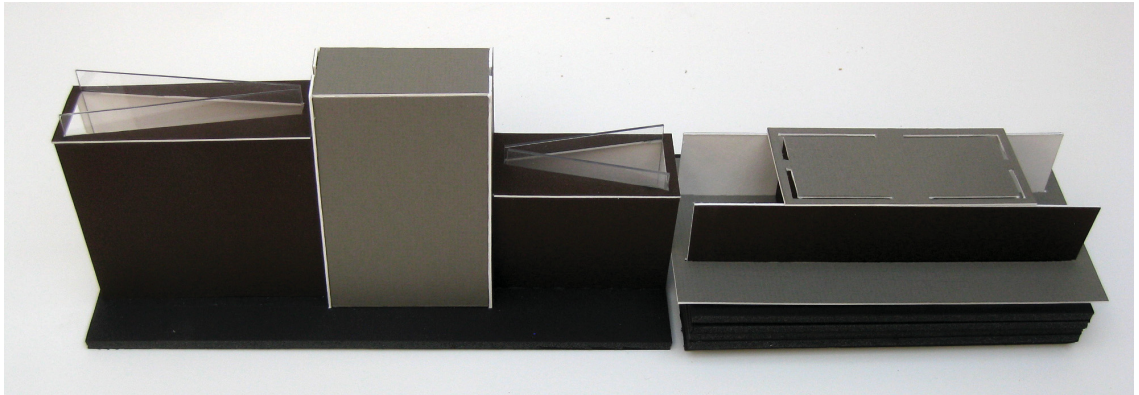
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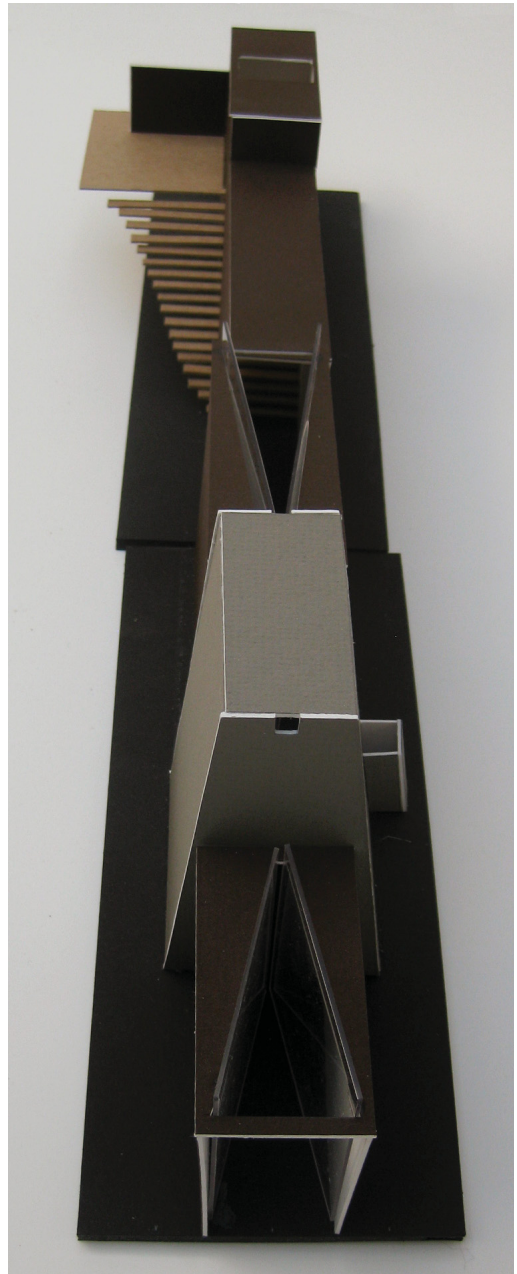
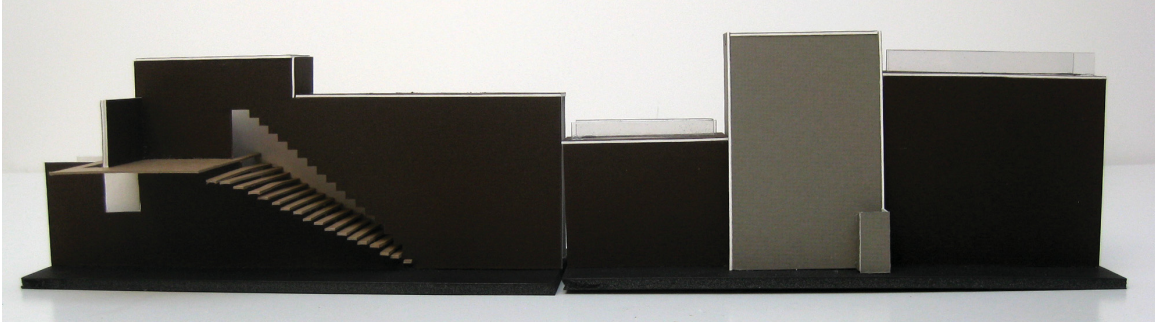
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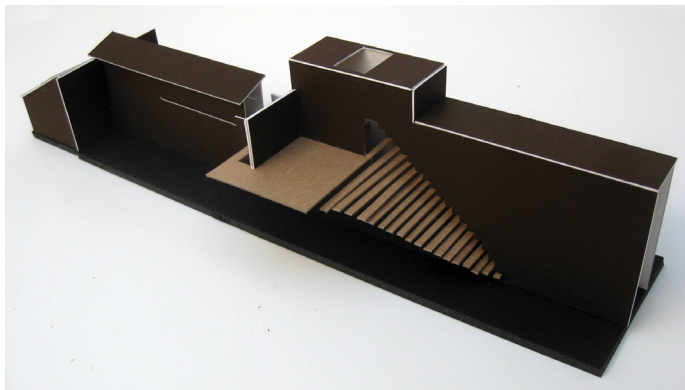
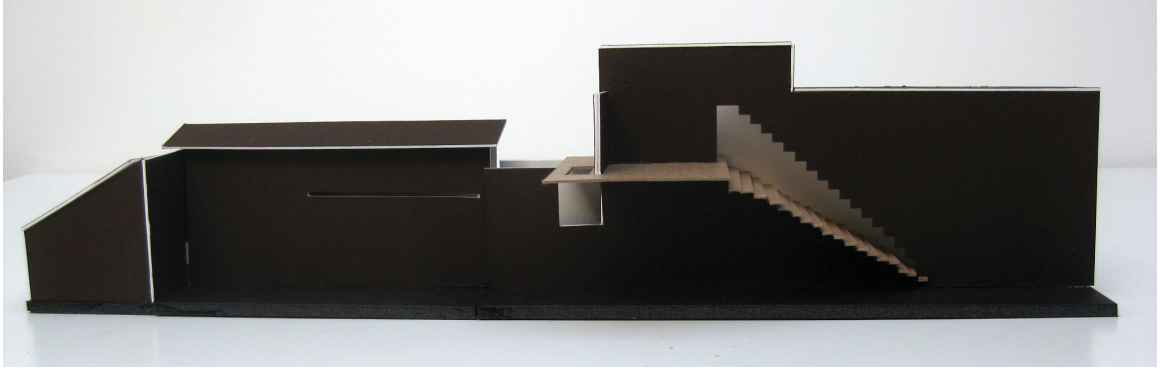
Detail of section DD



