

The Slow Regard of Silent Things

Stitching the Infrastructural Void in the Urban Fabric with Layers of Life and Death

Amanda Eliasson

Master Thesis 2017

Chalmers University of Technology Dptm. Architecture and Civil Engineering
Architecture and Urban Design

Material and Turn Studio
Examiner Jonas Lundberg
Supervisor Kengo Skorick



CHALMERS

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1. PROJECT PLAN

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1.1 PROJECT ABSTRACT

By inhabiting the railway with the resting of our dead, it is possible to tap into the railway's unused spatial potential. The cemetery becomes incorporated into the urban fabric in a natural way and functions as a bridge across the railway barrier.

Cities suffer a lack of space, not just for the living but also for our dead. As the number of living inhabitants increase, the neighbourhoods of our dearly departed become a waste of space, exumed to make room for the living. Juxtaposed to the cemetery is the railway, another gap in the urban fabric. It claims massive amounts of lands, vital to the continued development of urbanity but only periodically hosting life or movement.

The project functions on two scales; the urban and the human, and is developed in three phases. The first phase identifies what spatial elements of a train station are appropriate for a cemetery. These elements are used to create a systematic approach to the design process. By studying the existing layering of flows and voids in a train station, systematic potentials for the layering of programmes is found. The second phase puts the spatial system into a defined context to see how it works as a connector between opposing sides of the railway. The third phase goes back into the structure, exploring the spatial tension and detailing of the actual meeting between the two scales, the human and the infrastructural.

The result is a combined trainstation and cemetery that acts as a connector for two sides of the railway in Jurong East, Singapore. It extrudes above and below ground and sits as an undulating, multilevel part of the landscape in the barrier defined by the railway.

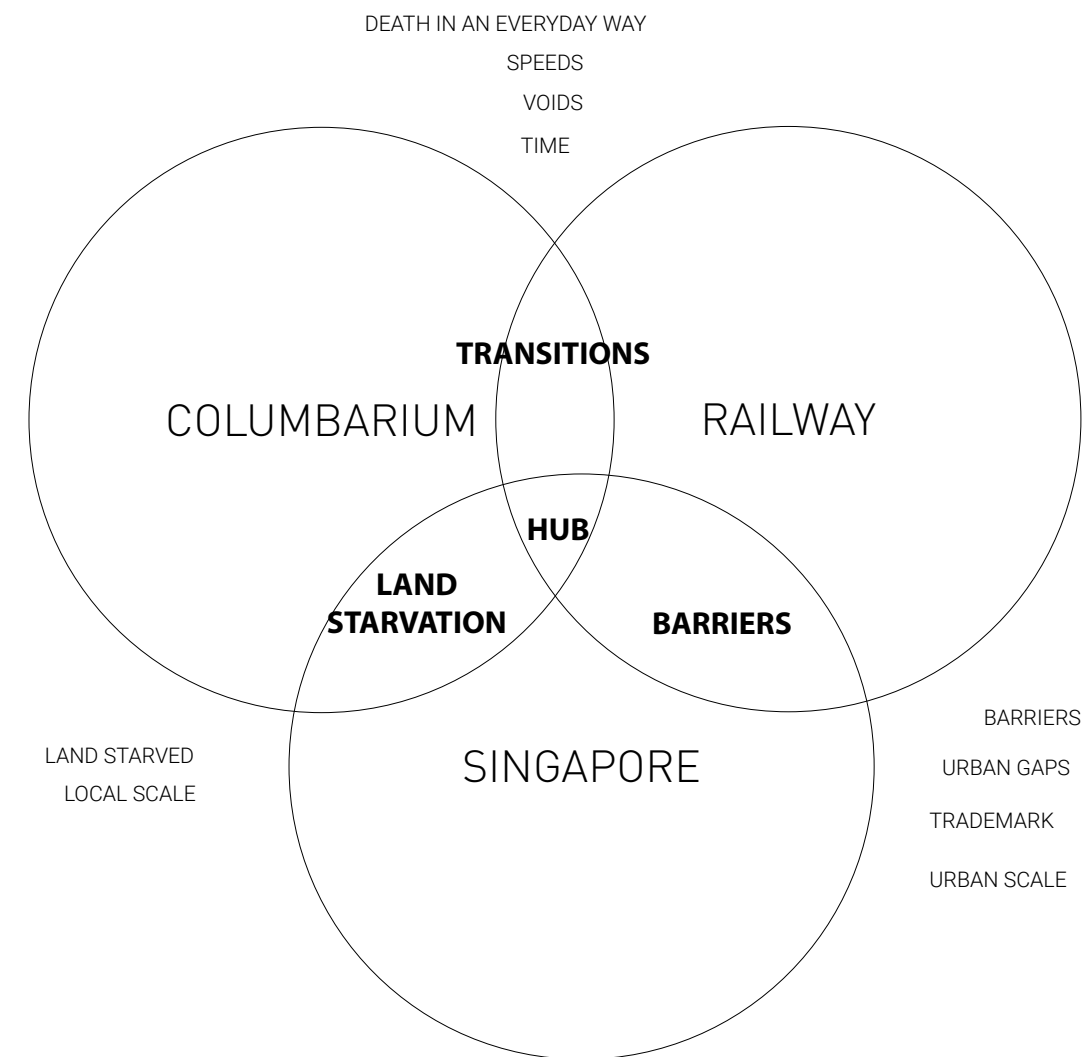
It consists of a system of rails, voids and interconnecting paths corresponding to its contextual parameters. The system functions so the number of interconnections between rails, allowing pedestrian circulation across the structure, increases as the distance between rails decrease, resulting in tight spaces of intense pedestrian activity. As the rails diverge and the distance between them increase, the number of connections decrease as the space defined by the rails swells into an echoing void. Where

the site demands higher permeability through the structure, the tracks converge. Where the site is calmer, the tracks diverge and create corresponding areas of tranquility. It is this undulating correspondence between tracks that define the programmatic gradient within the structure, from slow memorial gardens in the swells, to busy platforms with fast food stalls and pocket columbariums in the denser areas.

The structure describes a layering of speeds, of continuity, beginnings and ends. The rational logic of travel becomes a spatial expression of life and death and the trains become architectural elements in themselves. As the system is governed by the needs of the surrounding city, life is layered by death in accordance and becomes a part of the urban fabric.



In a land starved city struggling with a lack of burial space and infrastructural barriers cutting the urban fabric, the integration of a railway station and a cemetery into one locally and globally interconnected hub of physical and spiritual transitions turn the rational spaces of travel into a spatial expression of life and death in a structure that stitches together the infrastructural gap in the urban fabric.



1.4 PROJECT PURPOSE

Earth's population is increasing. Looking at the planet's surface, cities cover it in patches connected by infrastructure in the form of roads, railways, ferries and airplanes. These connections are instrumental in the urban growth, as they feed the cities and bind the patches together. Looking from a closer perspective, from within the city, these connections become barriers. They are gaps in the urban fabric as the heavy flows of traffic running along them disable spontaneous movement, cutting the city into parts. They become as rivers. Some are small and possible to wade through. Some are majestic flows needing bridges in order to be traversed. Put together they take up massive amounts of space.

Consequentially as the population grows, the number of deaths increase as well. As land starvation is a problem in many cities, the question of what to do with our dead arises. Traditionally cemeteries are pushed to the edges of a city. As the cities grow, cemeteries are exhumed and pushed away further and further from the core (Thiong Bahru f ex) This approach of exhumation and rebuilding is not a sustainable approach to something as supposedly long-term as a burial ground. As a further consequence of this, cemeteries become low-value estate and isolated from everyday life. While serenity is vital for the cemetery-setting, it becomes a problem when it becomes difficult to reach.

Looking at these two issues together, there is within each a possibility to solve the other one's problem. By combining the cemetery and the railway, is it possible to create a bridge over the infrastructural gap in the urban fabric, which in turn gives the cemetery a long-term and natural place in the city's everyday life?

1.5 PROJECT AIM

By rethinking both cemetery and infrastructure new solutions for storing the dead are found. This is done by designing a combined train station and columbarium. By inhabiting the railway with the storing of our dead, we tap into the unused land potential of the railway and bridge the gap in the urban fabric. The railway is an actual physical gap in the urban fabric, while the columbarium is an emotional experience of a gap. By inhabiting the physical gap in the urban fabric with the emotional gap that is loss, the gap is bridged.

The proposal functions of two scales. The large scale, focusing on how the project systematically stitches together two sides of the urban gap, and the small scale, detailing how the railway meets the columbarium and the resulting spatial tension. In this way the thesis explores the spatial tension found in the layering of programmes.

In the rationality of saving space it is easy to get lost in efficiency. It is very important to remember that this thesis ultimately deals with the sensitive subject of grief in combination with something as down-to-earth as transportation, and it is in this duality that we find the richness.

The site for the thesis project will be Jurong East MRT station in Singapore. This will be the new terminus station for the planned High Speed Rail connection from Malaysia, going between Kuala Lumpur and Singapore. As an island-state with an increasing population and a lack of hinterlands to expand into the problem with land accessibility is acute. The city is growing, with large plans for expansion of both built environment and public transport. One of the consequences from this is the ongoing exhumation project of their largest cemetery grounds.

1.6 BACKGROUND

1.6.1 On the Symbolism of Train stations

Atmospherical qualities - Similarities between cemeteries and trainstations

Subjectively describing train station, it is both symbolic and rational. It is a place of stopping, starting, changing or continuing. It is also dubious, busy, efficient, stressed, boring, complicated, sometimes dirty and sometimes clean. It is a space of flow, ebbing and flowing in intensity, fed by the railway. The cemetery is a place of similar intent, it is indeed a place of stopping, but also a place of continuation and change but on the spiritual level. Seemingly, it is the opposite of a train station. It is serene and tidy, without being boring. It is a place of pause, everchanging in length. However, looking at descriptions of the train station in popular culture, is that really the case?

The railway station, a social history by Richards and MacKenzie (1986) looks at the history of the train station from a social perspective. It quotes Théophile Gautier (s.3) saying "These cathedrals of the new humanity are the meeting points of nations, the centre where all converges, the nucleus of the huge stars whose iron rays stretch out to the ends of the earth". Already in this quote, we find a description of the train station as a cathedral and a meeting place, connecting the local to the far-away. Mackenzie and Richards continue to describe it throughout history as a natural meeting place and a village hub. A place of motion and emotion, arrival and departure, joy and sorrow, parting and reunion. James Scott

observes in his *Railway Romance and Other Essays* that in the train station there is a deep connection to the individual human destiny. It represents a maelstrom of conflicting emotions and experiences. A railway station speaks of epochs of decision in life, a parting of the ways, cross-roads in conduct. Before travelling by airplane and bus, the railway station was an essential ingredient in every traveller's itinerary: point of departure, point of arrival and a point of contact. There are numerous examples of this, but despite romanticizing the subject heavily the book makes the symbolic value of the railway station clear.

Train stations and spiritual transitions

The heavy symbolism of the railway station as a crossroads, as a place for transitions in life is clear looking at it in further representations of it in popular culture. T.S Eliot describes in *The Dry Salvages* that the point of departure in a station is more than merely physical, but involves a metaphysical change (MacKenzie & Richards. 1986). Sometimes the departure is final, as there is an actual tendency to associate the train station with death. Tolstoy's *Anna Karenina* threw herself under a train. King's Cross station was cemented in the minds of the millennials as a place of transition when Harry Potter found himself there in a moment between life and death, contemplating whether he should board one of the trains or not. Quoting prof. Dumbledore "And if you were to board one of the trains? The journey

goes on, beyond the veil" .

There is a clear association of station departures with death and transfiguration, greatly contributing to the general mystique of the train station. Essentially, the atmosphere of the train station could almost be described as ecclesiastical (MacKenzie and Richards, p 11). In a railway station you find much the same atmosphere as a cathedral. It has in its characteristics the elements of a great ecclesiastical building; it has vast arches, void spaces and above all, it has the recurrence of ritual.

The trainstation's appropriety as a cemetery

Albeit heavily romanticized, the symbolic value of the train station in popular culture is clear, as stated in the examples above. It carries heavy symbolism as the herald of journeys, crossroads, farewells at the same time as it is the beginning of something new. If we at the same time equate Death as a sort of journey, approaching the cemetery with the mindset of a train station the notion is oddly comforting. In conclusion, as different as the programmes may seem at first, there is an abundance of similarities in both symbolic qualities and the actual architectural elements of the two.



Crematorium Baumschulenweg / Shultes Frank Architekten
photo by Mattias Hamrén



Jurong East MRT Station, Singapore

1.6 BACKGROUND

1.6.2 The Connection that Divides



Connection that divides - Zürich railway station
GRABER PULVER
(GRABER PULVER 2016)



Photos of Earth by night shows the glowing patches of urbanization.
(NASA)

Infrastructure feeds the city

According to United Nation's World Population Prospects 2017 the world's population will hit 10 billions by 2050, compared to today's 8 billion. According to Columbia's SocioEconomic Data and Applications Center's ongoing project GRUMP (the Rural-Urban Mapping project) approximately 3% of earth's land area is covered by urban areas. Earlier estimates showed 1-2%. It is safe to say that the cities of Earth are growing. Looking at pictures of Earth, cities are covering the surface like patches. These patches keep growing, connected by infrastructure in the shape of roads, railways, ferries and airplanes. The amount of infrastructure needed is massive. For example, the total length of railway covering the globe is a little over 1.05 million km of rail-route (World bank, 2017). Infrastructure provides a heavy flow of import, export, people and material going in and out of the cities, a necessity for cities to grow. But looking at infrastructural elements on a local scale, roads and railways become barriers that divide the city into parts. They can only be crossed a specific places on isolated "bridge" points.

The growing urban fabric

The city typically grows either vertically or by spreading into the hinterlands (urban sprawl). In an island city-state like Singapore this is a problem, as the only option for horizontal spread is to construct artificial islands like Jurong Island (New York Times, 2017). Singapore is a growing city-state. The population today is

approximately 5.6 million people, and estimated to reach 6.9 million by 2030 (Sing. Gov. 2013). The city's general strategy to house the increased population is to build vertically and de-centralize, extending the Public Transport System and build housing and amenities in close connection to major MRT (Mass Rapid Transit) stations. This decentralization process relies heavily on the extension of the public transport system. By 2020 the rail network will have doubled to 278 km, and that is not including the planned High Speed Train Connection going between Kuala Lumpur and Singapore (Sing. Gov. 2012)

The Singaporean example above is illustrating how infrastructure is needed in order for the city to grow. The problem is that with the increased amount of infrastructure creates more barriers in the urban fabric, barriers that also claim precious land area. At this point, 2017, roads alone claim around 12% of Singapore's total area (Worldbank. 2009). The railway becomes a connection that divides.

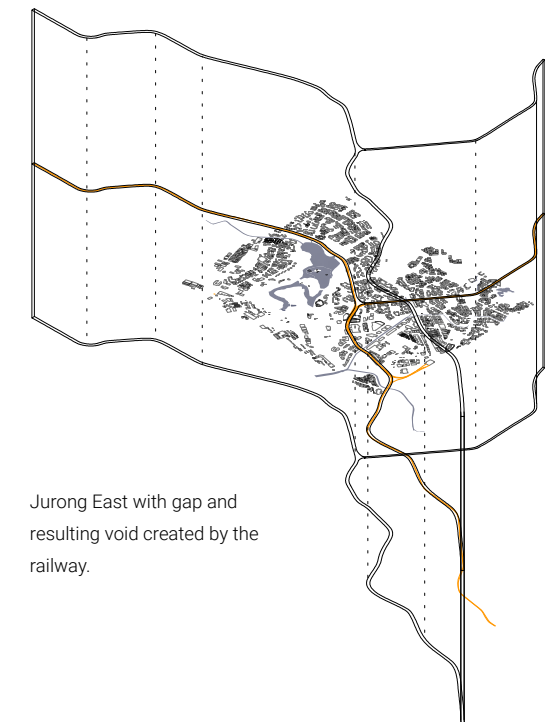
But what is the nature of these barriers?

Gaps

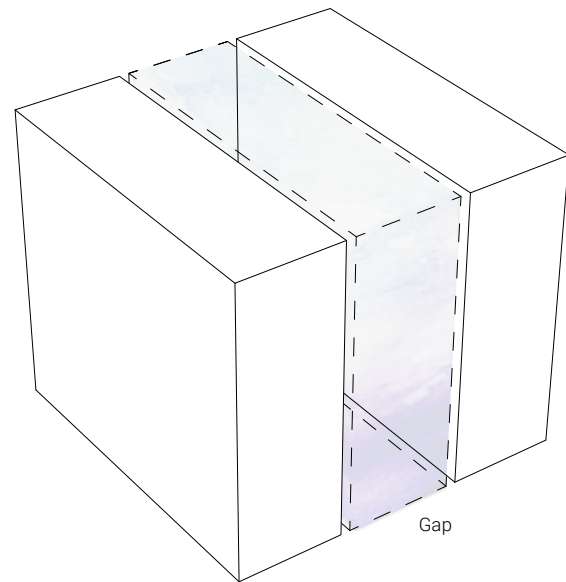
As the road or railway extends across the urban fabric, it creates a gap in it. A gap as an abstract idea can identify it as absence, pause, lack, separation, disruption or limbo. In spatial terms it is the space located between two structural instances. As a conceptual idea, the gap can be identified as the interval or pause between two things. The concept of "Ma" is a spatial concept

describing the phenomenon of the gap originating in Japanese culture, and can best be expressed as a pause or interval. The road or railway becomes a discontinuity of the urban fabric, creating an interval between the two sides of it; it defines a void. (Ruszczky, 2013; Nitschke, 1998)

When discussing voids it is easy to presume that it is simply empty space. *Railway stations by*



Jurong East with gap and resulting void created by the railway.