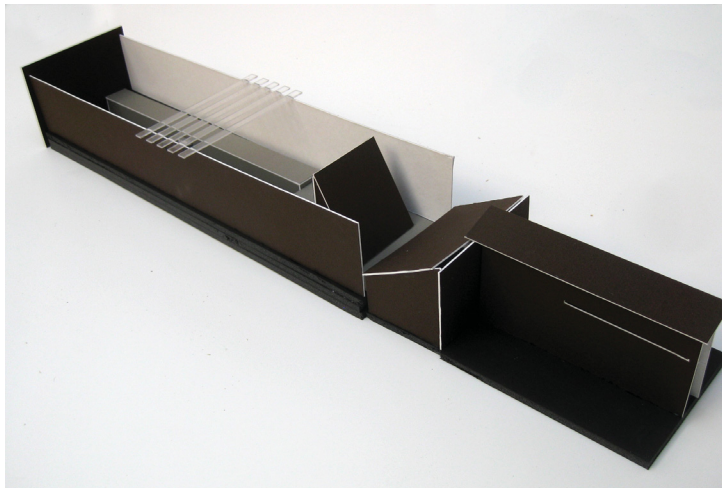
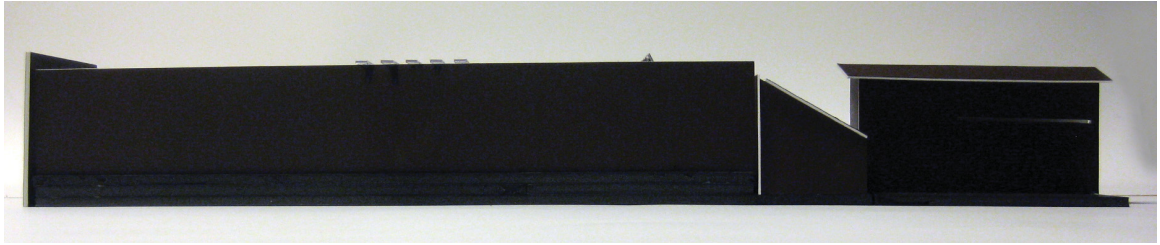
Fire and Air (final model)



Air and Earth (final model)