Gap as the implied space between two things (Ruszyk, 2013)

Julian Ross (Ross, 2000) describes the railway as inhabited by a Kinematic envelope. This can be understood as the void continually being inhabited by the possibility of materializing into moving mass. This is continually described as flow in this thesis. The flow defines a void in the urban fabric that is only temporarily inhabited by mass. Since the gap is there even when there is no mass the void space is not fully taken advantage of. In the situation of land-starvation that we face today it can be argued that it is unsustainable to let large amounts of land area sit unused, waiting for the periodical filling of a kinetic envelope.

The railway is generally a long term installation that is intended for use over long periods of time. By proposing to combine the urban gap that is the railway with other long-term programmes it is possible to tap into the unused spatial potential of the railway gap.

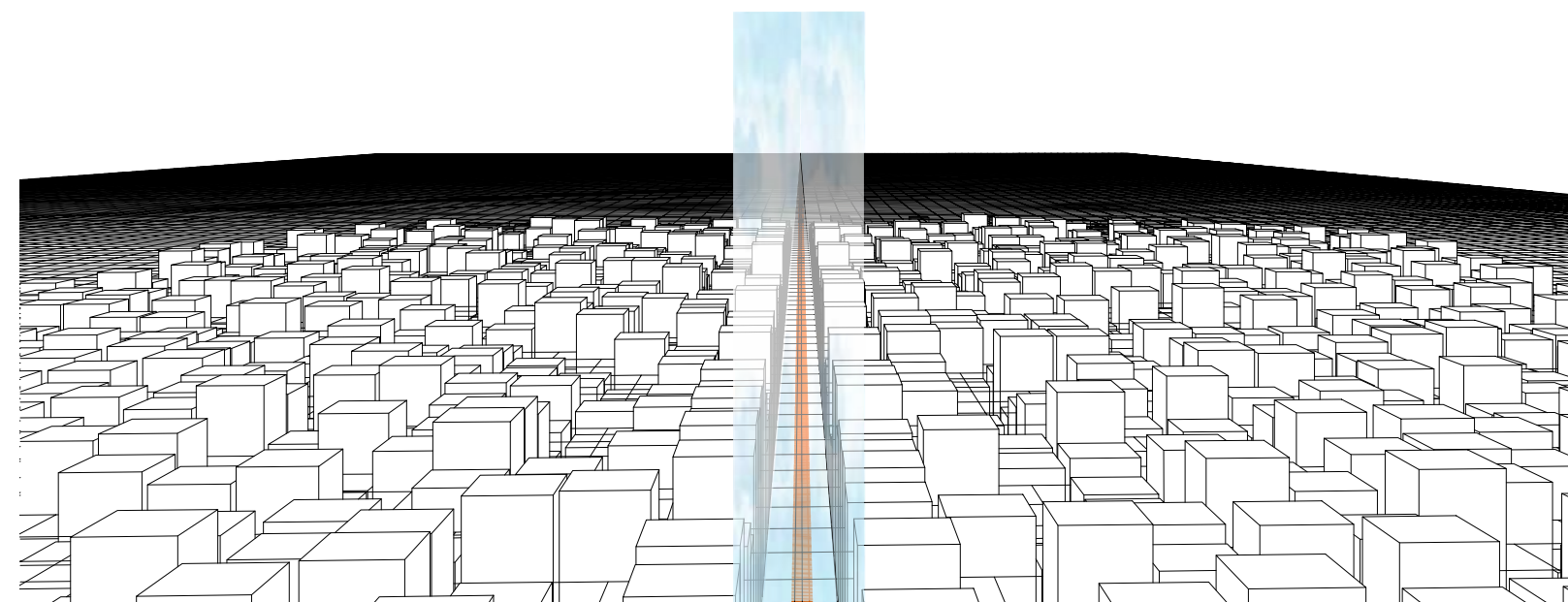
Land shortage for cemeteries

As stated above, the world's population is increasing. This increase in births ultimately amounts to the corresponding increase in deaths. Naturally this poses some problems in high-density areas. In 2015 the Guardian published an article called Death in the city: What happens when all our cemeteries are full? It describes how the land shortage in cities affect the burial situation, how the real estate market profits from the price of land and how burial space becomes a question of class and economics. In Hong Kong,

for example, a private grave can cost 30 000\$. The alternative is a five-year wait for a small spot in a public columbarium. The last available space for cemeteries was used up in the 1980's, when a series of hastily created hillside cemeteries were erected. (The Guardian, 2015)

In 2016 architectural research initiative Arch Out Loud announced an idea competition brief describing a very similar problem in Tokyo, Death & the city, Tokyo Vertical Cemetery. Private developers in Tokyo used temples as covers

to build cemetery plots which they sell for ten times the price of land without taxes, resulting in cemeteries spreading through the urban fabric in complete disregard of how two vastly dissimilar environments relate to each other. The cemetery is described in the brief as a "solemn and uninvited program", and the brief calls for a proposal that examines the life and death within the city. The competition is interesting, as it both addresses the lack of space and how the program of the cemetery meets the vibrant city. (Arch out Loud, 2016)



Gap as the implied void between two defined sides of the city.

1.6 BACKGROUND

1.6.3 No Room for the Dead



Tseung Kwan O Cemetery, Hong Kong
Lam Yik Fei/Getty Images
(The Guardian, 2015)



Old Chinese grave in Tiong Bahru (Lit. "New Cemetery"). Tiong Bahru is a calm residential area just outside downtown. It used to be a cemetery pushed to the edge of formerly central Singapore. As it has not been exhumed yet it most likely belongs to a very rich family.

Singapore exhumations

Singapore is a prime example of the land shortage regarding cemeteries. Singapore is an ambitious city-state developing rapidly since its independence from Malaysia in 1950. In a city where 50-year old buildings are considered cultural heritage, like the Bungalows in One North, cemeteries are rare links to the past and they are rapidly disappearing.

In order to house the rising population, land for roads and housing is needed. The 18ha Bidadari Cemetery for example, used to be one of Singapore's largest and oldest cemeteries accepting burials up until 1972. Between 2001 and 2006 140 000 bodies were exhumed in order to make room for a new Housing Board town and several private estates. (Tan, 2013). The city's main shopping street, Orchard street, is built on a former graveyard that was dug up. It is now prime real estate-land. According to The Straits Times in 2015, a four bedroom unit in Orchard goes for up to 11 million Singaporean dollars, roughly the equivalent of £5m. Department stores and boutiques mark what used to be the largest Teochew Community cemetery on the island. The exhumation of Bukit Brown cemetery raised controversy, as it was an old cemetery inaugurated in 1922 containing graves dating back to 1823. The activists fighting to save it claimed it to be a distinctive slice of Singapore's fast disappearing multi-ethnic country's history. (bbc) In fact, in 1978 there were 213 burial grounds on 3,7% of the island, most facing clearance even then. Minister EW Barker told parliament that all private

cemeteries over the next few years will have been closed for burials and required for development. (Han, 2015)

Currently the only cemetery open to burials is Choa Chu Kang cemetery to the west of Singapore. Western Singapore however is facing a major development phase, and large parts of Choa Chu Kang are therefore subject to exhumation. Relatives are encouraged to claim the remains of their deceased. If unclaimed, the remains will be cremated and kept for three years before they are scattered at sea (NEA Exhumation programme, 2017)

Singapore has a rich ethnic culture. Choa Chu Kang cemetery is divided by the ethnic groups and their religions. There is the muslim cemetery, the Christian, the Hindu and the Chinese, all with diverse burial traditions. Traditionally, only the Chinese Singaporeans have cremated their dead, while other cultures opt for a coffin. In 1998 the government introduced the New Burial Policy, limiting the burial period to 15 years. After this period, graves are exhumed and the remains cremated or re-interred according to the deceased's religious requirements. (NEA, 2017)

It is clear that new solutions for urban cemeteries are needed, but as illustrated in the brief from the Arch Out Loud competition brief, it needs to be done in a manner that is contextually sensitive. When the link to a nation's cultural history is as weak as in Singapore it is this thesis conclusion

that it is of extra importance that the solution is long term as well as spatially efficient.



CONNECTION THAT DIVIDES

Taema - Pause, gap (lit. discontinuous place)

Early interpretation of the railway as MA according to Nitschke (Nitschke.1988). The trainstation is a temporary discontinuity of the flow that is the railway, as the railway is a discontinuation of the urban fabric.

1.7 QUESTIONS

PRIMARY

How can the railway station and the cemetery be integrated into one both locally and globally connected hub?

SECONDARY

(systematic)

What inherent qualities can be found in infrastructural space befitting a memorial?

What elements generate these qualities?

How can these qualities be reshaped and systematized?

What is the spatial outcome?

(contextual)

How would the trainstation/cemetery tie into surrounding conditions?

What kind of barriers are found on site and how does the proposal bridge those?

(spatial)

What sort of spatial tension is created by layering two opposite programmes?

What types of flows are generated in a train station vs a cemetery and how do they work together?

How does the columbarium meet the railway?

1.8 DELIMITATIONS

This project functions on two levels, both on the urban scale and on the local scale. As such, it needs to cover both in adequate parts and cannot go into minute detail of both. While not an urban planning project, it looks at how the railway can be a connector and not a divider. As such, it only looks at existing railways and does not propose new ones. It looks at what happens on the different sides of the railway, but does not propose to change the surrounding urban fabric.

Important to point out is that the goal of this project is not to design a complete and fully functional train station, as that is a large project in itself. The design of the train station stays on the level that trains can stop in certain areas, there is a possibility to move between the train tracks and pointing out where potential for shops and other programmatic necessities could be located.

The spatial detailing is limited to two types of spaces inside the train station. In order to paint the most varied picture of the project the two most differing spaces have been chosen, namely one large space for memorials and the most bustling places, namely the platform areas.

1.9 METHOD

There are three major steps to the development of this project;

- Development of a spatial system
- Contextual adaptation
- Spatial detailing

The first phase, Spatial System, is identifying what spatial elements of a train station are appropriate for a cemetery and what elements define these. These elements are used to create a spatial prototype, a systematic approach to the design process. By studying the existing layering of flows and negative space in the train station potentials are found for how to layer the vibrant programme of the train station with the tranquility of a columbarium. This part of the process focuses on the internal connections of the structure.

The second phase, Contextual Adaptation, is putting the spatial system into a defined context, to see how it can work as a connector between the two sides of the railway. A reading of the urban territory is made in order to identify barriers and possible connectors.

The third and final phase, Spatial detailing, goes back into the structure, exploring the spatial tension and detailing of the actual meeting between railway and urn.

1. SPATIAL SYSTEM	2. CONTEXTUAL ADAPTATION	3. SPATIAL DETAILING
Collection of references		Collecting existing references of trains and cemeteries.
Analysis of reference	Selection of site	Exploration of the spatial detailing by zooming into two specific spaces in the structure.
-Extraction of Base Architectural System	Studytrip Singapore - Collection of data	Concluded primarily in section and views.
Development of BAS through testing of Prototypical system.	Conclusion of data by drawing of Territorial Conditions	
Concluded in model.	Space Syntax analysis	
	Concluded in plan and model.	

1.10 DESIGN PROPOSAL

The finished design explores poetic spatial tension generated from layering two different programmes. It allows one void, the emotional gap that is the columbarium, to bridge another void, the gap that is the railway

The finished project occupies the actual space claimed by the railway, it extends above and below but not horizontally beyond the railway tracks. It is the actual railway that defines the outer border of the design.

- The large scale looks at how the proposal sits in the context. It investigates what connections are made, what barriers are bridged, the site's territorial conditions and how they influence the project.
- The local scale looks at the detailing of a specific space within the trainstation columbarium. It details more precisely how the meeting between the two programmes happen and looks at the relationship between urns and railway.

Rather than the structural approach to architecture, I'm very interested in the conceptual and experiential aspects of space. I love the potential for poetry in space, and I love the conceptual vision in my projects. I did my bachelor's degree at Umeå school of Architecture which puts emphasis on the artistic approach to architecture. This shows well in my portfolio, as my projects emphasize speculation and space rather than structure and rationality.

In Hermit's hut, my first semester of Matter space at Chalmers, I really enjoyed the notion of making a hideout and using the existing conditions of the site to make space. I then ordered the spaces in a procession and named them by their qualities.

The second semester I worked with the notion of voids and memories and was fascinated by the spatial qualities therein. Key for this semester was working with a proposal that connected different points of the site, but at the same time provided a large barrier for the rest of the project. At the end of the semester in the competition course, I proposed a wedding chapel for the grieving. It is at the moments of great change in life that the void left by our lost loved ones is the most noticeable. I wanted to propose a wedding chapel that acknowledged that void.

For the third semester of my masters I did an exchange to EPFL in Switzerland, working on parametric urban design. I do not appreciate working on urban design in itself, which makes me want to work more with architectural proposals. What I did pick up on was the fact that the urban fabric needs a driver to grow, and that driver needs to connect to the larger urban context by the infrastructure. However, at the same time as the infrastructure is vital for connectivity and growth it creates a barrier, much like the studio project I did during second semester. It is a connection that divides.

Previous semester I also took a class in Cartography that taught how to identify and portray the governing systems of a site. In theory, the concept of cartography and parametricism would provide "a beautiful reading of the urban territory generating the project". Data found from the cartography would be used in the software (grasshopper) to generate parameters for the project.

2. SPATIAL SYSTEM

- 2.1 Architectural Systems
 - 2.1.1 Precedence
 - 2.1.2 The Immense and Distant Sound of Time
- 2.2 Momentous Space
 - 2.2.1 Track Curvature
- 2.3 The People Who swarmed Benath
 - 2.3.1 Densification of space - Internal relations
- 2.4 Encompassed Vastness
 - 2.4.1 Iterative Subdivision
 - 2.4.2 System of Voids, Circulation and Rails

2.1 SPATIAL SYSTEMS

2.1.1 Precedence



BERLIN HAUPTBANHOF STATION GMP (1993-2006)

Layering of pedestrian and infrastructural flows in a vast, open space. Large voids filled by the bustle generated from multiple flows of pedestrian and infrastructural movement.

Interior Berlin Bahnhof Station

<https://travelingcanucks.com/2011/10/europe-most-fascinating-train-stations/>



INTERIOR TURKU ECUMENIAL ART CHAPEL

SANAKSENAHO ARCHITECTS 2005

Peace through uninterrupted movement. Stillness/peace created by a singular undisturbed line of movement toward a strong source of light along rhythmically repeating elements.

Interior space

<https://www.dezeen.com/2014/11/17/turku-ecumenical-art-chapel-sanaksenaho-architects-copper-finlan/>



TRAIN STATION - HAYAO MIYAZAKI, SPIRITED AWAY (2001)

Highlighting the absurdity of an improbable context through the normalcy of an everyday activity. Absurdity of the situation highlighted by the railway going across the sea stopping at a platform arriving at seemingly nothing.

Spirited away / Spirit train riding along the ocean

<https://www.derpihooru.org/148500>

The station, as he entered it, was murmurous
With the immense and distant sound of time.
Great slant beams of moted light
Fell ponderously athwart the station's floor,
And the calm voice of time
Hovered along the walls and ceiling
Of that mighty room,
Distilled out of the voices and movements
Of the people who swarmed beneath.

It had the murmur of a distant sea,
The languorous lapse and flow
Of waters on a beach.
It was elemental, detached,
Indifferent to the lives of men.
They contributed to it
As drops of rain contribute to a river
That draws its flood and movement
Majestically from great depths,
Out of purple hills at evening.

THE TRAIN STATION, THOMAS WOLFFE

Ephemerality of train station captured by describing the lives passing through it - capturing the ephemerality of the train station as the sound generated by the ebb and flow of people.

(MacKenzie & Richards. 1986)

Few buildings are vast enough
To hold the sound of time
And now it seemed to him
That there was a superb fitness in the fact
That the one which held it better than all others
Should be a railroad station.
For here, as nowhere else on earth,
Men were brought together for a moment
At the beginning or end
Of their innumerable journeys,
Here one saw their greetings and farewells,
Here, in a single instant,
One got the entire picture of the human destiny.

Men came and went, they passed and vanished,
And all were moving through the moments of their
lives
To death,
All made small tickings in the sound of time -
But the voice of time remained aloof and unper-
turbed
A drowsy and eternal murmur
Below the immense and distant roof.

2.1 SPATIAL SYSTEMS

2.1.1 Precedence

TERMINUS EMYTHOLOGY

noun (pl) -ni, -nuses

1. the last or final part or point
 2. either end of a railway, bus route, etc, or a station or town at such a point
 3. a goal aimed for
 4. a boundary or boundary marker
 5. (architect) another name for term (sense 10)
- Word Origin
C16: from Latin: end; related to Greek termōn boundary

Terminus

noun

1. the Roman god of boundaries
- terminus ad quem

noun

1. the aim or terminal point
- Word Origin
literally: the end to which

terminus a quo

noun

1. the starting point; beginning

Word Origin

literally: the end from which

Word origin and history for terminus

n.

1550s, "goal, end, final point," from Latin terminus (plural termini) "end, boundary line," from PIE root *ter-, base of words meaning "peg, post, boundary, marker goal" (cf. Sanskrit tarati "passes over, crosses over," Hittite tarmaizzi "he limits," Greek terma "boundary, end, limit"). In ancient Rome, Terminus was the name of the deity who presided over boundaries and landmarks, focus of the important Roman festival of Terminalia (held Feb. 23, the end of the old Roman year). Meaning "either end of a transportation line" is first recorded 1836.

terminus. (n.d.). Collins English Dictionary - Complete & Unabridged 10th Edition. Retrieved March 30, 2017 from Dictionary.com website <http://www.dictionary.com/browse/terminus>

RESEARCH VOCABULARY

Urban Gap The continuous void in the urban fabric caused by infrastructure.

Void Consist of flows and negative space, defined by an outer border (tracks).

Flows Directional movements of either pedestrians or trains of varying intensity.

Negative space The resulting empty space found in between flows and an outer border.

Paths Vehicle for pedestrian flows

Rails Vehicle for infrastructural flows

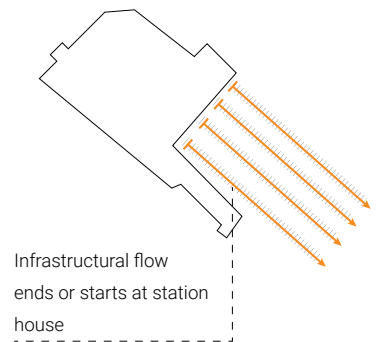
Void is made up by negative space and flows and defined by an outer border.

Flows are pedestrian paths and infrastructural rails and the

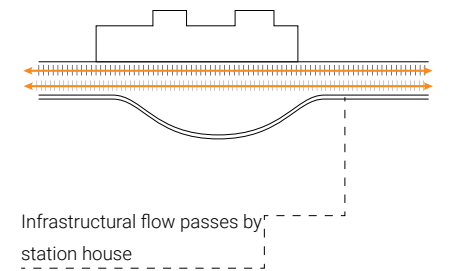
outer border

THREE TYPES OF INFRASTRUCTURAL FLOWS IN A TRAINSTATION

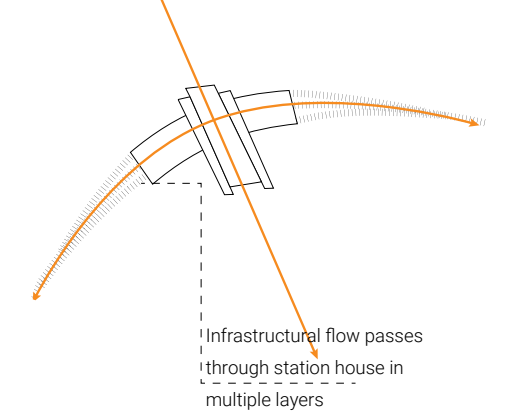
Terminus



Sidostation



Tracks above and below



(Bakerson, 2010)

2.1 SPATIAL SYSTEMS

2.1.2 The immense and distant sound of Time

ANALYSIS

Berlin Hauptbahnhof: Large Scale

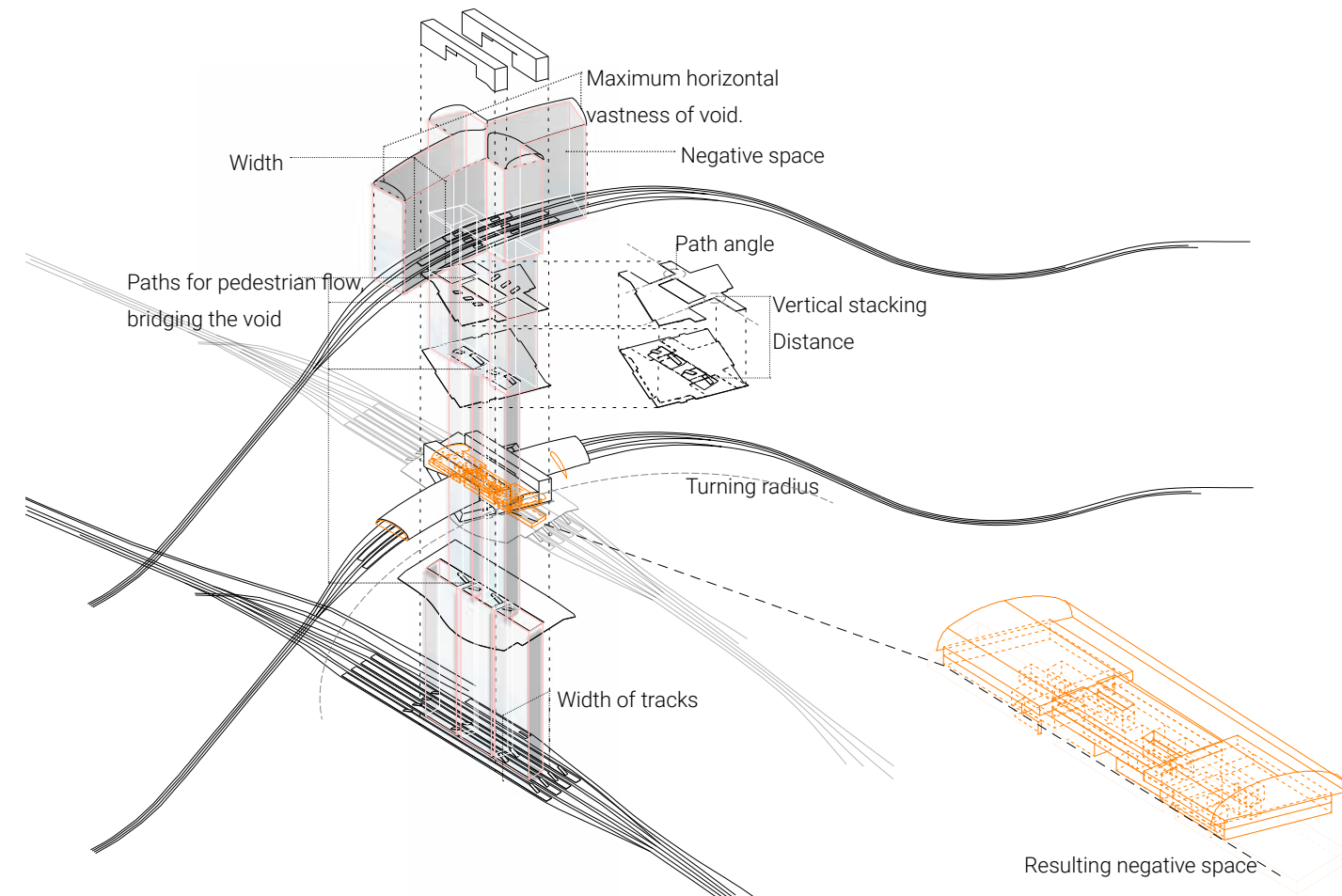
Combining two infrastructural gaps by using the train station as a junction. The station sits on top of two intersecting infrastructural drivers, creating a layered junction of infrastructural flows.



ANALYSIS

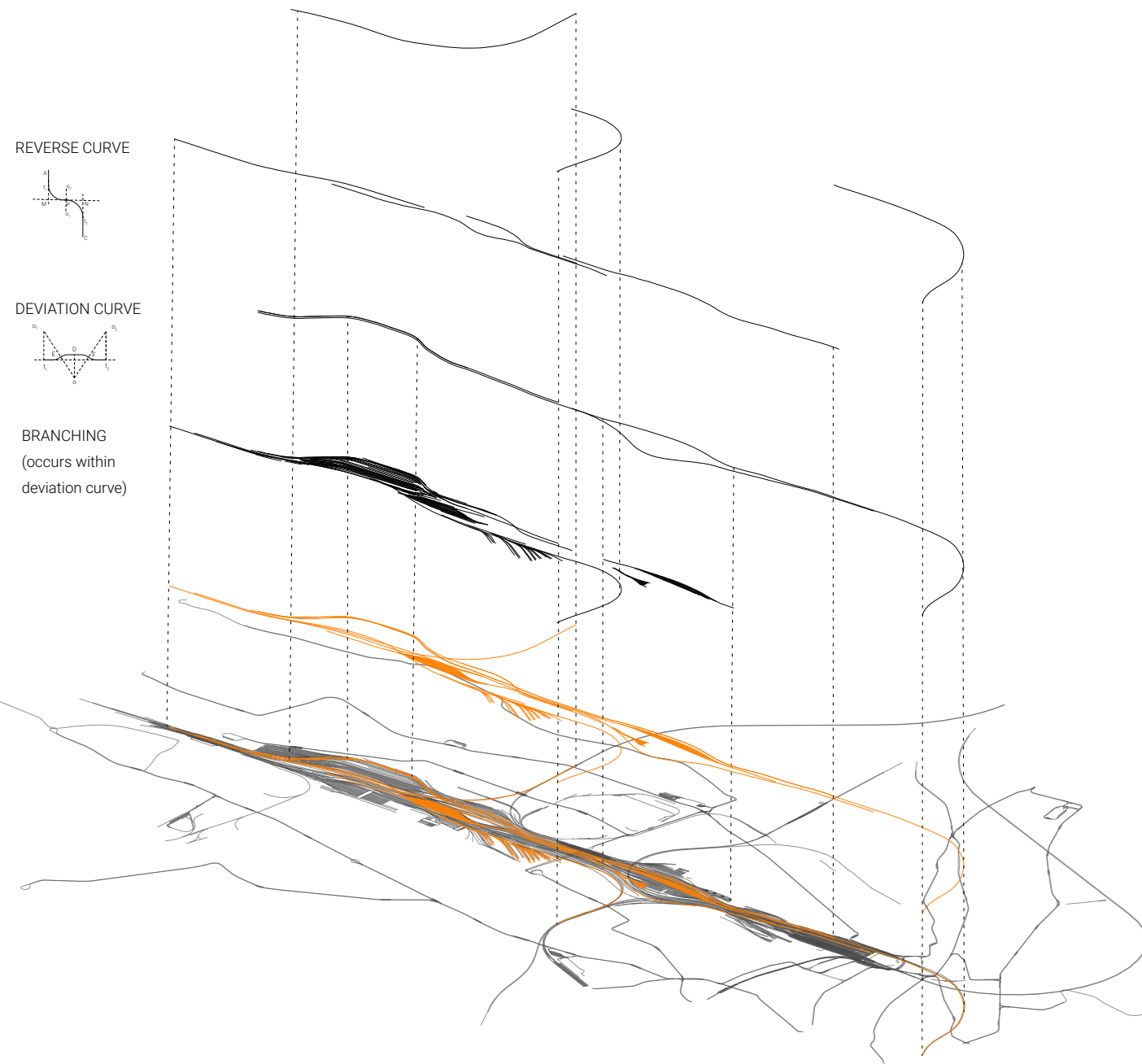
Berlin Hauptbahnhof: Local scale

Designing negative space in a void by layering of flows



2.2 MOMENTOUS SPACE

2.2.1 Track Curvature



TRACK CURVATURE STUDY CASE: ZÜRICH TRAIN STATION

Using an existing train station for examples of how the tracks in themselves function as definer of space.

The lazy curvature of the railway tracks is concluded to be the result of the use of the Euler curve as basis for a transition curve. Unfortunately, implementation of the actual equation to join curves for rail-designing proved to be too complicated. In order to identify the lounging movements of the curves the usage of a precedence was used. The complex interlacing and swaying of the tracks of Zürich trainstation closely resembles that of the intended design goal. Curves were traced and identified according to previously identified railway curves. The resulting tracings are used for future experimentation.

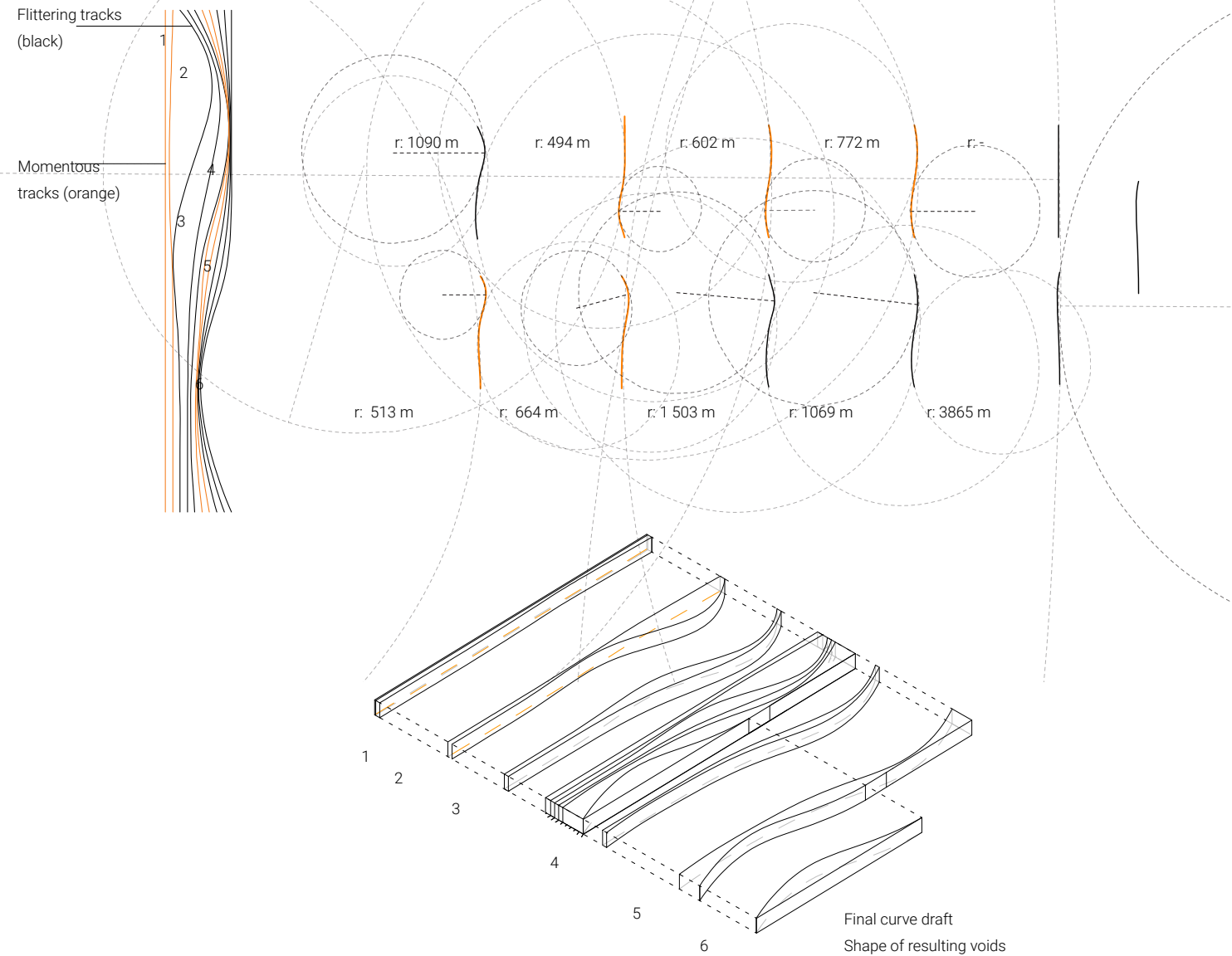
Note: Zürich trainstation is an extremely complex urban node. This example focuses solely on the curvature of the traintracks, investigating how the different types of curves found in railway construction together constitute the intricate twisting of the infrastructural void as seen in the Zürich railway station. For investigation on how the flows work inside the station, please see Analysis of Berlin Hauptbahnhof station in Architectural Systems.

2.2 MOMENTOUS SPACE

2.2.1 Track Curvature

TRACK CURVATURE AS DEFINER OF NEGATIVE SPACE

A number of random deviation- and reverse curves are arrayed alongside each other. Image analyses the sharpest turn radius of the train along each track. The curve defines amount of deviation from other tracks, already starting to define the space in between. Orange curves define a curve radius greater than 1000m.



Moment of stillness

Voids shaped by track curvature

speed



Final curve draft - speed

Final curve draft tested in model and explored by photography. Curves distributed in vertical direction. Model photography expressing the sense of speed along the elevated rails overlaid with moments of stillness.

2.3 THE PEOPLE WHO SWARMED BENEATH

2.3.1 Densification of space - Internal relations

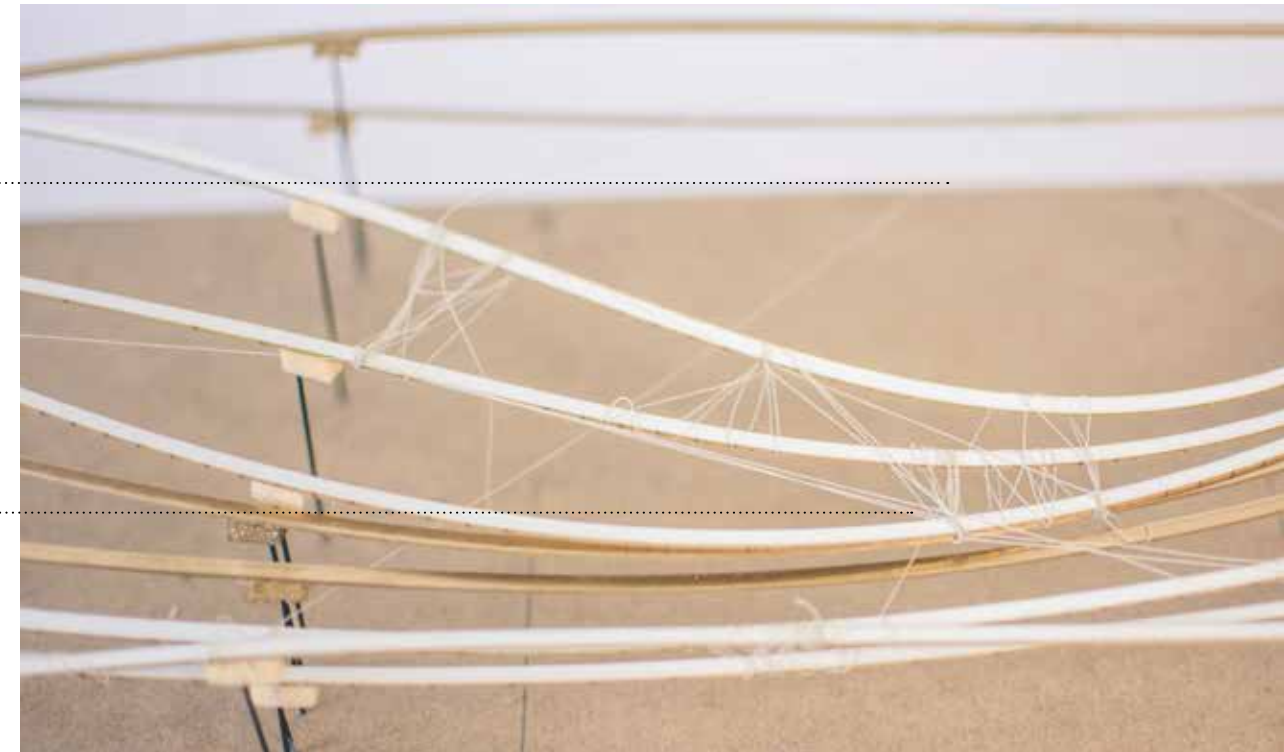
Circulatory logic

Model exploring the logic of the interconnectivity of the rails. The shortening distance between tracks suggest an easier mode of transversing the tracks. The logic for the circulatory system explored in this model is that the number of connections between the tracks increase with diminishing distance between tracks. This means that train tracks that are closer together create space that is more easily traversed by pedestrians, resulting in spaces of more intense circulation. By controlling the distance between tracks it is hence possible to control the circulatory intensity. A densification of space is achieved, both by the decreasing of voids between tracks by diminishing the distance between the tracks and by the adding of connections.