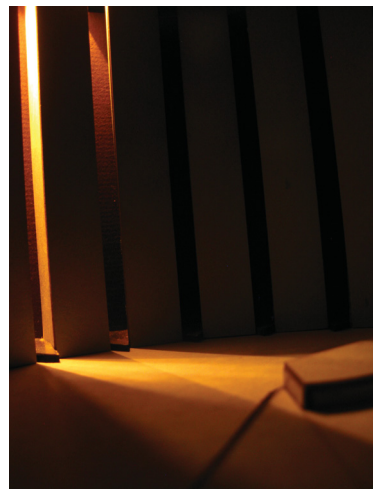
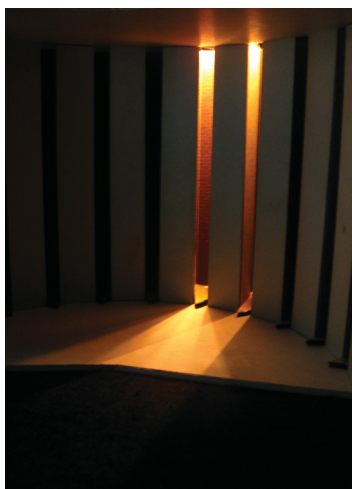
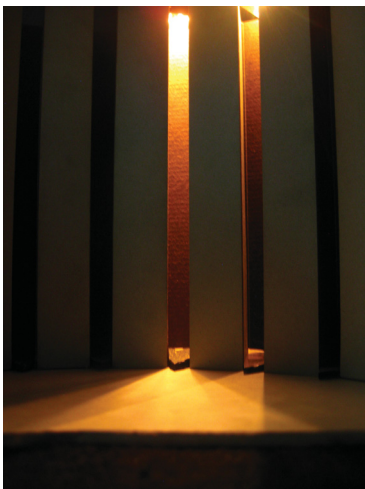
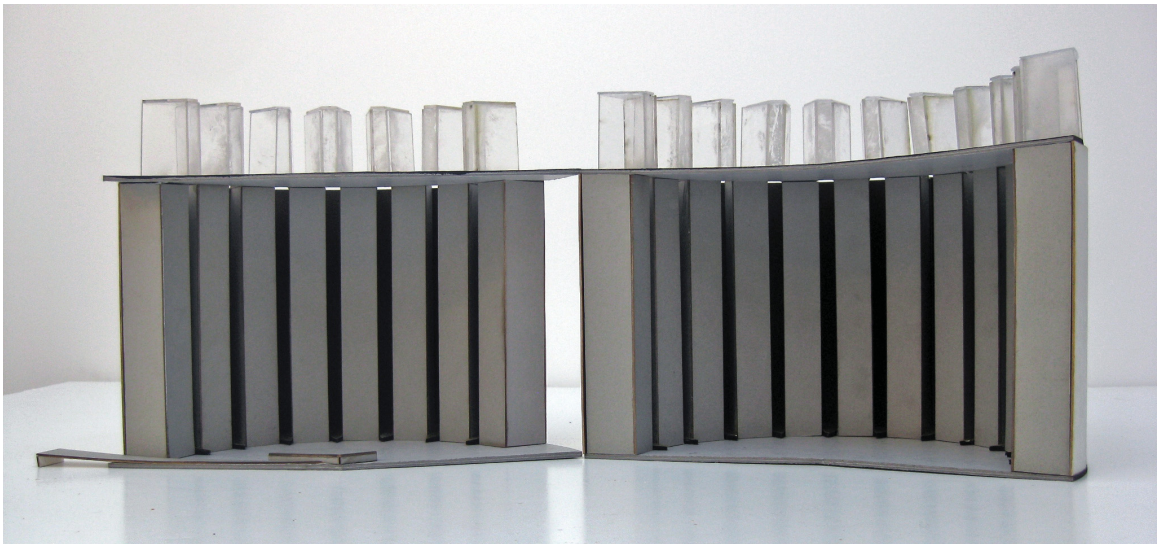
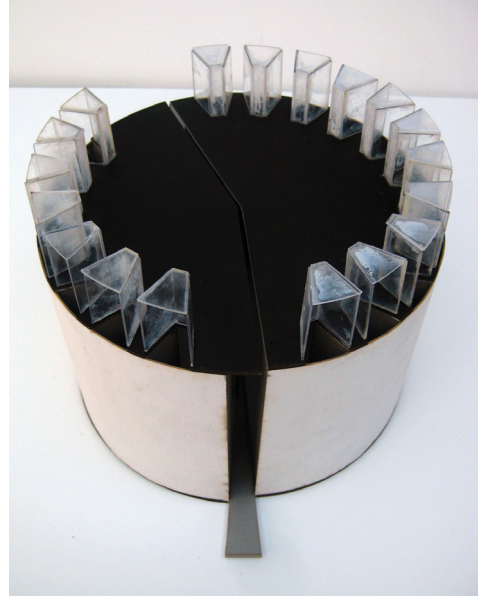
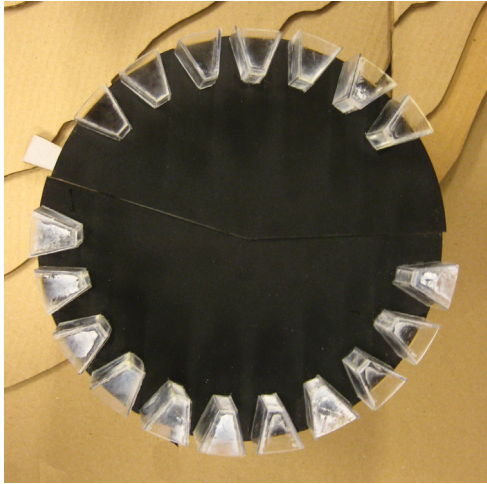
Earth and Water (final model)



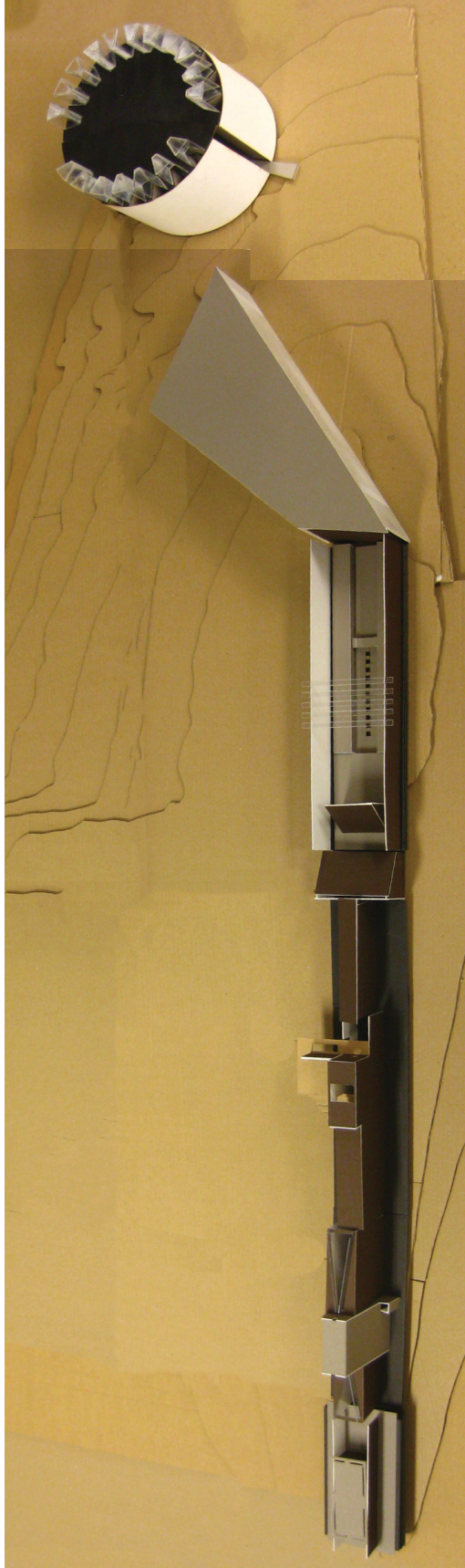
Water, Silence and "Black Rain" (final model)