Larger distance - fewer connections

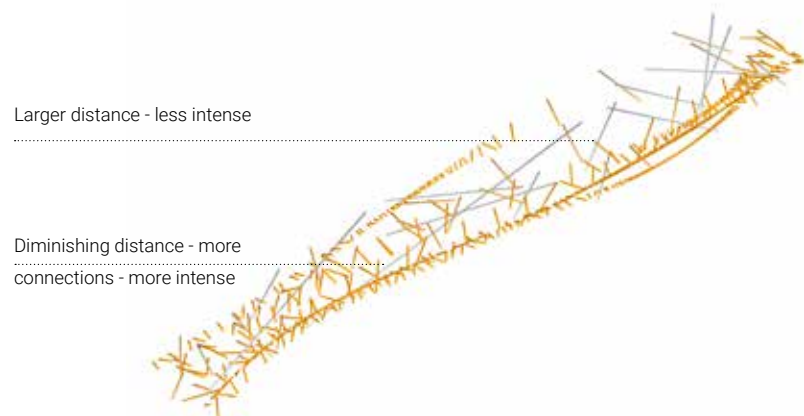
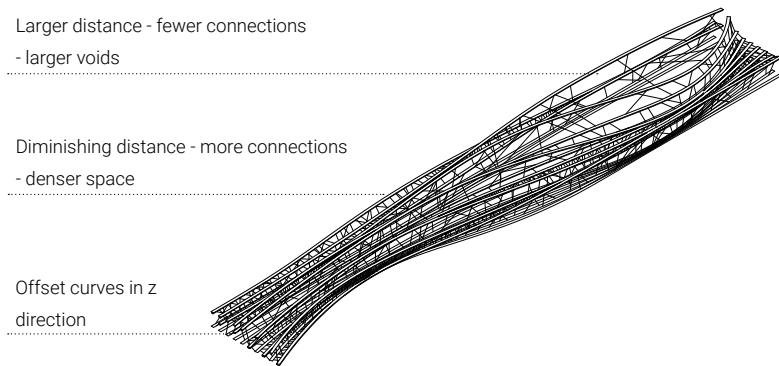
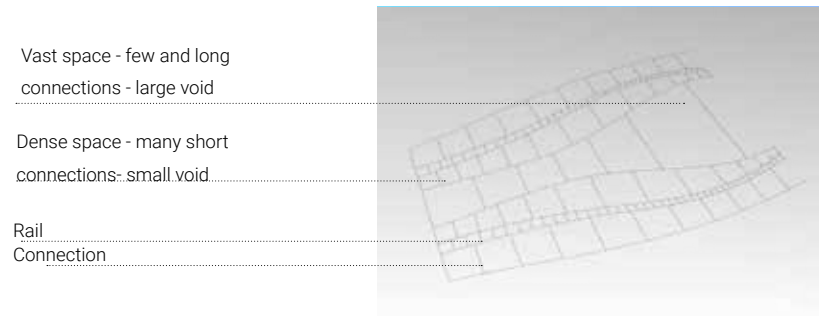
Diminishing distance - more connections

Diminishing distance - densification of space



2.4 ENCOMPASSED VASTNESS

2.4.1 Iterative Subdivision



Systematizing circulatory logic

The number of connections in relationship to distance between rails is set up through a recursive algorithm that divides a curve in relation to its distance to others.

System for Encompassed Vastness

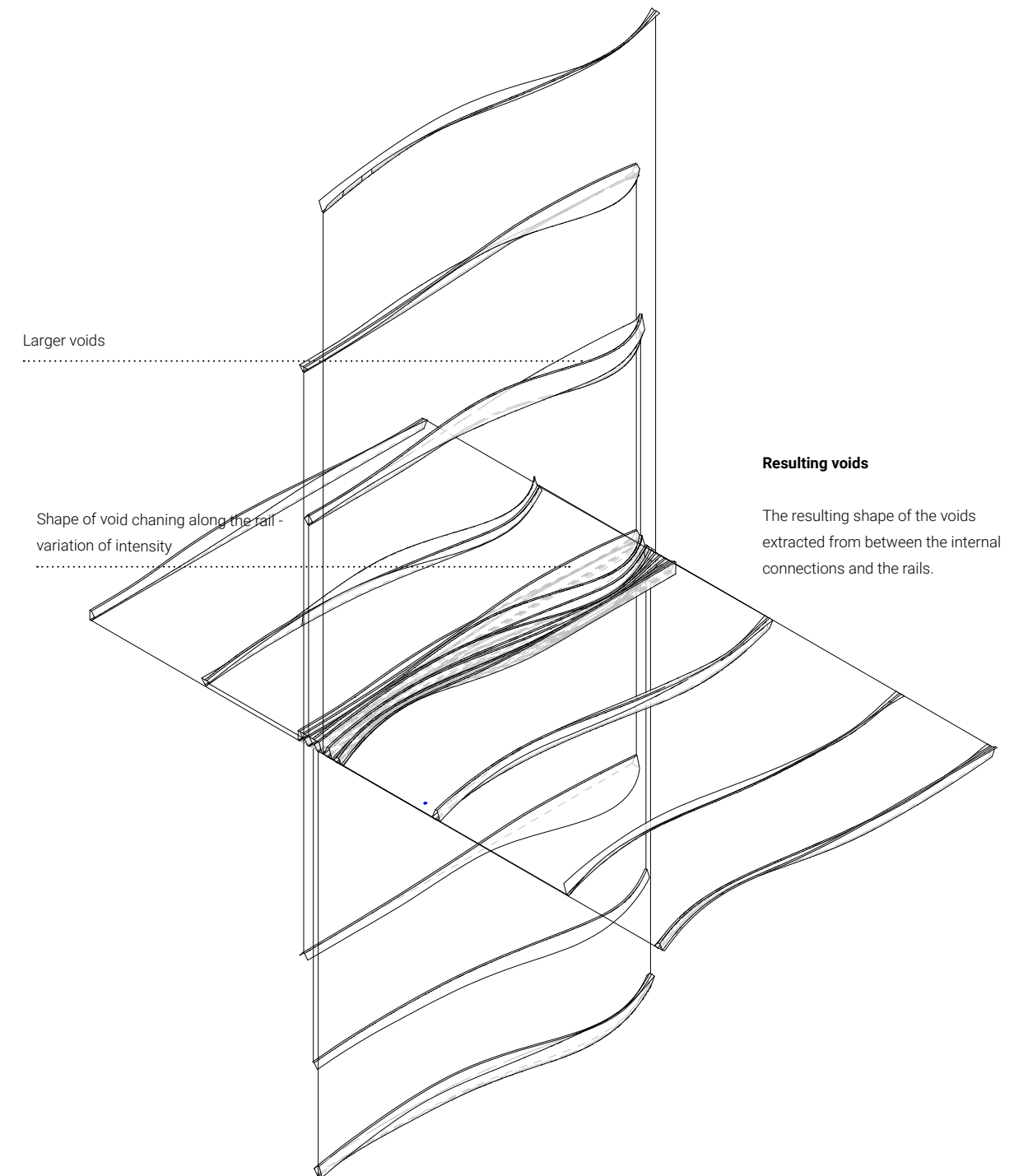
The connections, the rails, and the voids together make up a system. By controlling the shape of the rails it becomes possible to control both the amount of circulation in the space, as well as the shape of the voids. The connections drawn between the rails create imaginary surfaces that define the voids, and gives a sense of encompassed vastness. By also offsetting the rails in z-direction it is possible to gain more control over the connections, and more complex systems of circulation.

Intensity of circulation

The shorter connections become more intense, layering the amount of activity throughout the space.

2.4 ENCOMPASSED VASTNESS

2.4.2 System of Voids, circulation and Rails



2.4 ENCOMPASSED VASTNESS

2.4.2 System of Voids, circulation and Rails

Track curvature

Diminishing distance - more connections - denser space

System for Encompassed Vastness

The connections, the rails, and the voids together make up a system. By controlling the curvature of the rails it becomes possible to control both the amount of circulation in the space, as well as the shape of the voids. The connections drawn between the rails create imaginary surfaces that define the voids, and gives a sense of encompassed vastness.



3. CONTEXTUAL ADAPTATION

- 3.1 Contextual Forces
 - 3.1.1 Singapore Field Trip
 - 3.1.2 National contextual forces
 - 3.1.3 Territorial conditions

- 3.2 Base Organisational System
 - 3.2.1 Precedence
 - 3.2.2 Serenity along axial movement: radial bundling

- 3.3 Contextual interaction
 - 3.3.1 Contextual interlace

3.1 CONTEXTUAL FORCES

3.1.1 Singapore field trip

"30 years of tabula rasa"
- Rem Koolhaas



"It really has a very interesting combination of cultures, with a complex history and novel relation to architecture as seen to being an incredibly small but prosperous city-state."

-Sam Joyce, assistant Prof. Singapore University of Design

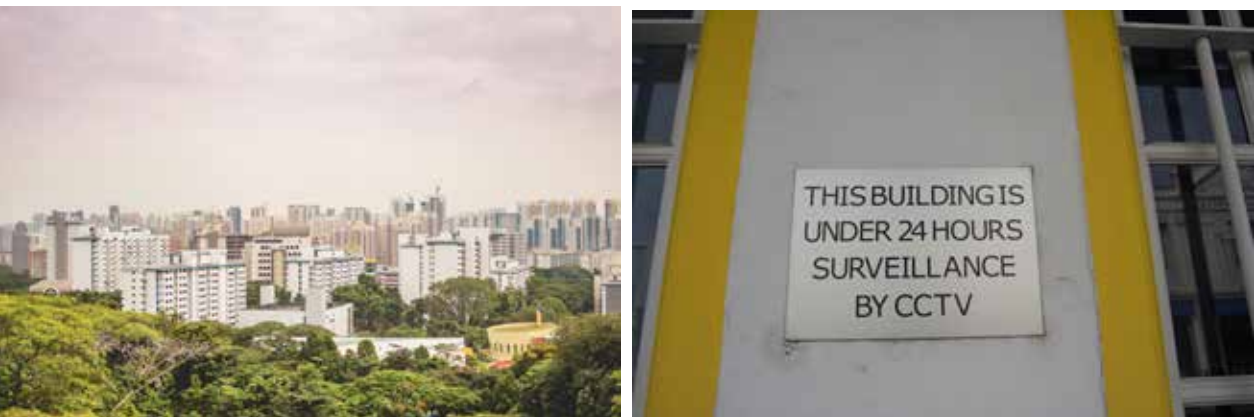
In Rem Koolhaas Singapore Songlines from 1995 - "30 years of Tabula rasa"
British Colony since 1824 – shop houses
Independence from Malaya 1959 – intense economic growth
Anything older than 1950 - considered old (Frven Lim 20161010)

3.1 CONTEXTUAL FORCES

3.1.1 Singapore field trip



Singaporean Wet market - The traditional food markets of Singapore moved inside by governmental policies. Not as ideal as an the traditional outdoor market, but easier to control.



Typical Social Housing block - The governmental initiative to house the population after the 1950's, as people were bought out from their traditional Kampung residences and housed in HDB flats.

Political situation

- PAP (People's Action Party) reselected since Declaration of independence 1965 (guiden)
- Heavily controlled, strict laws with harsh punishments such as whipping and death penalty
- Rising costs for living is one of the major future issues, because of the lack of land.
- Strong Military presence. Lots of land allocated to secret Military bases despite lack of land for future development.
- Generally seen as strict but uncorrupt
- General impression: Well functioning city, very clean and very safe, but at the cost of individual independence and personal freedom.

3.1 CONTEXTUAL FORCES

3.1.1 Singapore field trip



Urban planning research at CREATE Labs, NUS



Foodtruck in One North Business district - typical for the "hipster" and very westernised food joints/café's spread out in downtown



Enormous Snorlax made by students in the FabLab at SUTD.



Billboard in Changi Business park, one of the next large areas in Singapore to be developed.



"Underground" club.

Trading hub

- Their greatest export is themselves - "Exporting the model smart city".
- Very conscious of branding itself as a vibrant, innovative and cutting edge technological state. It is dependant on trade and attracting scientists and researchers from the rest of the world.
- Focus on art and technology, , innovation, Fab labs, Data Farms, etc

General impression: Singapore wants to be seen as a cool, modern and hip state, full of creators and Vibrant city life. The impression is that they want an eastern Copenhagen with a technological twist. How that is supposed to be achieved in a state where spitting on the street has a 500 SD fee and the usage of drugs is penalized by death, remains to be seen.

3.1 CONTEXTUAL FORCES

3.1.1 Singapore field trip



Celebration of the Chinese New Year in an British Colonial style wet market, with the high rises of Downtown Singapore in the background.



Chinatown and Downtown

Rich culture but no Heritage

- Young state with an old heritage
- Independent from Malaysia since 1965
- Old british colony
- "Tabula rasa" - Koolhaas
- Pride in how well different types of people live together, population made up of Malays, Chinese and Indians

General impression: Search for technological innovation somewhat leaves cultural heritage behind, creating a strange duality of both typology and mentality.



"Reflections" at Keppel bay by Daniel Libeskind in the background and traditional Singaporean Housing in the foreground..

3.1 CONTEXTUAL FORCES

3.1.1 Singapore field trip



“Modern Singapore is like a strange mix between a vertical variant of the Garden Cities of Ebenezer Howard and the suburbs of Modernism, while at the same time being hyper futuristic”

- WOHA Architects, study visit
20170210



Dualities

- Vastly different typologies, on the one hand there is the modernist heritage with clear geometries and on the other it embraces the futuristic and parametric expression.

- Consequence of previous topics of Heritage and Branding.

- Vertical gardens. Lots of usage of plants on facades and terraces. One argument is densification of urban fabric without losing green space. (WoHa architects)

- "...and seeing as it is Singapore, it was a crazy enough to be built"