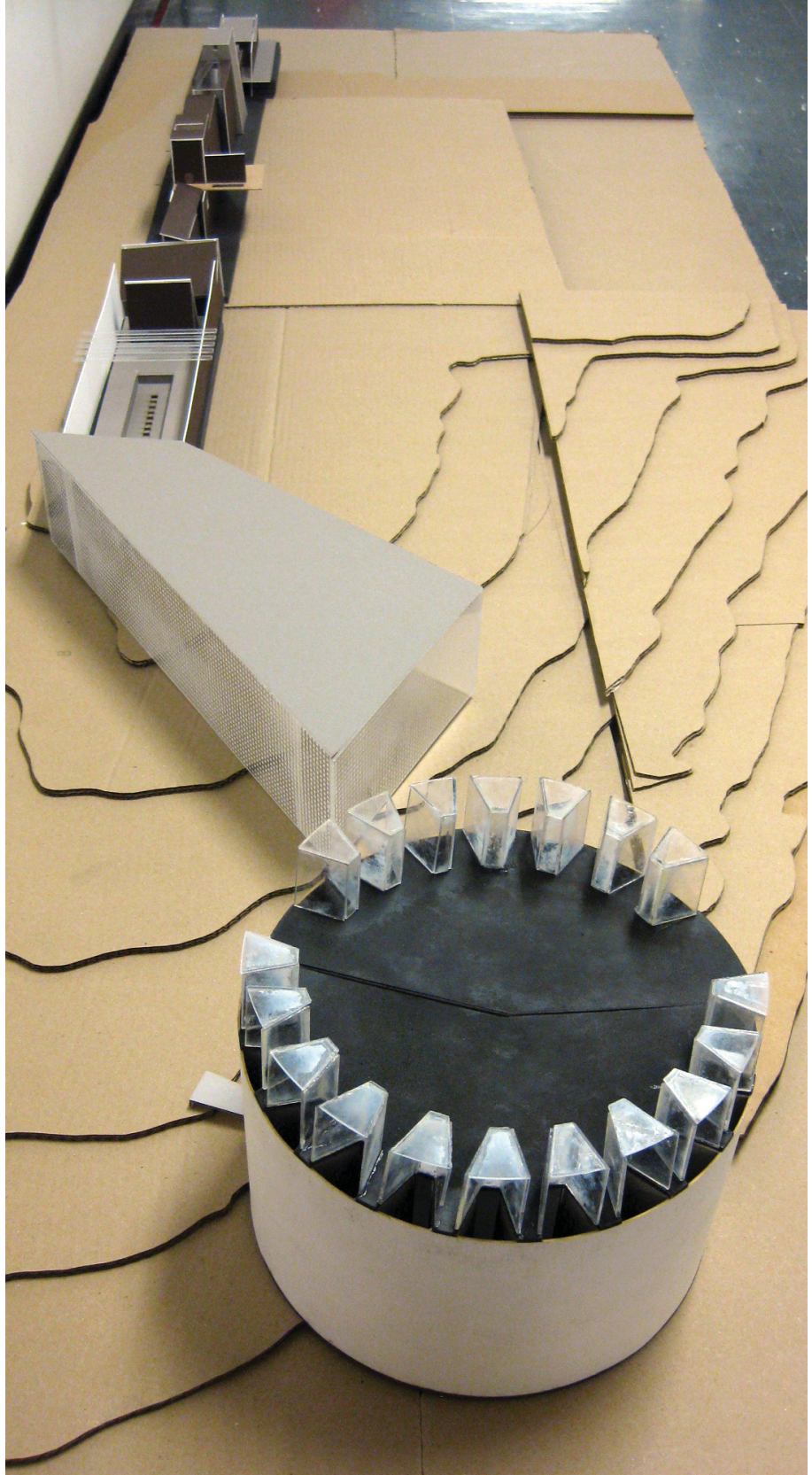
Silence, "Black Rain", and Vitrine (final model)



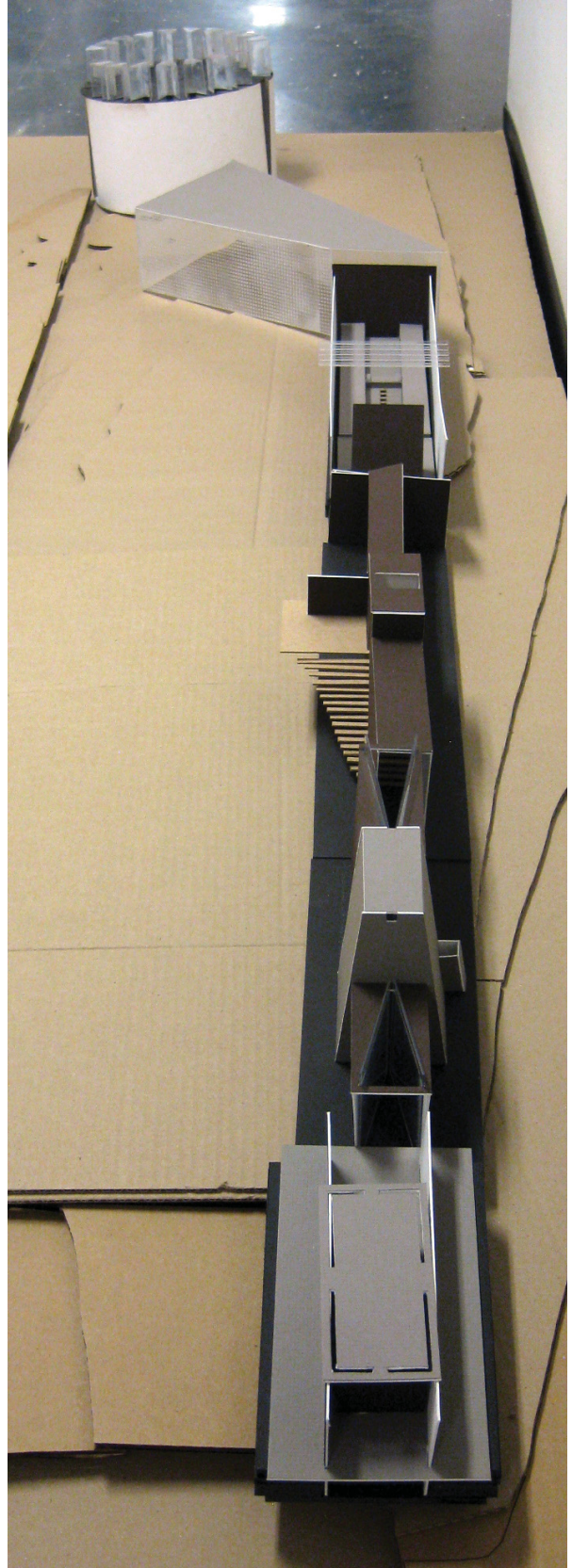
Sacred Space (final model)