- Peter Ortner, Ass. prof. EPFL

3.1 CONTEXTUAL FORCES

3.1.1 Singapore field trip



SUTD, UN Studio



Vertical gardens at Park Royal, Woha Architects



Golden Mile Complex



Social Housing and Sports Centre at NUS



Elevated MRT rails



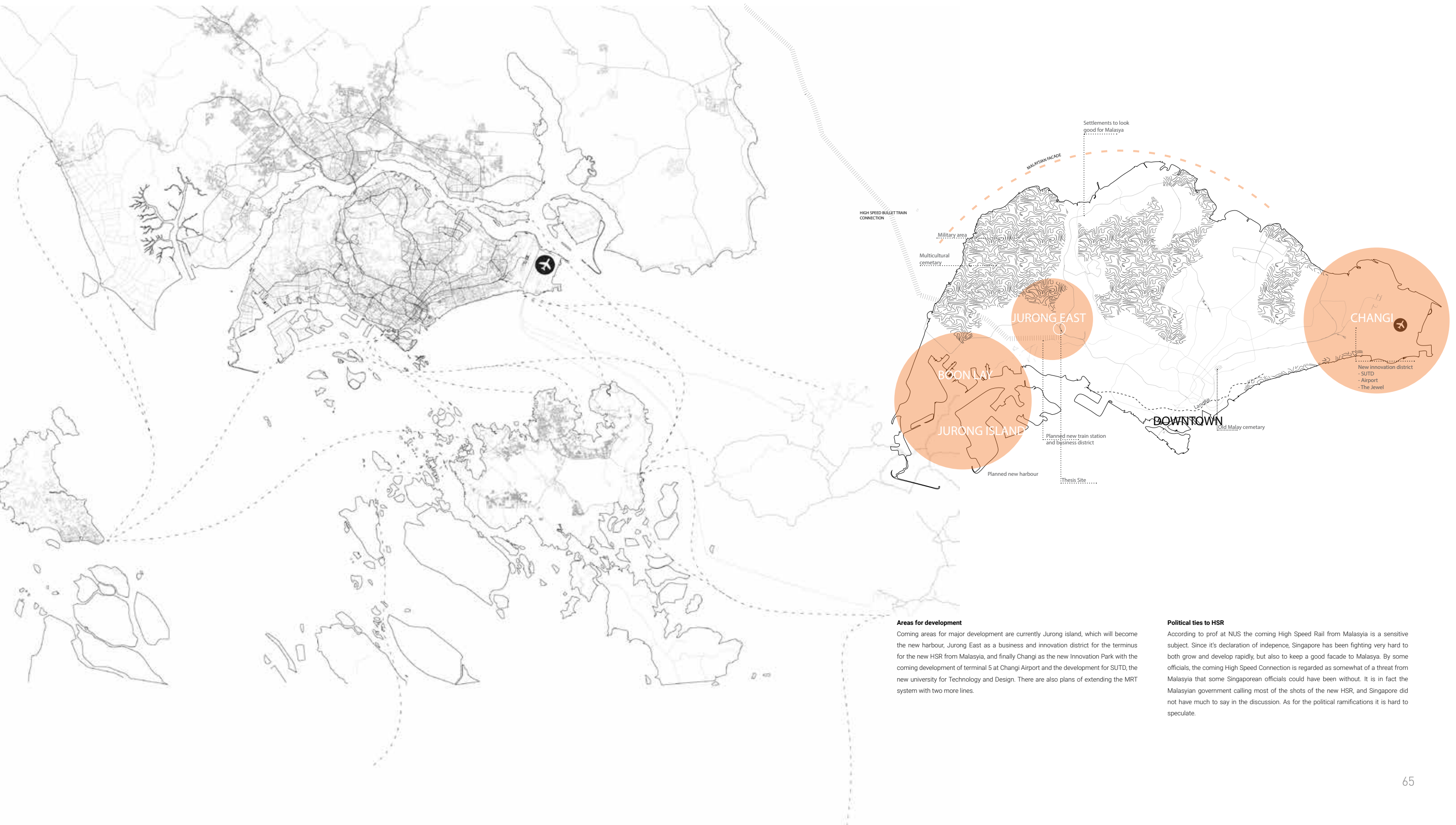
Marina Bay Sands, Safdie Architects



Henderson Waves, RSP Architects Planners & Engineers

3.1 CONTEXTUAL FORCES

3.1.2 National contextual forces



Areas for development

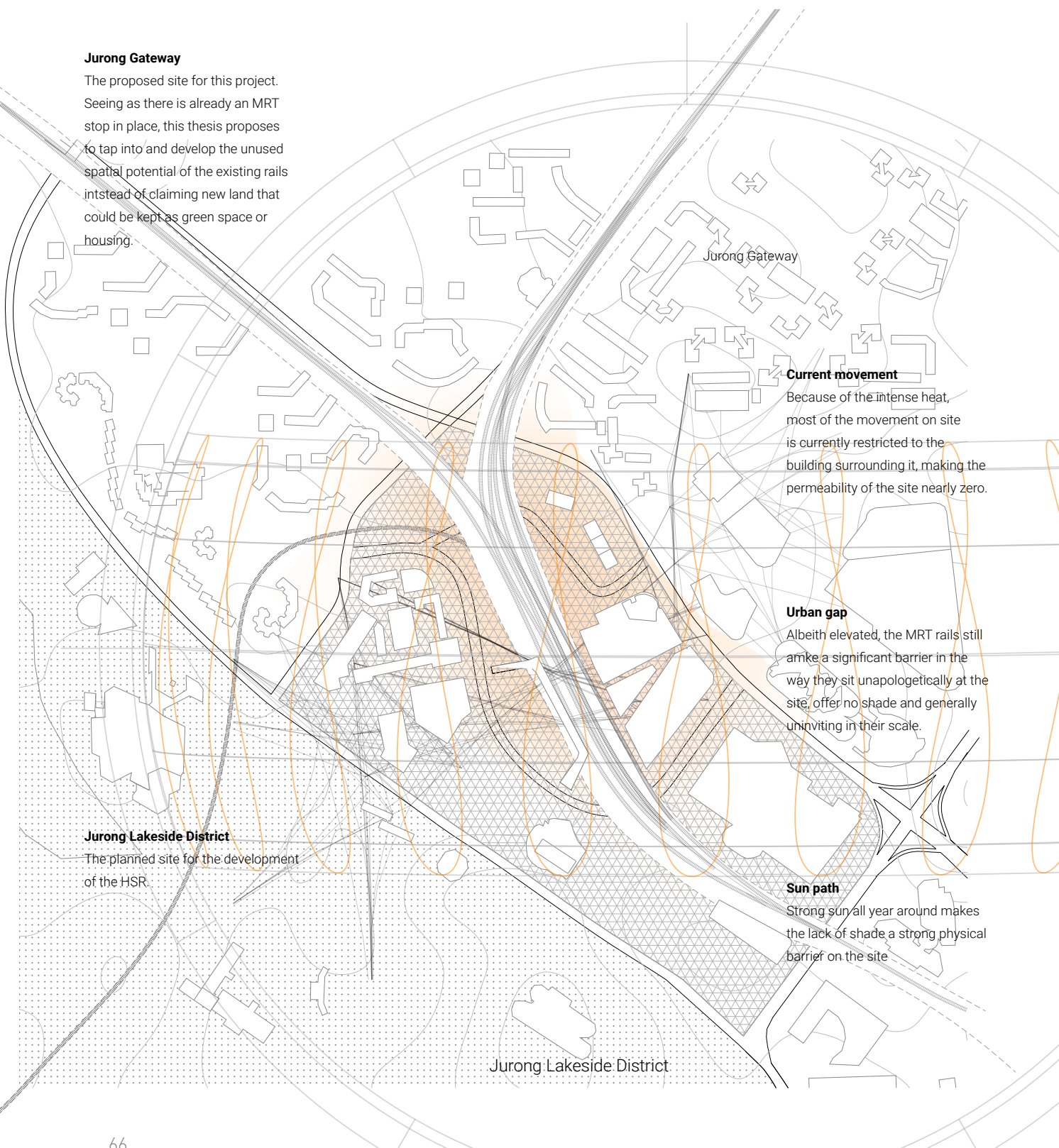
Coming areas for major development are currently Jurong island, which will become the new harbour, Jurong East as a business and innovation district for the terminus for the new HSR from Malaysia, and finally Changi as the new Innovation Park with the coming development of terminal 5 at Changi Airport and the development for SUTD, the new university for Technology and Design. There are also plans of extending the MRT system with two more lines.

Political ties to HSR

According to prof at NUS the coming High Speed Rail from Malaysia is a sensitive subject. Since it's declaration of independence, Singapore has been fighting very hard to both grow and develop rapidly, but also to keep a good facade to Malaysia. By some officials, the coming High Speed Connection is regarded as somewhat of a threat from Malaysia that some Singaporean officials could have been without. It is in fact the Malaysian government calling most of the shots of the new HSR, and Singapore did not have much to say in the discussion. As for the political ramifications it is hard to speculate.

3.1 CONTEXTUAL FORCES

3.1.3 Territorial conditions - Barrier map



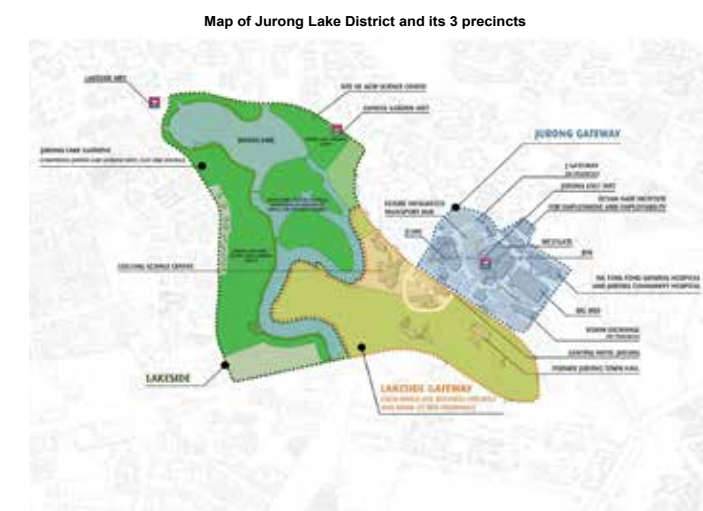
The URA (Urban redevelopment Authority) is aiming for the Jurong Lake district to become Singapore's next business district, on the level of London's Canary Wharf (CREATE labs). It is part of Singapore's de-centralization plan and will become the city-state's second Central Business District.

Jurong Lake district is so far comprised by two sectors that are still being developed. Jurong Gateway has a focus on shopping and office opportunities. Lakeside is a large green area for recreational activities, Singapore's "new, national gardens in the heartlands". These two districts will be joined by a third, the Jurong Lakeside Gateway. Lakeside Gateway is planned to contain the terminus for the coming High Speed Railway to Malaysia, as well as shopping and business opportunities.

Lawrence Wong is the Singaporean Minister for National Development and Chairman of the steering committee. He claims that "We have an exceptional opportunity to transform Jurong Lake District into 'A District of the Future' and our second CBD, which will redefine the way we live, work and play. As a CBD in our heartlands, the District will drive Singapore's growth in the future economy, and cater to the diverse needs of businesses, residents, visitors, and Singaporeans from all walks of life. It will be a distinctive new gateway to Singapore, distinguished by its high connectivity, accessibility and environmentally-

friendly features, where smart and green mobility options are the choice modes of commute. The District will be a hub for smart innovations, and home to sustainable urban infrastructure that will boost productivity and manpower efficiency. Most of all, Jurong Lake District will stand out as a delightful and inclusive destination for the community, defined by its greenery, extensive water bodies, built heritage, and vibrant public spaces. This is only the start of a very exciting transformation. We look forward to working closely with professionals and the public to shape an outstanding plan, and will engage extensively to realise the vision for the District."

(URA. 2017)



<https://www.ura.gov.sg/uol/-/media/User%20Defined/URA%20Online/media-room/2016/jul/pr16-45c.pdf?la=en> 20170411

3.2 BASE ORGANISATIONAL SYSTEM

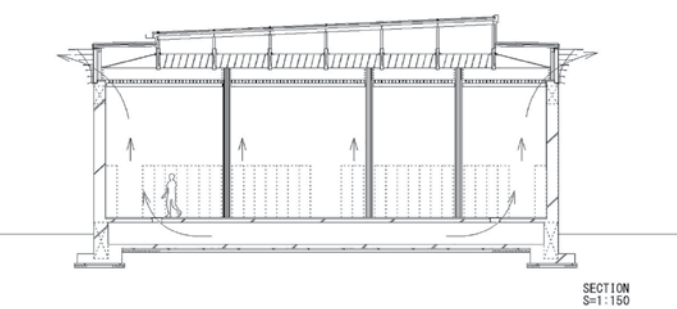
3.2.1 Precedence



CHUA CHO KANG COLUMBARIUM

Serenity in a radial organization of movement along stillness.
Urns arrayed in smaller modules along radial axes, originating from a concentrated point of visitors coming and going.

maps.google.com 20170423



MYOENJI COLUMBARIUM / FURUMORI KOICHI ARCHITECTURAL DESIGN STUDIO

Stillness contained inside static space.
Urns arrayed along the walls of a square building with no space shaped to accommodate flows. It is a static space.

(Archdaily. 2017)



MEMORY WOUND BY JONAS DAHLBERG

Making the emotional gap a physical disconnect.
Physical manifestation of the emotional gap that is loss by disconnecting the site of the terrorist attack from the main land. It is made physically inaccessible, but retains a visual connection. It is possible to see what is going on but near impossible to reach.

(Dezeen. 2016)

COLUMBARIUM

noun (pl) -ia

1. another name for a dovecote
2. a vault having niches for funeral urns
3. a hole in a wall into which a beam is inserted

Word Origin

C18: from Latin, from columba dove

Word Origin and History for columbarium

n.

“subterranean sepulchre in ancient Roman places with niches for urns holding remains,” neuter of Latin columbarius, “dove-cote” (so called from resemblance), literally “pertaining to doves;” from columba “dove.” Literal sense of “dove-cote” is attested in English from 1881.

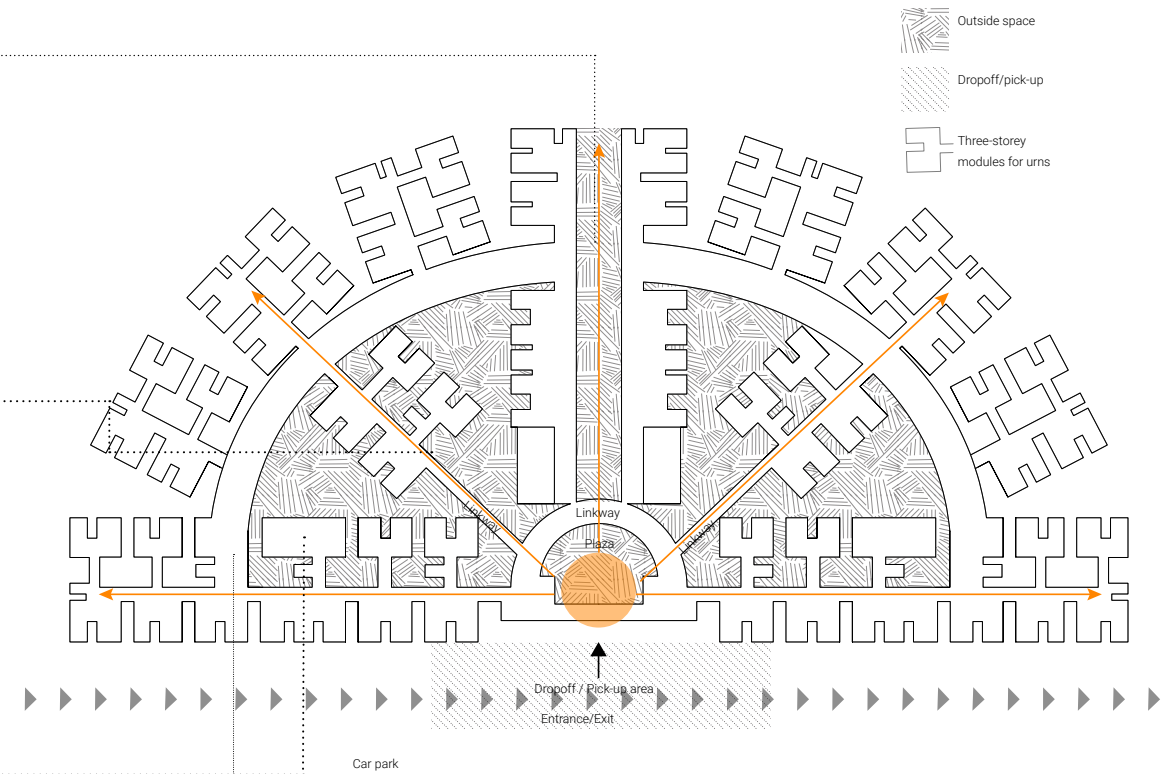
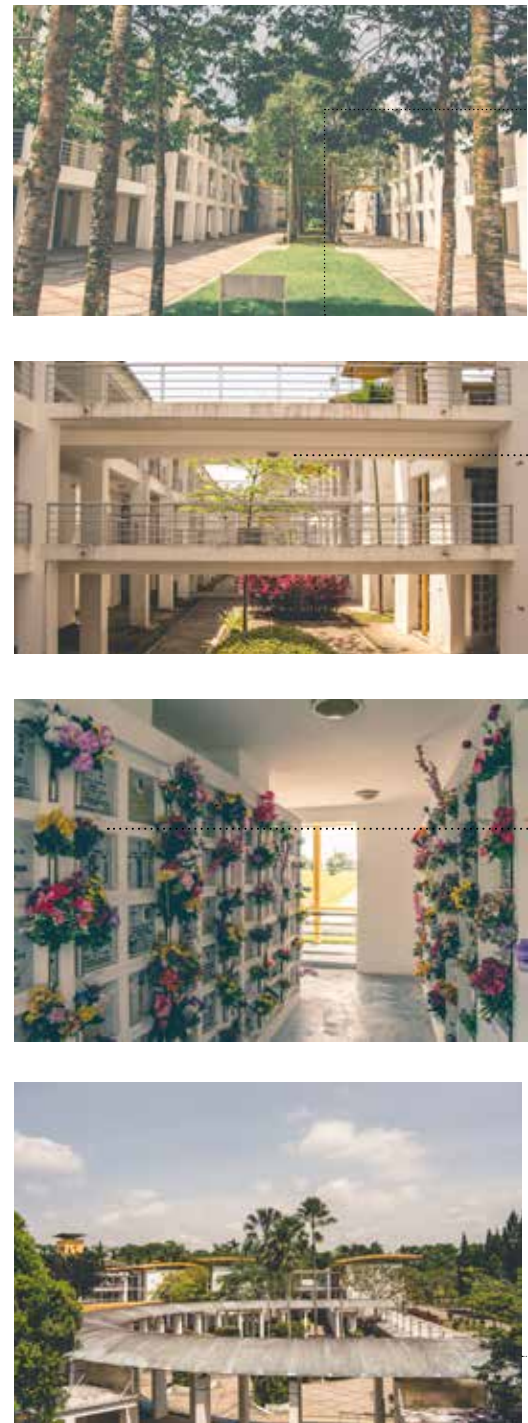
columbarium. (n.d.). Collins English Dictionary - Complete & Unabridged 10th Edition. Retrieved March 30, 2017 from Dictionary.com website <http://www.dictionary.com/browse/columbarium>

“It is like walking up the stairs to your bedroom in the dark, and thinking there is one more stair than there is. Your foot falls down, through the air, and there is a sickly moment of dark surprise as you try and readjust the way you thought of things”

-*The Reptile Room*, Lemony Snicket on the loss of a loved one

3.2 BASE ORGANISATIONAL SYSTEM

3.2.2 Serenity along radial movement

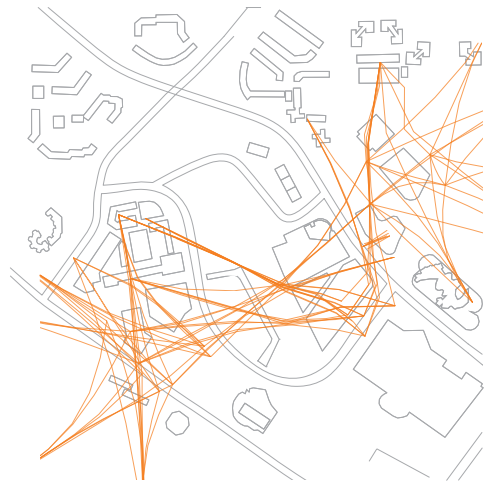


1. Sense of serenity (O) achieved through symmetric array (P) of urn storage modules (E) along linear lines of pedestrian movement (A) .
2. One clearly (P) articulated point of entry and exit (E) is the origin for the radial movement (A), creating a clearly weighted center of the plan(O)
3. Radial array (P) of urn storage (E) creates long sightlines (A), giving a vast sensation to a relatively small space (O)
4. Open(P) walls (E) between modules and outside plazas (A) allows peacefulness to permeate the whole premise (O)
5. Generous (P) usage of greenery and ornamental flowers (E) break austerity of architectural expression(O).
6. Openings (P) in walls and along pathways (E) create ambient play (O) of light and shadow (A) in the urn spaces.