Overall model (final model)



Overall model (final model)



Overall model (final model)

Chapter 3: Conclusion

Creating memory requires an individual to be involved and present. Architecture can provoke inquisitions through extraordinary experiences. Personal interpretation begins to form when the imagination generates its own reasons and answers for a curiosity that is unseen and untold.

Between the theoretical and philosophical ideas about the poetics of the human imagination and the re-creation of a natural memory to produce the creation of a new memory, it is critical that the method of translation and the projected idea must be definitively clear and obvious to the person who is left to interpret. This thesis was able to prove that architecture, as a medium, can be created and arranged in ways that can be read as a narrative and remembered through haptic experiences. In the re-telling of a memory, it is easiest to remember something that had first engaged the human senses, then activated the mind to explore or to be curious about something. The best way to trigger the recalling of a memory is to using a sequence to delineate the order of things, whether it be a series of rooms or particular objects. Although personal interpretation can be wholly subjective, I have learned that a designer has the ability to control the amount of margin (either narrow or wide) for one to debate the meaning of an experience given within the confines based on a theoretical process.

Similar to a sequence, this thesis revealed a series of linear progresses in thought, exploration, process and

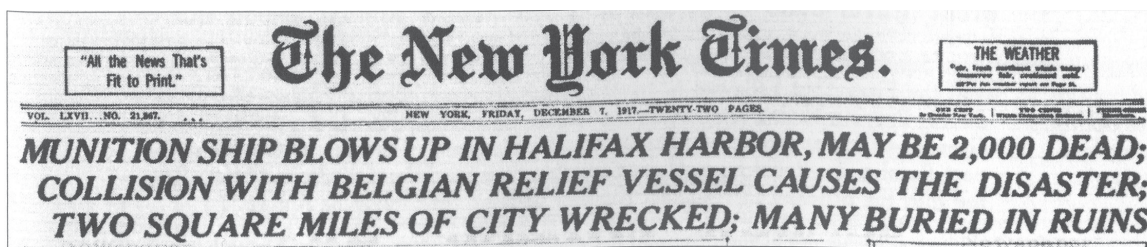
design development. Guiding the terms of exploration and process, the experiences of the individual were always considered first. The phenomenon of light added the dimension of memory within architectural form and space.

Architecture as a building can be thought of in a theatrical sense where the building becomes the actor, and the visitor is the audience seeing the play by encountering the sequence and spaces within the building. The collective memory involves a memorial that is always evolving depending on who participates; it is never fixed, and its conditions are always different because different people are being engaged.

Appendix A: Halifax Explosion



Front page newspaper headline from *The Pittsburgh Sun*, December 6, 1917. Source: Blair Beed, *1917 Halifax Explosion and the American Response*, 72.



Front page newspaper headline from *The New York Times*, December 7, 1917. Source: Blair Beed, *1917 Halifax Explosion and the American Response*, 73.



Front page newspaper headline from *The Montreal Gazette*, December 7, 1917. Source: Blair Beed, *1917 Halifax Explosion and the American Response*, 50.

Appendix B: By the Numbers

Location: Halifax, Nova Scotia
 Date: December 6, 1917
 Time of Explosion: 9:04:35am
 Total Explosives: 2,925tons
 Killed: over 2,000
 Wounded: over 6,000
 Homeless: 9,000
 Fully Blinded: 41
 Half-Blinded: 249

Morgue Statistics, 1918
 Known dead and Missing
 Male: 933 (58%)
 Female: 678 (42%)
 Total: 1,611 (100%)

Age:	Male	Female	Total
0-14	264 (16%)	218 (14%)	(30%)
15-40	324 (20%)	242 (15%)	(35%)
Over 40	211 (13%)	155 (10%)	(23%)
Age unknown	134	63	(12%)

Race:		
Caucasian	1,586	(98%)
African	10	(1%)
Asian	3	(0%)
Indian	11	(1%)
Malay	1	(0%)
	1,611	

Marital Status:	
Single	820 (51%)
Married	571 (35%)
Widowed	64 (4%)
Not stated	156 (10%)
	1,611

Religion:	
Church of England	437 (27%)
Roman Catholic	538 (33%)
Presbyterian	194 (12%)
Methodist	121 (8%)
Baptist	60 (4%)
Lutheran	9 (1%)
Congregational	2 (0%)
Other Denomination	35 (2%)
Not stated	215 (13%)
	1,611