3.3 BASE ORGANISATIONAL SYSTEM

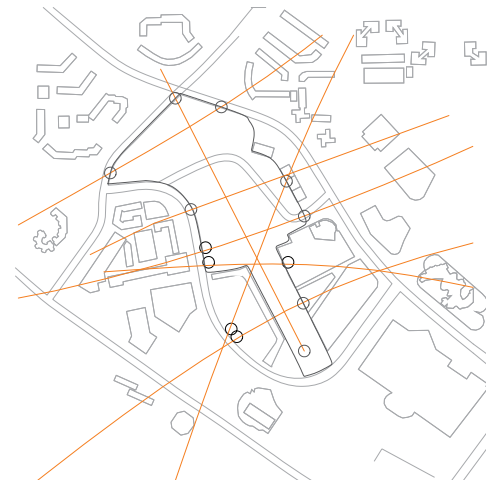
3.3.1 Contextual interlace - radial bundling

Applying the logic of radial motion originating from a clear point of departure to the site, with the aim of tying the structure of rails to the site and enable movement across the infrastructural void. In the previous step the radial logic is touched upon but underdeveloped.



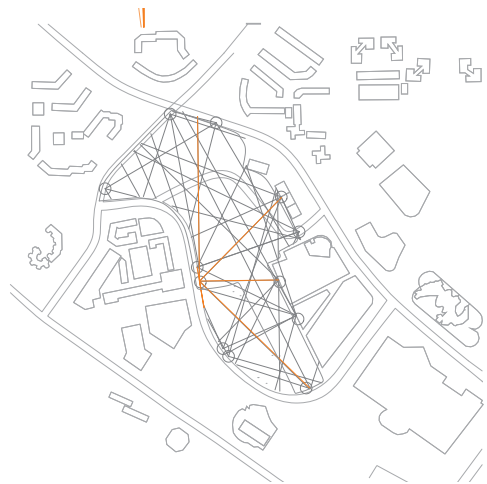
Current movement across site

Current movement across site - the movement is heavily concentrated to the shopping centers and the existing tram station. Climate conditions and extreme heat result in most of the area to be unused, open green space.



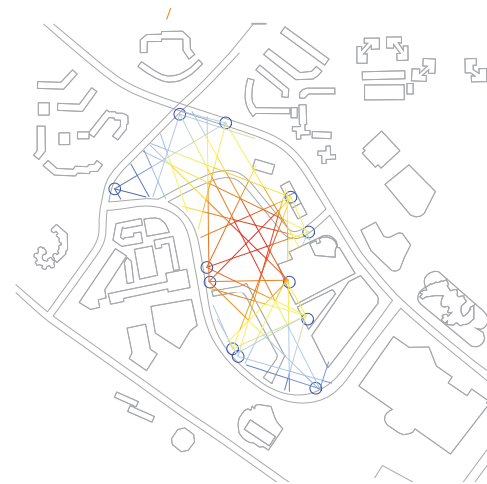
Proposed movement across site

Paths between different types of areas are drawn in order to find connections across the site. Different access points based on surrounding programs are identified. The surroundings consist of a Hospital, housing, offices and shopping.



Identifying possible entrance points.

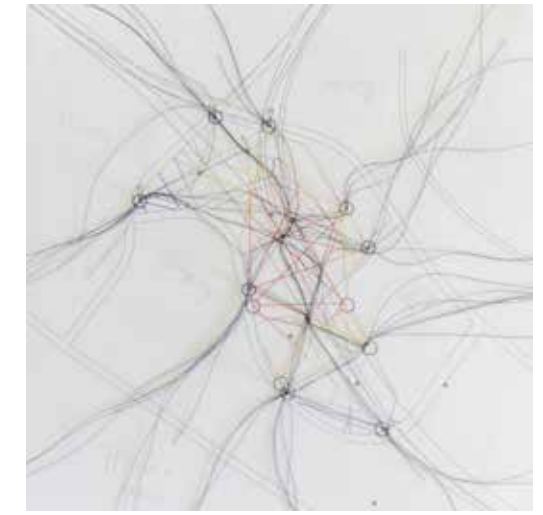
Possible entrance points to the site are identified, which can continue to function as the focal point of the radial motion identified in the study of Choa Chu Kang Columbarium. At each entrance point an axis is drawn, with radial paths descending from it in the same fashion as in the Columbarium.



Space syntax analysis

The result is an intricate network of criss-crossing paths originating from certain entrance points. A Space Syntax analysis of the proposed paths show that the integration level of the paths in the middle of the site is the highest, hence the ones that would be used the most.

Centralized bundling in model. Drawing inspiration from Otto Frei's bundling experiments were conducted to simplify the paths and concentrate them toward the rails. (Frei, 2010)



Radial bundling



Simplified Paths

Bundling experiments simplified and finalized for implementation into model.t

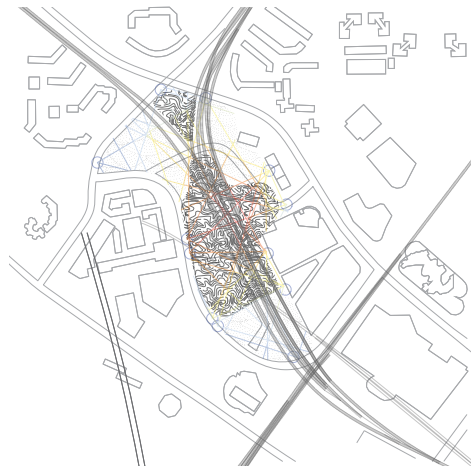
A note about Otto Frei

These experiments do not exactly recreate the bundling experiments of Otto Frei, but are somewhat modified to adapt to the system of paths and intensity implemented from the prototype. Threads are drawn across the site in accordance to the radial axes. Where the lines from the Space Syntax analysis are red would be where most people would move. This system works on the premise that closeness between curves generate more movement, hence more bundling. The bundles are concentrated toward the existing rails, drawing paths that would lead into the structure.

3.2 BASE ORGANISATIONAL SYSTEM

3.2.2 Contextual interlace - radial bundling

Applying the System of Encompassed vastness based on the circulatory conditions of the site.



Different qualities on site

By tracing the red and blue outlines in the Space Syntax analysis it is possible to identify which areas would need to be more intense, and which would allow for a more calm environment.



Implementing new rails

Following the mapping of which areas would need more permeable qualities the additional rails are added. In accordance to the designed system of voids-rails-connections the new rails are drawn tighter together where the permeability needs to be higher, and are allowed to swell into quiet voids where less circulatory possibility is needed.



Bundled paths

Addition of the bundled paths on the sides. The bundles are separated toward the edge of the structure, as any intersecting curves disrupt the integrity of the voids.

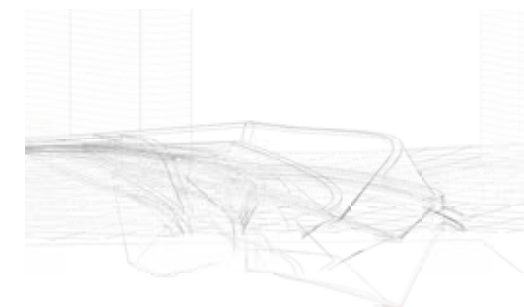
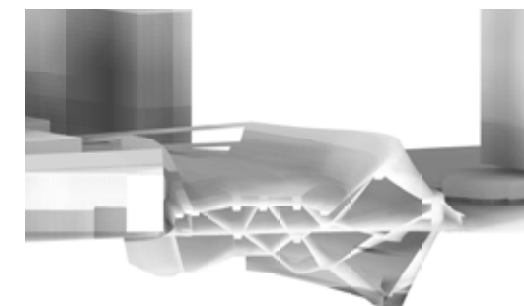
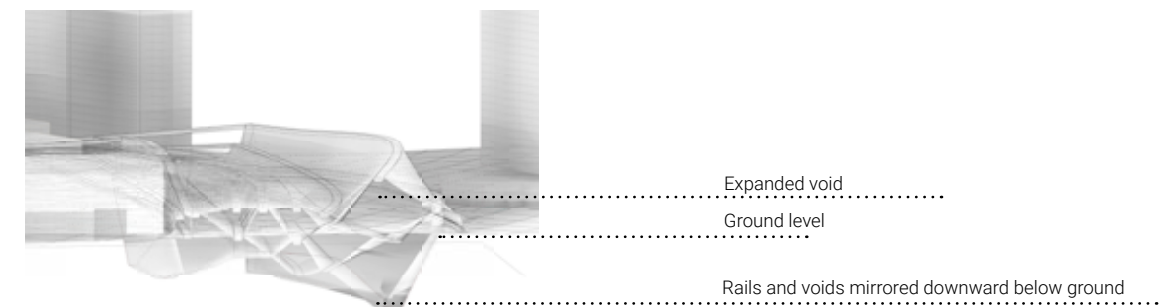


Final configuratin of bundles and rails

To finalize the merging of the structure to the ground, a few extra curves are drawn between the more intensely populated rails and the bundled paths. The bundles create a network on the ground outside the structure, connecting to the surrounding fabric, while the hybridized curves are lofted and subsplit, leading into the structure. They emanate from one specific point in the same manner as the columbarium.

Extension below ground

Tracks mirrored downward to mirror the above ground space. Space extends below ground to make room for the underground connecting high speed rail. Contradictory to make a ditch in order to connect two sides of a site, but adding the structure adds shade and connections when before there were none.



3.2 BASE ORGANISATIONAL SYSTEM

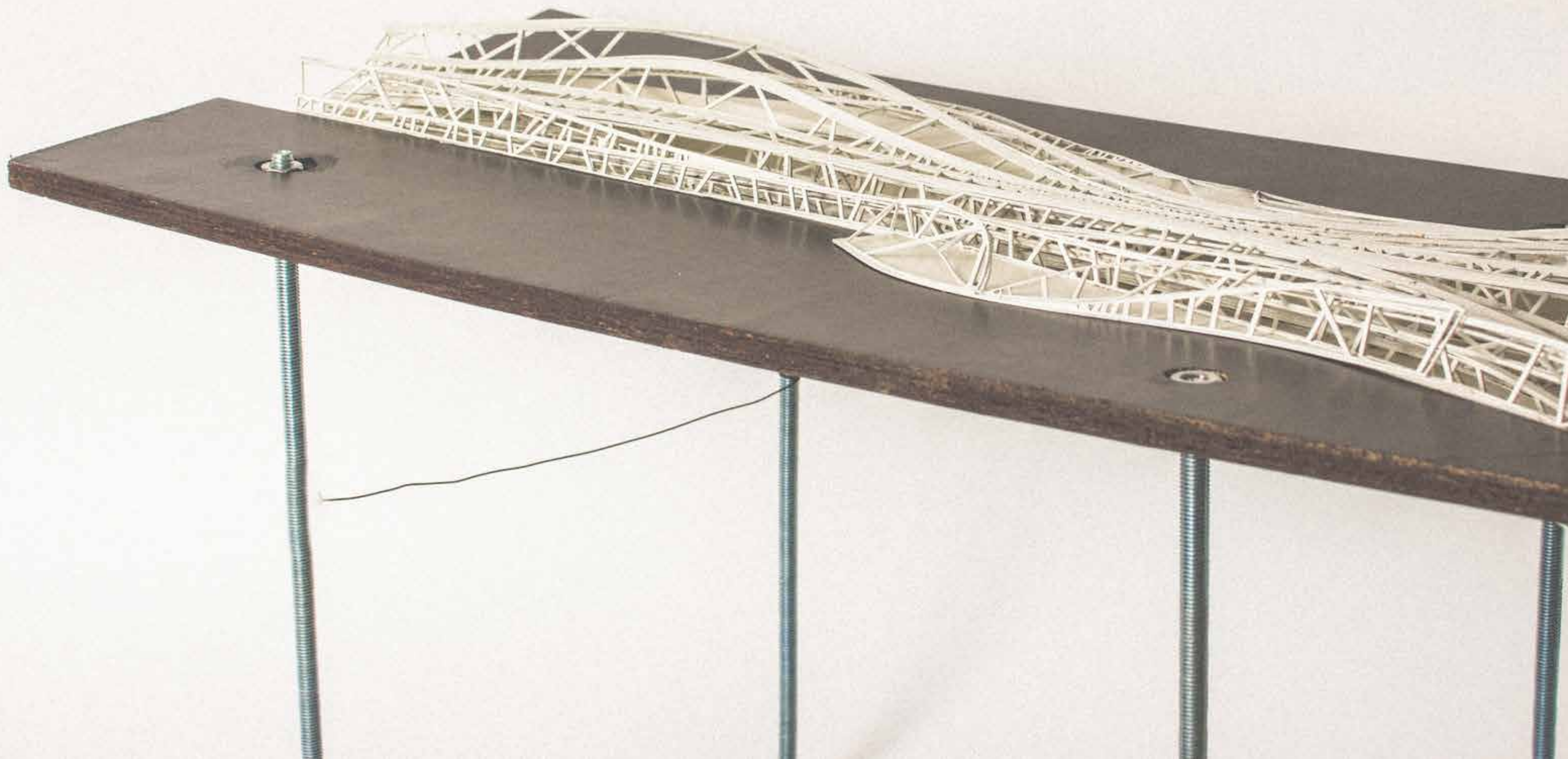
3.2.3 Outcome



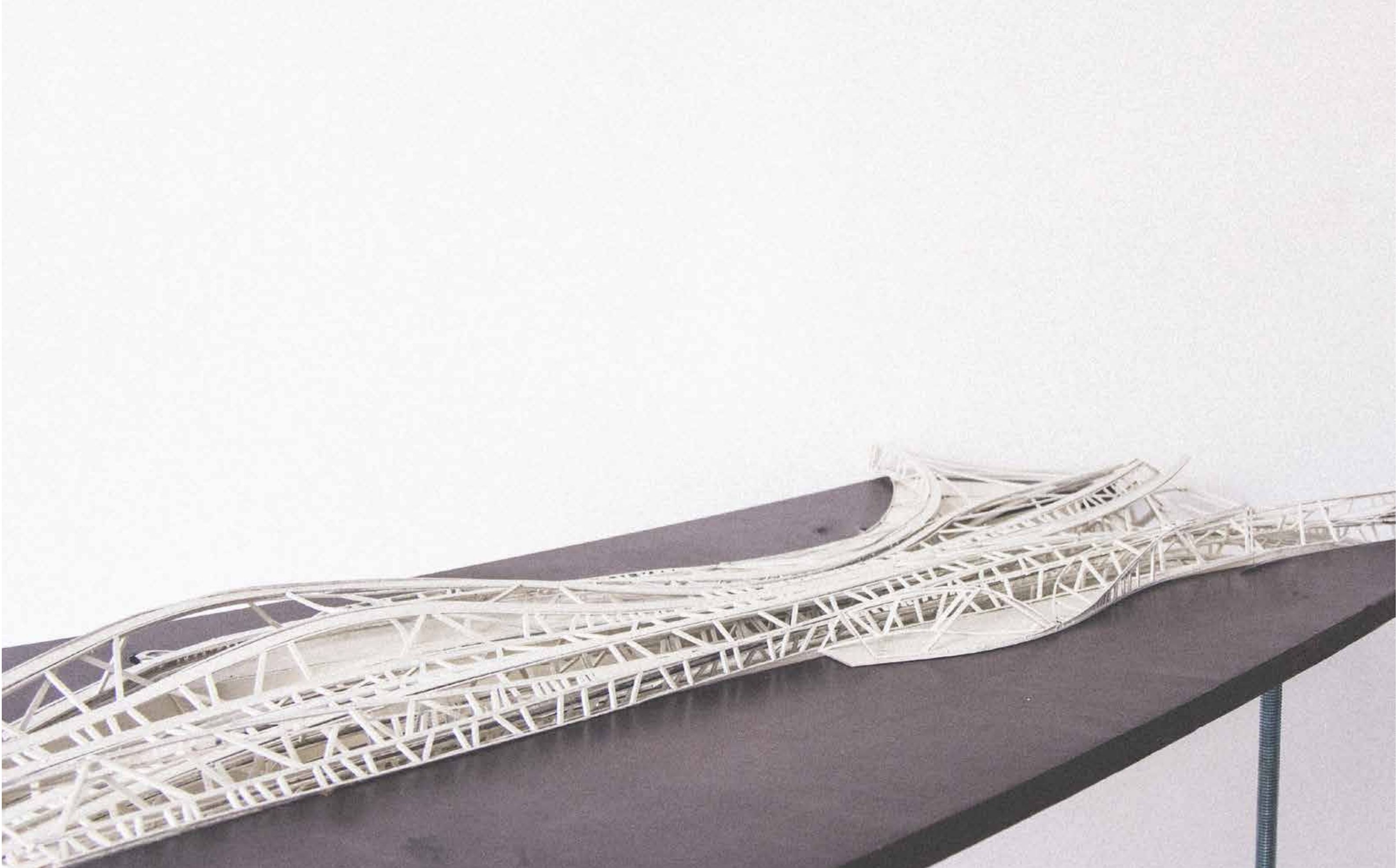
3.2 BASE ORGANISATIONAL SYSTEM

3.2.3 Outcome









4. SPATIAL DETAILING

- 4.1 Spatial detailing
 - 4.1.1 Precedence
 - 4.1.2 Imaginary surfaces
 - 4.1.3 Programmatic gradient

- 4.2 The slow regard of silent things

4.1 SPATIAL DETAILING

4.1.1 Precedence



PALEY POCKET PARK, ROBERT ZION (1967)

Creating a small pocket of stillness in a busy urban setting, just by turning a corner.