Occupation:	
Professionals	13 (1%)
Tradesmen	21 (1%)
Clerks	43 (3%)
Farmers	3 (0%)
Fishermen	1 (0%)
Craftsmen	120 (7%)
Miners	1 (0%)
Laborers	165 (10%)
Railwaymen	39 (2%)
Housewives	331 (21%)
Domestics	10 (1%)
Students	18 (1%)
Seamen	113 (7%)
Soldiers	21 (1%)
Miscellaneous	85 (5%)
No Occupation	627 (39%)
	1,611

Age:	Male	Female
Under 1 yr	36 (2%)	31 (2%)
One year	23 (1%)	18 (1%)
Two years	29 (2%)	20 (1%)
Three years	19 (1%)	20 (1%)
Four years	22 (1%)	14 (1%)
5-9 years	84 (5%)	72 (4%)
10-14	51 (3%)	43 (3%)
15-19	61 (4%)	43 (3%)
20-29	142 (9%)	108 (7%)
30-39	121 (8%)	91 (6%)
40-49	100 (6%)	60 (4)
50-59	55 (3%)	40 (2%)
60-69	33 (2%)	29 (2%)
70-79	16 (1%)	18 (1%)
80-89	6 (0%)	6 (0%)
90-100	1 (0)	2 (0)
not stated	134 (8%)	63 (4%)
total	933 (58%)	678 (42%)

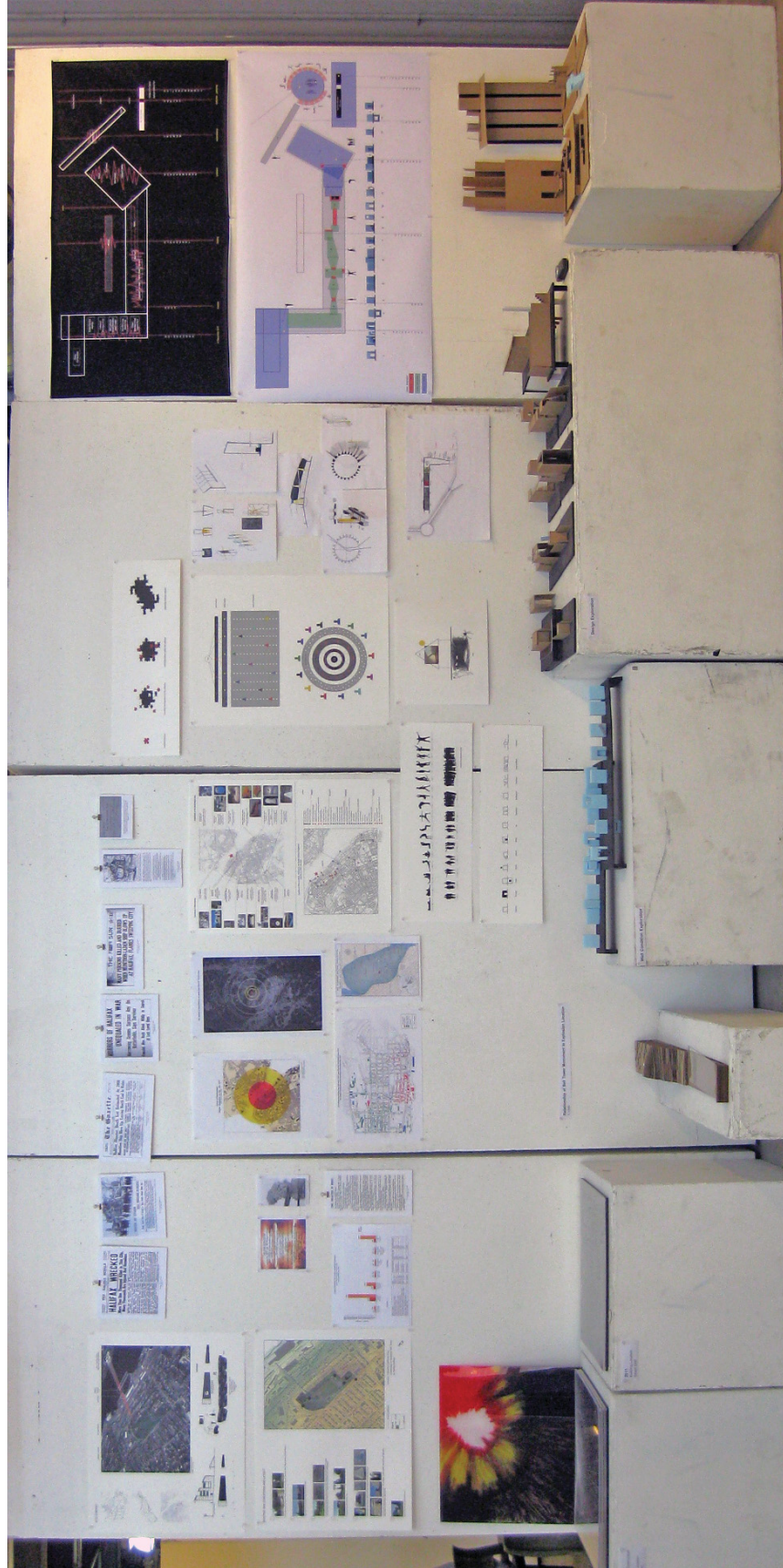
Other Statistics:	
Identified	959 (60%)
Unidentified	242 (15%)
Total buried	1,201
Bodies known to be missing:	410
Total known dead a/o 1918:	1,611
Dead a/o 2004	1,952