(Untapped cities. 2011)



IGUALADA CEMETERY, ENRIC MIRALLES (1994)

A new type of cemetery that blends into the landscape as part of it. Designed as a tiered landscape that unfolds into it as a single fluid progression. Graves arranged as niches on an inclined wall.

(Archdaily. 2017)



VIETNAM MEMORIAL, MAYA LIN (1982)

Memorial on a grander scale. Not hosting actual graves, but shaping the landscape as a part of the remembrance.

(500 random artworks 2017)

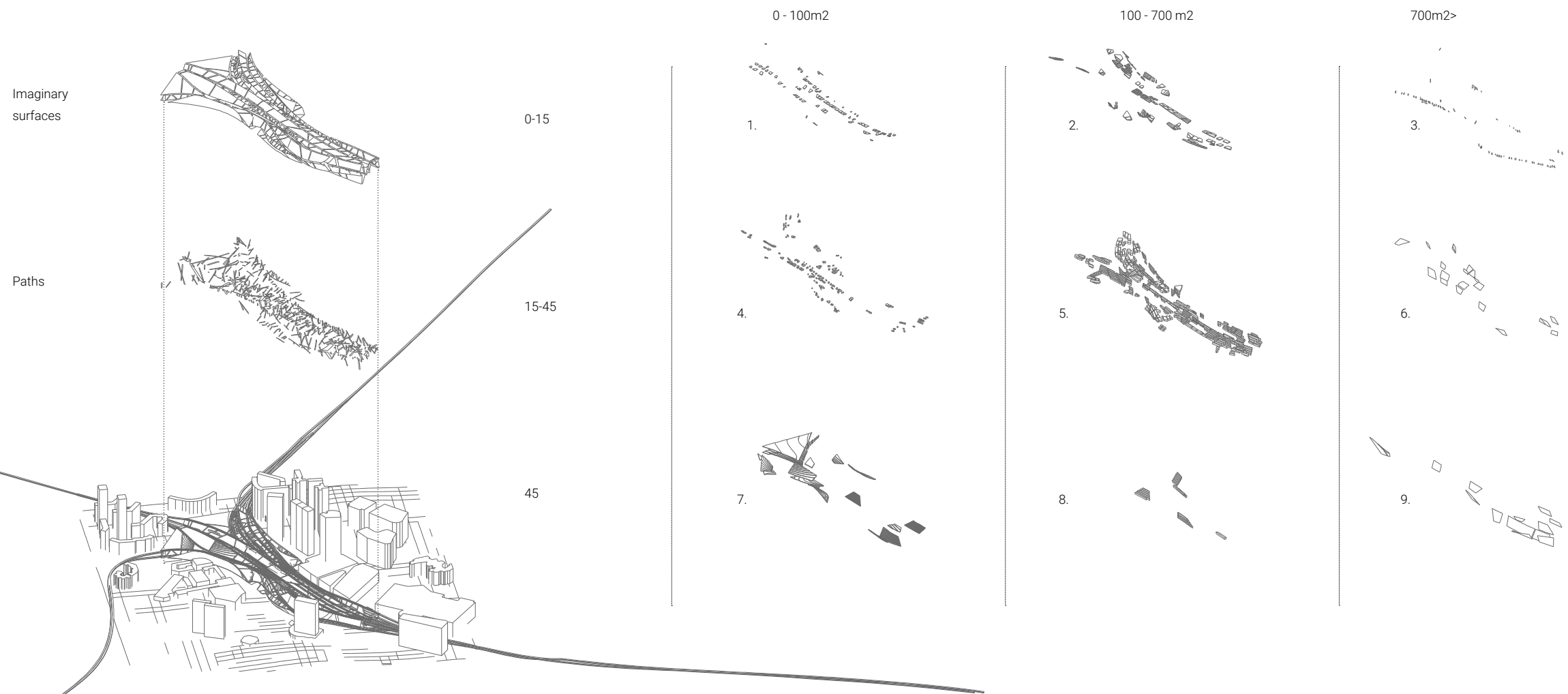


4.1 SPATIAL DETAILING

4.1.2 Imaginary surfaces

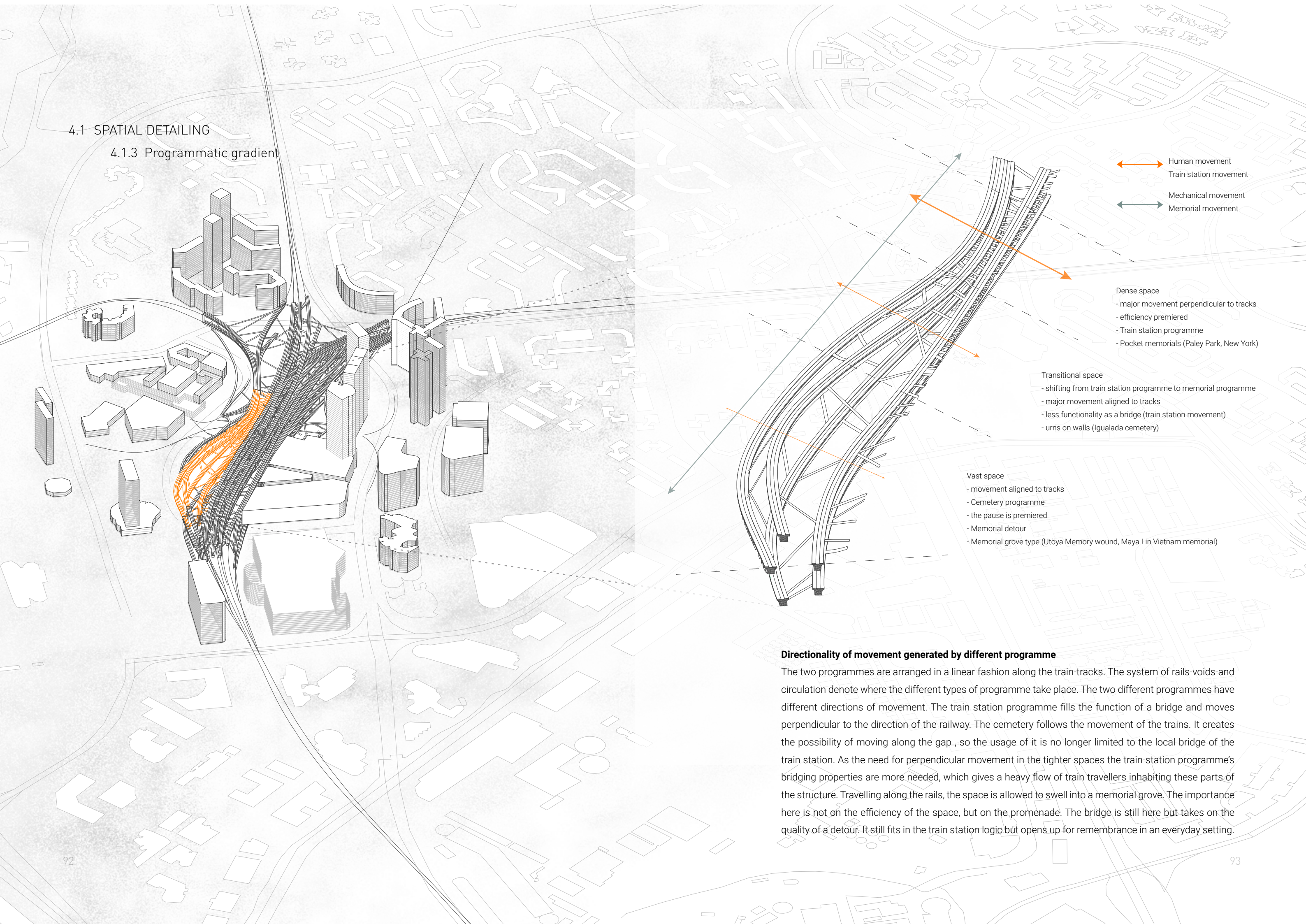
Imaginary surfaces

The way the rails swirl and swell, between themselves they define an invisible surface. This surface is cracked by the connections, resulting in a number of individually unique surfaces, or shards. The size and inclination of the shards are a direct result of the distance between the tracks. Therefore, by sorting the shards by size and inclination, it is possible to distribute the different programmes to the shard based on how they are sorted. This results in a flowing gradient of programmes aligned along the rails depicted by The System of Encompassed Vastness, smoothly flowing into each other.



4.1 SPATIAL DETAILING

4.1.3 Programmatic gradient



- Human movement
- Train station movement
- Mechanical movement
- Memorial movement

- Dense space
- major movement perpendicular to tracks
 - efficiency premiered
 - Train station programme
 - Pocket memorials (Paley Park, New York)

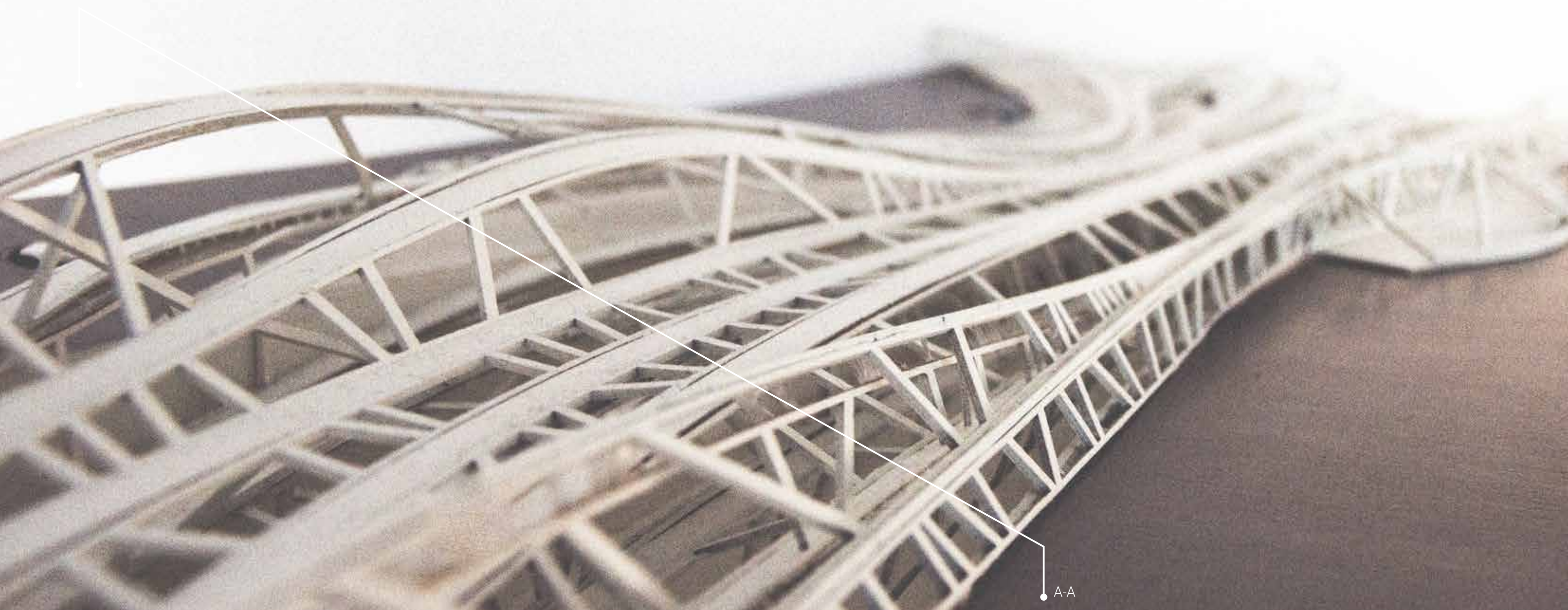
- Transitional space
- shifting from train station programme to memorial programme
 - major movement aligned to tracks
 - less functionality as a bridge (train station movement)
 - urns on walls (Igalada cemetery)

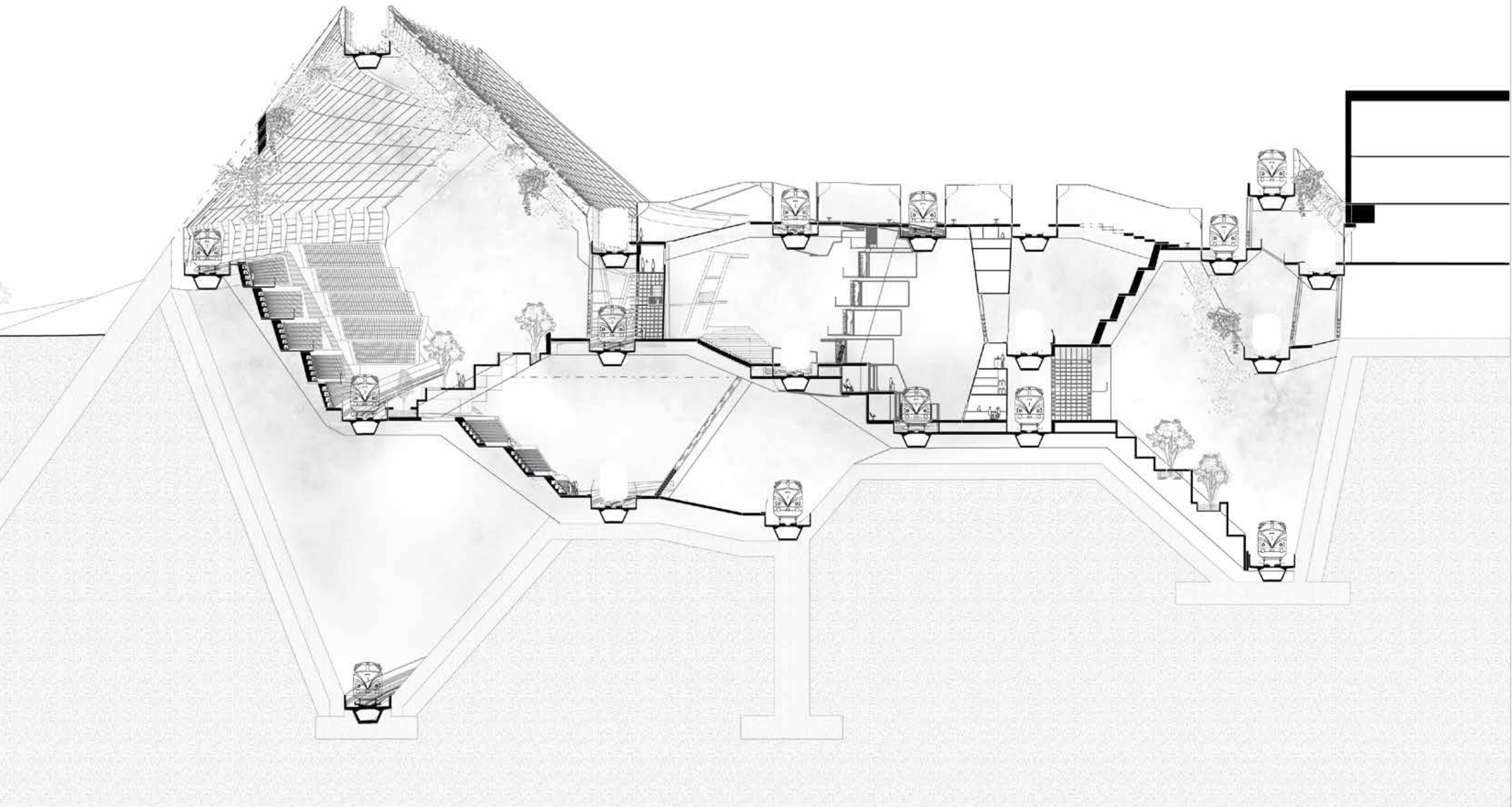
- Vast space
- movement aligned to tracks
 - Cemetery programme
 - the pause is premiered
 - Memorial detour
 - Memorial grove type (Utøya Memory wound, Maya Lin Vietnam memorial)

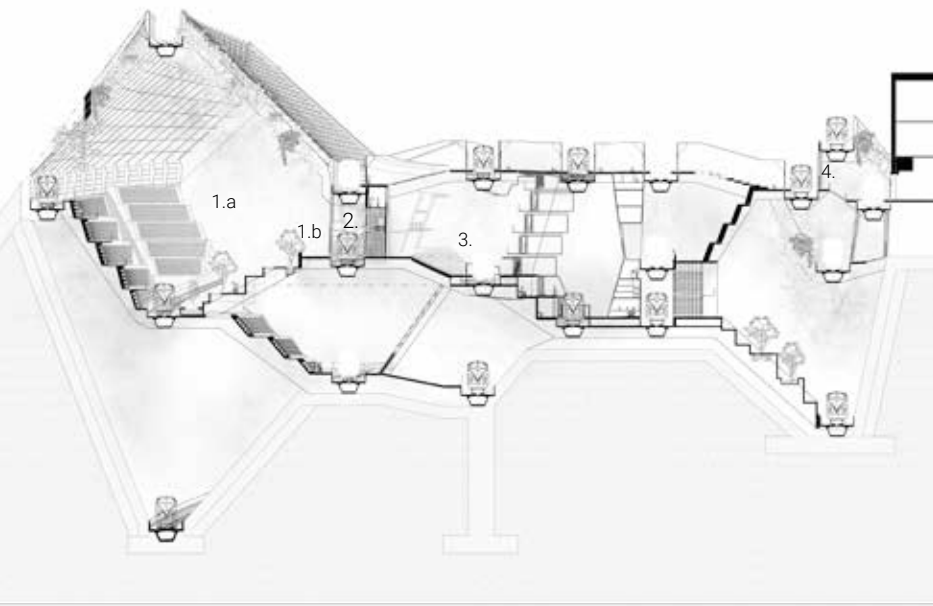
Directionality of movement generated by different programme

The two programmes are arranged in a linear fashion along the train-tracks. The system of rails-voids-and circulation denote where the different types of programme take place. The two different programmes have different directions of movement. The train station programme fills the function of a bridge and moves perpendicular to the direction of the railway. The cemetery follows the movement of the trains. It creates the possibility of moving along the gap, so the usage of it is no longer limited to the local bridge of the train station. As the need for perpendicular movement in the tighter spaces the train-station programme's bridging properties are more needed, which gives a heavy flow of train travellers inhabiting these parts of the structure. Travelling along the rails, the space is allowed to swell into a memorial grove. The importance here is not on the efficiency of the space, but on the promenade. The bridge is still here but takes on the quality of a detour. It still fits in the train station logic but opens up for remembrance in an everyday setting.