Appendix C: Thesis Presentation - July 10, 2012

site and historic context

theoretical context

sequence exploration



site axis model

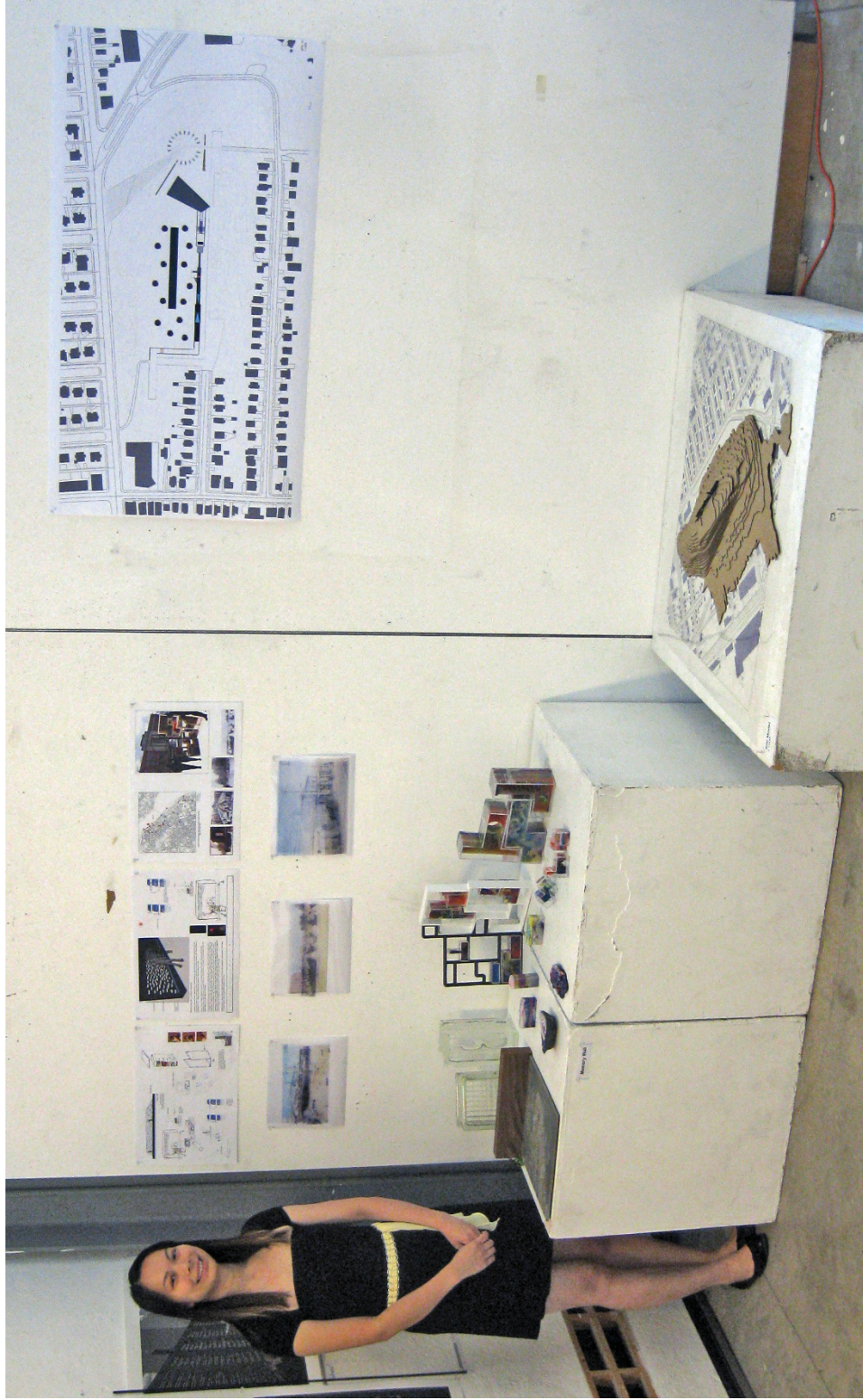
wall exploration model

study models



final design work

memory candle wall BSI exploration



site plan

site model

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