4.2 THE SLOW REGARD OF SILENT THINGS

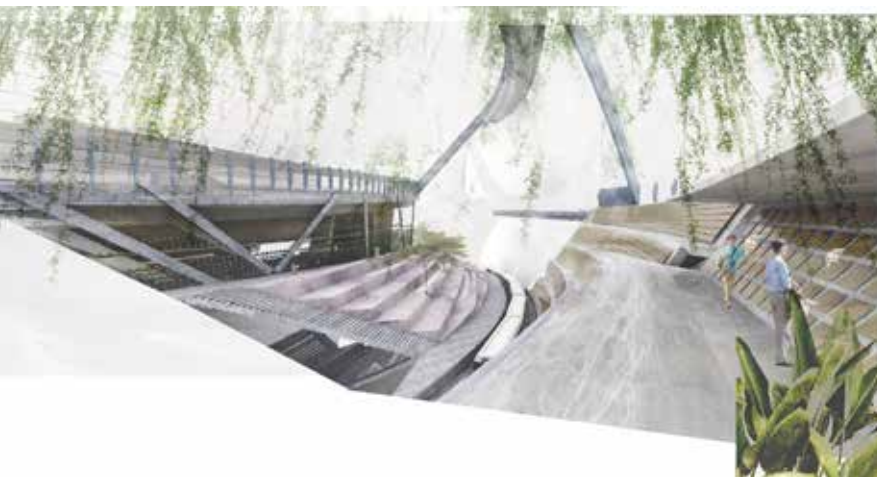






2. Tempietto Train

- "Accidental" space generated by the distribution of rails.
- Tunnel created between shelves and pocket-park tempietto
- Train exuding noise and movement and heat, starkly contrasting the stillness of the urns.

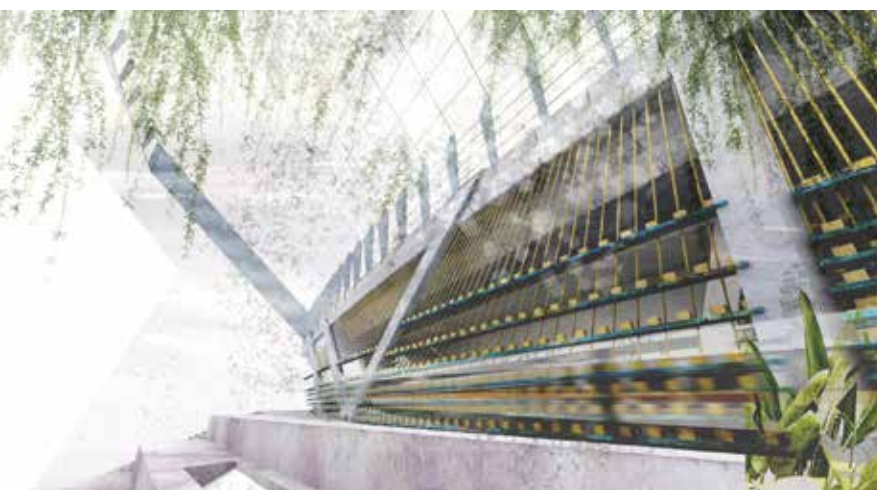
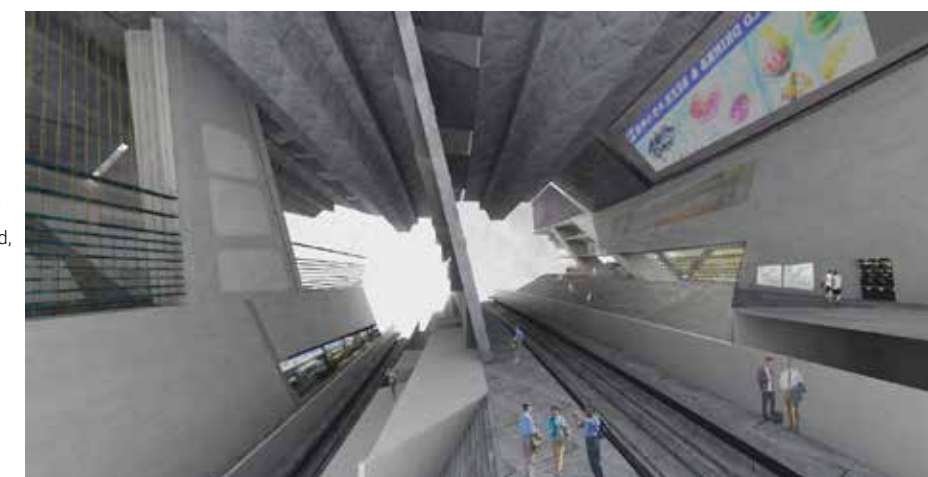


1a. Memorial garden

- Large, airy.
- Igualada-cemetery inspired urn-stairs.
- Large and quiet but swells with the noise of a passing train.
- Train flows through space like a river
- Flatter stairs function as a Memorial stair
- Shaded by plants and pergola, no glass because of heating problem
- Monsoons flow through the space, collected at the bottom layers of structure

3. Two fast spaces

- -Starkly different in contrast from the memorial gardens. They contain more people, train stops, food stalls, reminiscing of the Hawker centers characteristic for Singapore.
- -Darker than the memorial space, full protection against the sun is provided, but natural light is allowed to seep in through the platforms above.

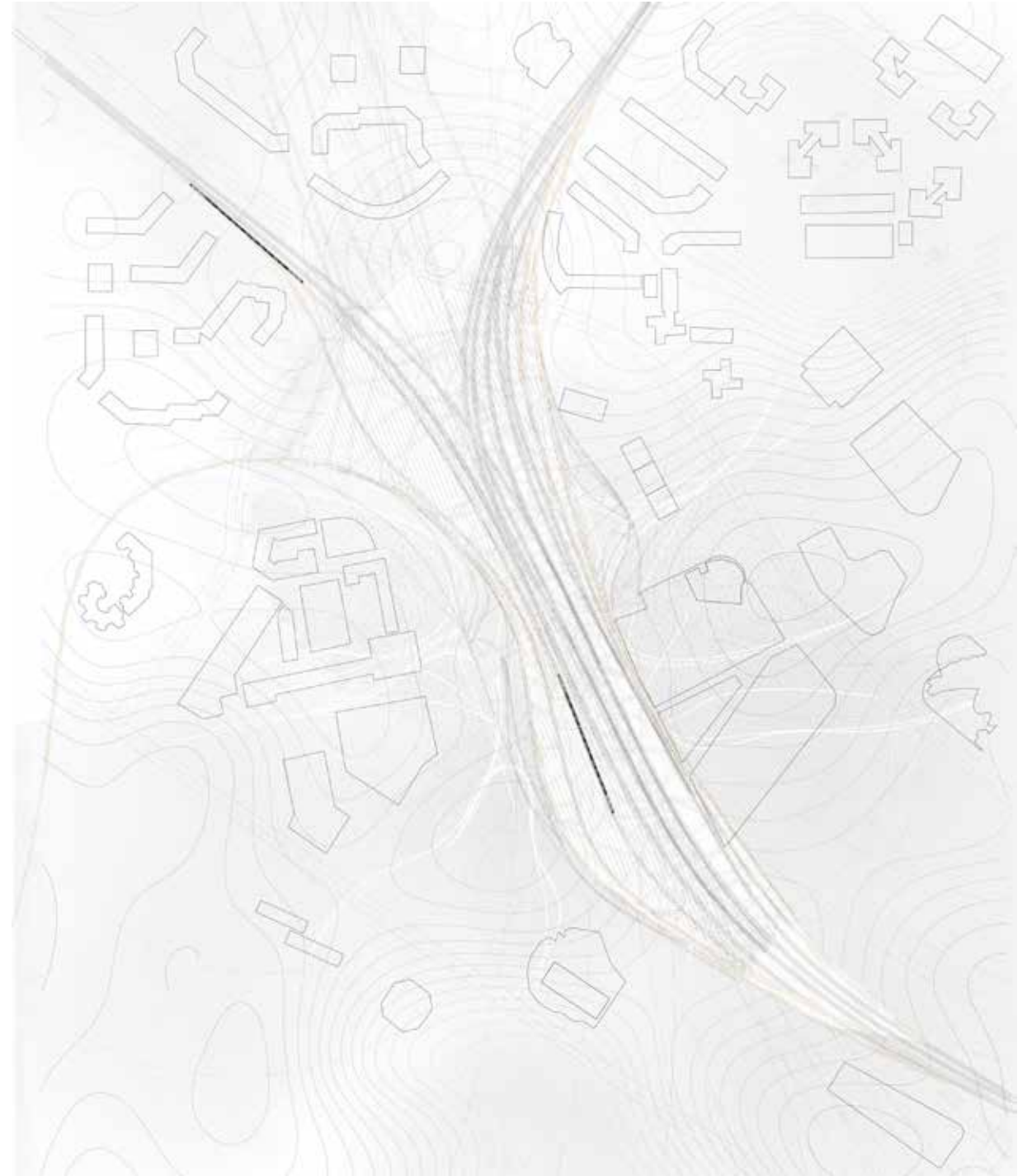


1b. Memorial garden

- Passing trains force a pause in pedestrian activity with the noise and heat
- The pause embodies the sense of derailment from losing a loved one
- Shelves of urns separating the memorial garden from the next space
- Semi-permeable visual connection to the next space

4. Layering - Columbarium and Train platform





Resulting plan - increased number of connections where site circulation needs to be heavier.

5. SUMMARY AND CONCLUSION

5. SUMMARY AND CONCLUSION

Today we have a problem with land starvation in our cities. It's not only difficult for the living to find somewhere to stay, but cities like Hong Kong and Singapore struggle with a lack of space for the keeping of our dead. Juxtaposed to this lack of space we find the railway, claiming large amounts of space only temporarily inhabited by actual mass and consequentially defining a gap and a barrier in the urban fabric. This thesis asks the question; By combining the programmes of a trainstation and a columbarium, is it possible to simultaneously bridge the gap in the urban fabric that is the railway and solve the question of where to house our dead?

General design

- What I propose is a combined railway station and a columbarium. It is placed at the MRT stop in Jurong East, Singapore, extruding above and below ground as a natural part of the landscape. It exists in the infrastructural void already defined by the existing railway, integrating the existing tracks into the system.
- The combination of programmes not only rational, but also based on the train station's inherent symbolism. Starting and stopping, continuing, etc.
- The interior spaces are shaped by a simple yet complex system of voids, train tracks and pedestrian connections between. As the train curves converge, more connections are created between them.

- This results in a gradient of spaces along the tracks. Train tracks curve in the air, defining large swelling voids for memorials and more focused hallways where there would need to be more pedestrian permeability and stops for the trains. Each track helps define a specific void that reaches all along the curve, but the distance between the tracks categorizes what type of space it is.
- Dominated by parallel or aligned movement depending on tracks
- The Japanese concept of Ma describe a gap as the empty space between two instances of matter and describes matter as an intensification of visual stimuli. It is a pause, the silence between two notes, a discontinuity. This is interpreted in this thesis as both the gap in the urban fabric and the emotional, the sense of discontinuity caused by the sudden void left by a loved one. Like walking a stair in the dark thinking there is one more step than it is, and there's this sickly moment when you try to readjust to the way things are.
- The filling of the gap, "the intensification of stimuli" is life and people, which I find a comforting thought in the context of loss. Like the Wolffe poem, the gap is filled with the "Immense and distant sound of time", the rhythm and pulse of life as the sound of

a tide. The more bridging qualities needed, the more connections are created, the more sounds of life. And where not as many bridges are needed, the voids are allowed to swell in silence and provide room for grief.

Train station meet Columbarium

One of the main questions of the thesis is how the programmes of the train station and the columbarium meet. It focuses on the spatial qualities and the tension of juxtaposing the two different programmes. The answer is that the layering of the programmes is inherent in the system of train tracks, curves and connections. The voids are separated by invisible surfaces reaching between the tracks. They are split by the paths going between the rails, fracturing what would otherwise be one long continuous surface. These fragments of void are sorted by inclination and size, determining the spatial detailing of the space and describing how the voids relate to each other perpendicularly to the tracks. Largely speaking, small surfaces depict train station functions like foodstalls, ticket booths, luggage rooms and toilets. Larger surfaces mean larger spaces, giving them a memorial-esque quality. Because the invisible surfaces twist and swell gradually there is no clear border between the different programmes. This gives some surprising moments of tension, like an urn stair in an otherwise dense train space.

- Memorial garden. Large, airy space,

dominated by Igualada cemetery stair-style walls of urns on the steeper sides. The way the surfaces are split into stairs turn the urns into a landscape of sorts. Large and quiet, it swells with the noise of trains passing by. Sound of trains become like a tide, periodically filling the space and taking over, forcing a pause in pedestrian activity. At the bottom of the space there is a train track without platform, so it doesn't stop but just flows through the space like the river at the bottom of a valley. On the surfaces leading onwards into the structure is a flatter stair space, what I call a Memorial stair. There are no urns but functions more as a park where you can sit and contemplate the unreachable urns on the other side, or just relax and enjoy the space. The space is filled with greenery in the Singaporean style of growing plants on the buildings. Upwardly the void is defined by a pergola-style grid without glass to avoid heating, following the edges of the surfaces and emphasizing the shape of the fragment. Elements on the side of the rail holds up the wires and work as rhythm markers of the space, denser on short fragments. The plants could even function as an actual memorial grove, where plants could be grown in the actual urns. Plants offer shade, giving the space a dappled lighting situation. On the side another train passes, offering the passengers a view either out over the city, or into the memorial garden through the

plats hanging from the roof. On top of the space passengers are offered views over the landscape of the structure. Blocking the light falling into the space as it passes, shaking everything. As it rains the water would fall between the plants, dripping of the leaves and fall onto the urns and stairs.

- At the end of the space is a medium sized, vertical shard. It is inhabited by more wires marking the shape of the shard in the same way as the roof grid. It has shelves containing the urns in boxes, creating a semi-permeable visual connection into the next space. On the other side is a small void fragment containing Train station programmes. Here's actually an interesting space, depending on proximity to the memorial spaces, the small fragments can contain pocket park-style like small tempiettos, providing a pocket of calmness. So this small tempietto over here and the shelves create a tunnel for the train passing through. The trains have the same pause-forcing qualities here as in the memorial garden, exuding noise and movement and heat, starkly contrasting the stillness of the urns.
- On the other side of the tempietto you find two fast spaces, starkly different in contrast from the memorial gardens. They contain more people, train stops, food stalls, reminiscing of the Hawker centres

characteristic for Singapore. Darker than the memorial space, full protection against the sun is provided, but natural light is allowed to seep in through the platforms above.

- Platforms above function spatially a bit in the same style as the memorial garden, but with TP focus instead. See through glass doors separating train tracks from people.
- The water from the memorial garden would fall down into the next space, collected in the glistening dark walls of the space below. Nothing going on here, designed to be just void filled with the echoing noise of a train passing by. Beheld from above. Train passenger passing through a glistening darkness lit from above.
- The space adjacent to it is stern in character, sparsely lit and more resembling a traditional columbarium. The urn stairs shape a landscape, giving view through another set of urn shelves into the next void.
- Another tempietto pocket park is found over on the other side, looking over a different memorial garden. Only one stair descending, lit from above through grids of plats. Small, bright void over to the left, transparent and filled with shelves. Connects to the buildings adjacent to the structure. Permeable architecture.

Ultimately, it is a design proposal for different speeds. Transitions, stops, beginnings, farewells, greetings. The flighty, flickering movement of humans and the slow, unstoppable rolling of a train. Tomas Wolfe describes the phenomenon in his poem "The railroad station" as "the sound of time". One passage describes the railway station as

"At the beginning or end
Of their innumerable journeys
Here one saw greetings and farewells
Here, in a single instant,
One got the entire picture of the human destiny"

The project functions on two scales, the small within the large, tied together by the system of voids, rails, invisible surfaces and paths. The columbarium trainstation functions as a bridge, both for commuting and as a shelter from the climate barrier tying two sides of a gap together and corresponding to a context. Where the movement across the site is heavier more connections are called for, hence a "pinching" of the curves. As a result, the interior spaces are directly corresponding to the surrounding context. At first glance it might look like a barrier, but connections sneaking into the surrounding urban areas lead pedestrians and cyclists into the structure, where a network of paths and rails offer shade and comfort where before there was none.

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